Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 6 (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Effectiveness Of Nerve Gliding Technique And Upper Limb Mobility Exercise On Individuals With Mouse Arm Syndrome

Mukesh Raghothaman[1], Shanmugananth Elayaperumal[*2], Arun Jenikkin[3], Yogiswari Gunasekaran[4]

[1]Research Scholar in Physiotherapy, Sri Balaji Vidyapeeth (Deemed to Be a university), Puducherry.

[*2]Professor and Principal, School of Physiotherapy, Sri Balaji Vidyapeeth (Deemed to Be a university), Puducherry

[3]Assistant Professor, School of Physiotherapy, Sri Balaji Vidyapeeth (Deemed to Be a university), Puducherry.

[4]Research Scholar in Physiotherapy, School of Physiotherapy, Sri Balaji Vidyapeeth (Deemed to Be a university), Puducherry.

***Corresponding Author:**

Shanmugananth Elayaperumal

Professor and Principal, School of Physiotherapy, Sri Balaji Vidyapeeth (Deemed to Be a university), Puducherry

Email ID: shankutty1981@gmail.com

Cite this paper as: Mukesh Raghothaman1, Shanmugananth Elayaperumal, Arun Jenikkin, Yogiswari Gunasekaran, (2025) Effectiveness Of Nerve Gliding Technique And Upper Limb Mobility Exercise On Individuals With Mouse Arm Syndrome. *Journal of Neonatal Surgery*, 14 (6), 76-83.

ABSTRACT

Background: The words "Mouse Arm Syndrome" and "Mouse Arm," in colloquial usage, have evolved to refer to the most prevalent pains, discomforts, and hand, arm, and shoulder issues that computer workers encounter, which are exacerbated or brought on by prolonged use of computer mice. Strangely enough, several western societies continue to debate the problem of repetitive motions and static muscular tension as potential causes of repetitive stress injury (RSI). It has been demonstrated that dragging tasks with a mouse raise carpal tunnel pressure by around 67% when compared to resting posture. Mouse arm syndrome manifests as a stiff wrist, pain, tingling, and burning. It happens when extensive periods of time are spent doing repetitive, continuous movements. This results in microscopic wounds, or microtraumas, which accumulate over time to create a syndrome that can severely limit people who are impacted.

Material and methods : This was an Quasi experimental study. The sample consisted of 20 participants with mouse arm syndrome including both male and female, participated in the study. The grip strength and upper limb mobility were assessed by dynamometer and DASH questionnaire respectively. The pre and post test was done and data was recorded.

Resullt : Since p value is less than 0.05 it is significant So we reject the null hypothesis and accept the alternate hypothesis that nerve gliding technique and upper limb mobility ecercise produce a significant effect on grip strength and upper limb mobility among mouse arm syndrome.

Conclusion: This study results indicating that there is a significant change in participants with mouse arm syndrome.

Keywords: *Mouse arm syndrome, nerve gliding technique, upper limb mobility and hand grip strength, DASH Questionnaire, Dynamometer.*

1. INTRODUCTION

An umbrella name describing pain and discomfort in the affected shoulder and arm brought on by (over)use of a computer mouse is "Mouse Arm," also known as "Mouse Shoulder" or "Mouse Arm Syndrome." Your working shoulder is most likely internally rotated, your forearm is outstretched, and your wrist and fingers are continuously used to grasp and move the mouse pointer to the desired location. The rhomboids and levator scapulae, two muscles in the neck and back that we don't usually consider to be engaged, are all triggered. These muscles become overstretched when used repeatedly, regardless of how little you move them. Mouse arm is a condition where tension causes pain in the forearm, shoulder, and possibly neck over time. Computer use has become a necessary aspect of daily life in the modern period, both personally and professionally. A greater dependence on digital devices has resulted from the quick development of technology, especially for online communication, gaming, and professional work. Computer use has become a necessary aspect of daily life in the modern

period, both personally and professionally. A greater dependence on digital devices has resulted from the quick development of technology, especially for online communication, gaming, and professional work[1.]

Mouse Arm Syndrome is one of the most common musculoskeletal problems brought on by extended and repetitive computer use. This ailment, which is also known as a type of repetitive strain injury (RSI), is brought on by constant strain on the hand, wrist, forearm, and shoulder muscles, tendons, and nerves. It is primarily brought on by extended and inappropriate computer mouse use[1]. The symptoms of mouse arm syndrome include numbness, tingling, discomfort, stiffness, and even a loss of strength in the afflicted areas. Over time, these symptoms arise as a result of excessive clicking actions, extended static postures, and recurrent microtraumas. Inadequate breaks, incorrect hand placement, and poor workstation ergonomics frequently make the problem worse. Mouse Arm Syndrome is having an increasingly noticeable effect on productivity, quality of life, and general well-being as the digital workplace grows. According to research, millions of people worldwide suffer from RSI in some capacity as a result of using computers, underscoring the critical need for awareness, prevention, and intervention measures[1].

Nerve gliding, or nerve flossing, consists of exercises that stretch and mobilize nerves to decrease inflammation and enhance range of motion. These methods allow for easy movement of the nerves, freeing stuck, compressed, or damaged nerves. Nerve flossing involves tensioning the nerve at one end and relaxing it at the other, reversing the tension to move the nerve[2]. These exercises are helpful in enhancing mobility and alleviating some forms of pain in both the upper and lower limbs.

Upper limb mobility exercises are designed to preserve hand dexterity and arm strength, avoiding secondary complications of swelling and contractures. In the upper extremities, mobility involves the shoulder, elbow, and wrist, and is how much a joint can move within its full range. These exercises can be focused on individual nerves, such as the median nerve, to promote mobility. Preserving posture and shoulder mobility are also essential aspects of these exercises[23].

Hand grip strength is generally determined with a hand dynamometer, a measuring instrument used to measure quantitatively an individual's capacity to exert their forearm and hand muscles. Dynamometers are concrete data sources that provide information to training status and can reliably measure grip strength. Dynamometers are utilized in sports, strength training, and sports such as baseball, tennis, and rock climbing to examine and train hand grip strength. Electronic hand dynamometers provide accurate measurements in increments of small size[24].

The Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire is a 30-item, self-report measure that quantifies physical function and symptoms in people with upper-limb musculoskeletal disorders. It evaluates the effect of an impairment on the level and nature of disability, with a score from 0 (no disability) to 100 (extreme disability). The DASH questionnaire is often employed to measure self-reported patient outcomes in orthopedics, rheumatology, and neurology. A DASH score cannot be calculated if more than 3 items are missing[25].

2. SUBJECTS AND METHODS

The present study follows a quasi-experimental design with a convenient sampling method. The study population consists of individuals diagnosed with mouse arm syndrome, with a total sample size of 20 participants. These participants are allocated into two groups: Group A (n=10), receiving the nerve gliding technique, and Group B (n=10), undergoing upper limb mobility exercises. The study is conducted at Mahatma Medical College and Hospital, Puducherry. The treatment duration for participants is set at six weeks, while the overall study duration spans six months. **Selection criteria:** All the participants were included with pre-defined inclusion and exclusion criteria in the present study, with clinical diagnosis of mouse arm syndrome. **Inclusion criteria** - The inclusion criteria for this study consist of IT workers who have a minimum of three years of work experience and work more than eight hours a day. Both male and female individuals are eligible to participate. Additionally, participants must be between the ages of 25 and 35 years. **Exclusion criteria** - Individuals who have fewer work hours, hand deformities, spinal nerve impingement, neurological conditions, cardiological conditions, or fractures within the past six months are excluded.

3. MATERIALS AND METHODS

A total of 10 participants with mouse arm syndrome were satisfied the selection criteria and they were included. After obtaining the consent from the legally authorized representative (LAR)of the participant and the participant information sheet (PIS) was also explained to the LAR. The baseline data such as age, gender, demographic data and inlusion criteria components such as participants who are clinically diagnosed with mouse arm syndrome with reduced hand grip and upper limb activity. The pre-test of hand grip strength and upper limb mobility were assessed with dynamometer and DASH questionnaire. Then the participants were divided into two groups using odd or even method. Participants in group A(n=10) received nerve gliding technique and participants in group B(n=10) received upper limb mobility exercise. All the exercise were performed for a period of 6 weeks. The executive functions and upper limb mobility was reassessed after 6 weeks intervention and the scores were documented. Results were compared and analysed statistically.

OUTCOME MEASURES PROCEDURE:

1. **DYNAMOMETER:** The Hand grip strength of the participants with mouse arm syndrome were assessed using dynamometer The dynamometer records the maximum force applied when a person squeezes the handle with maximal force. Typically, strength is expressed in pounds (lbs) or kilograms (kg). To get a precise evaluation, several trials are carried out.
2. **DASH questionnaire:**

The upper limb mobility of the participants with mouse arm syndrome were assessed using DASH questionnaire. This questionnaire has 30 items each with grade of 0 to 5. This questionnaire asks about your symptoms as well as your ability to perform certain activities. A DASH score may not be calculated if there are greater than 3 missing items.

4. TREATMENT PROCEDURE

NERVE GLIDING TECHNIQUE:

Nerve gliding exercise are a type of physical therapy movement designed to gently stretch and mobilize nerves by encouraging them to glide smoothly through the surrounding tissues.

Exercises:

- Hand and wrist glide
- Finder stretches
- Median nerve stretch
- Median nerve slider

Upper Limb Mobility Exercise:

- Shoulder shrugs
- Shoulder circles
- Shoulder abduction
- Shoulder flexion
- Breast stroke
- Boxing
- Elbow bends
- Wrist bends
- Making a fist

5. DATA ANALYSIS AND RESULT

The values has been generated via SPSS 25 software Since p value is less than 0.05 it is significant So we reject the null hypothesis and accept the alternate hypothesis that nerve gliding technique and upper limb mobility ecercise produce a significant effect on grip strength and upper limb mobility among mouse arm syndrome.

TABLE-1: DEMOGRAPHIC DATA OF AGE AND GENDER

Statistics			
		Age	Gender
N	Valid	20	20
	Missing	0	0
Mean		29.95	1.40
Std. Deviation		3.103	0.503

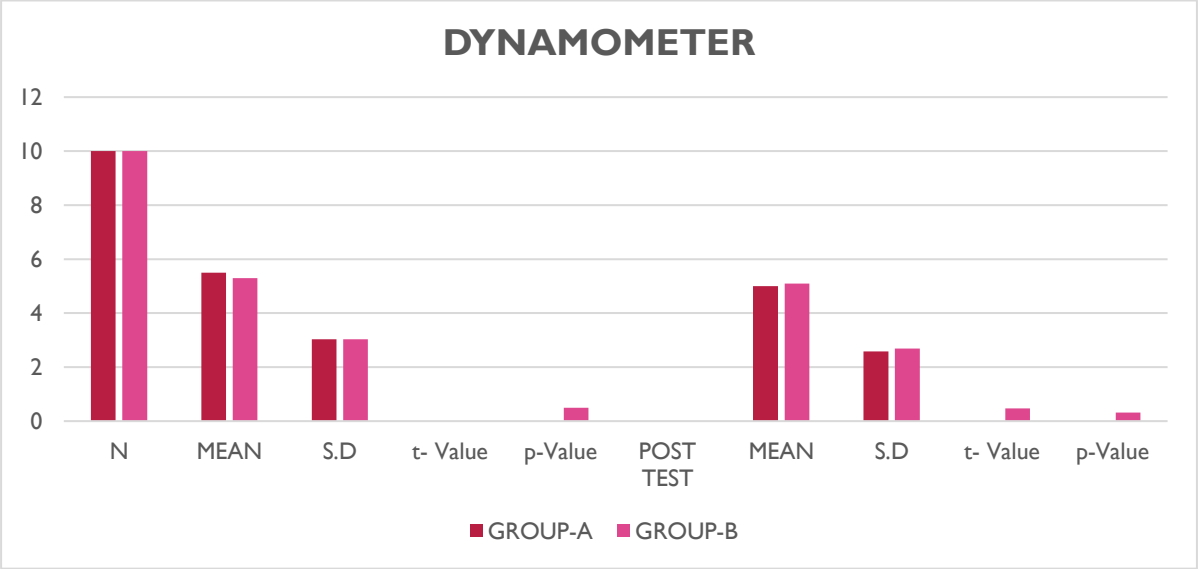
This table shows the demographic data of age and gender among participants

TABLE-2: INTER GROUP PRE-TEST AND POST TEST COMPARISON OF DYNAMOMETER (BETWEEN GROUP-A AND GROUP-B):

This table says that the Pre Test For Group-A&B says The *t*-value is 0.08624. The *p*-value is 0.466116. The result is *not* significant at $p < .05$ and the Post Test For Group-A&B says The *t*-value is -0.32147. The *p*-value is .37578. The result is *not* significant at $p < .05$.

SL.NO	PRE TEST	N	MEAN	S.D	t-Value	p-Value	POST TEST	MEAN	S.D	t-Value	p-Value
1.	GROUP-A	10	5.10	3.028	0.08624	0.466116	GROUP-A	5.50	3.128	-0.32147	0.37578
2.	GROUP-B	10	5.50	2.781			GROUP-B	5.60	2.875		

GRAPH-1:



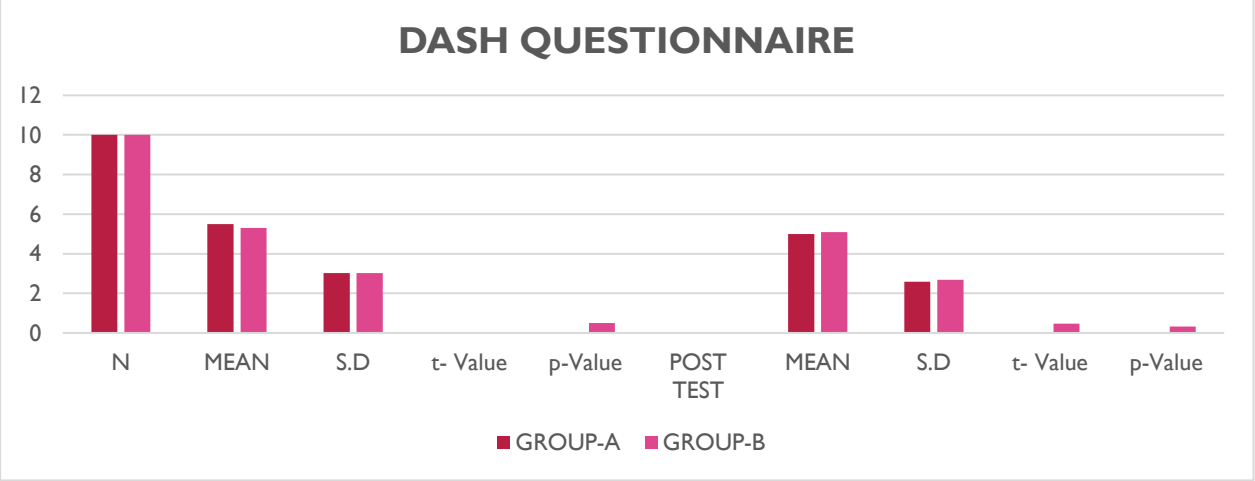
This Graph says that the Pre Test For Group-A&B says The *t*-value is 0.08624. The *p*-value is 0.466116. The result is *not* significant at $p < .05$ and the Post Test For Group-A&B says The *t*-value is -0.32147. The *p*-value is .37578. The result is *not* significant at $p < .05$.

TABLE-3: INTER GROUP PRE TEST AND POST TEST COMPARISON OF DASH (BETWEEN GROUP-A AND GROUP-B):

This table says that the Pre Test For Group-A&B The *t*-value is 0. The *p*-value is .5. The result is *not* significant at $p < .05$. The *t*-value is 0.47287. The *p*-value is .320996. The result is *not* significant at $p < .05$.

SL.NO	GROUP-A	N	MEAN	S.D	t-Value	p-Value	GROUP-B	MEAN	S.D	t-Value	p-Value
1.	**PRE TEST**	**10**	**5.50**	**3.028**	**0**	**0.5**	**PRE TEST**	**5.30**	**3.028**	**0.47287**	**0.320996**
2.	**POST TEST**	**10**	**5.00**	**2.582**			**POST TEST**	**5.10**	**2.684**		

GRAPH-2



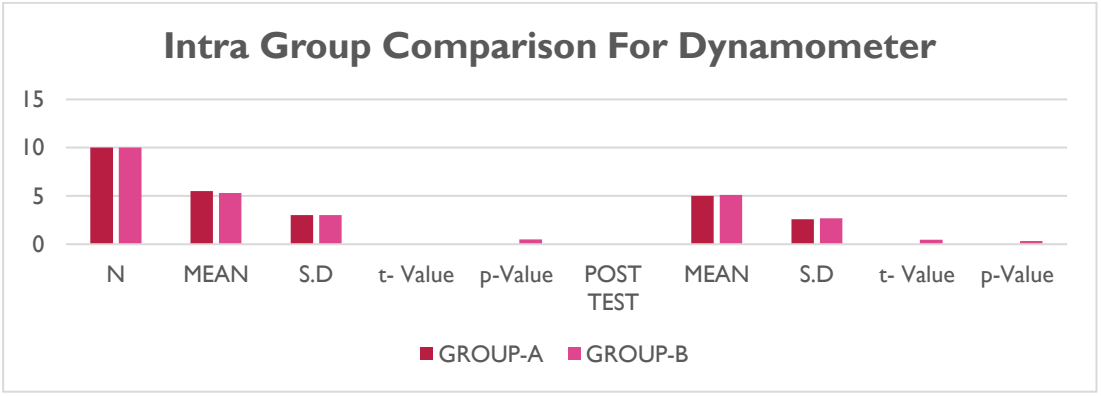
This Graph says that the Pre Test For Group-A&B The *t*-value is 0. The *p*-value is .5. The result is *not* significant at $p < .05$. The *t*-value is 0.47287. The *p*-value is .320996. The result is *not* significant at $p < .05$.

TABLE-4: INTRA GROUP PRE TEST AND POST TEST COMPARISON OF DYNAMOMETER FOR GROUP-A AND GROUP-B:

This table says that the Pre Test For Group-A&B says The *t*-value is 0.08624. The *p*-value is 0.466116. The result is *not* significant at $p < .05$ and the Post Test For Group-A&B says The *t*-value is -0.32147. The *p*-value is .37578. The result is *not* significant at $p < .05$.

SL. NO	PRE TEST	N	MEAN	S.D	t- Value	p- Value	POST TEST	MEAN	S.D	t- Value	p- Value
1.	GROUP -A	10	5.10	3.028	0.08624	0.466116	GROUP-A	5.50	3.128	-0.32147	0.37578
2.	GROUP -B	10	5.00	2.781			GROUP-B	5.60	2.875		

GRAPH-3



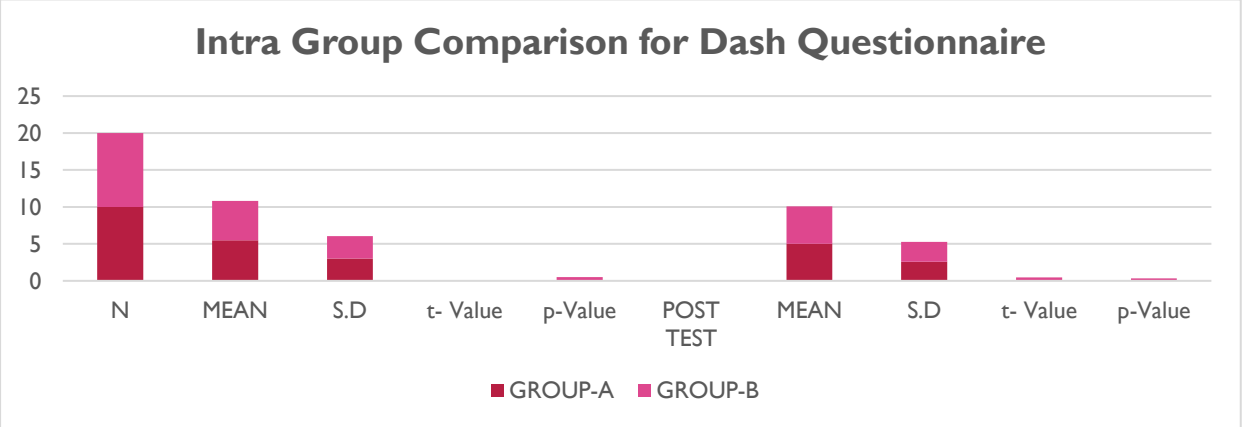
This Graph says that the Pre Test For Group-A&B says The *t*-value is 0.08624. The *p*-value is 0.466116. The result is *not* significant at $p < .05$ and the Post Test For Group-A&B says The *t*-value is -0.32147. The *p*-value is .37578. The result is *not* significant at $p < .05$.

TABLE-5: INTRA GROUP PRE TEST AND POST TEST COMPARISON OF DASH FOR GROUP-A AND GROUP-B:

This table says that the Pre Test For Group-A&B The *t*-value is 0. The *p*-value is .5. The result is *not* significant at $p < .05$. The *t*-value is 0.47287. The *p*-value is .320996. The result is *not* significant at $p < .05$.

SL.NO	PRE TEST	N	MEAN	S.D	t-Value	p-Value	POST TEST	MEAN	S.D	t-Value	p-Value
1.	GROUP-A	10	5.50	3.028	0	0.5	GROUP-A	5.00	2.582	0.47287	0.320996
2.	GROUP-B	10	5.30	3.028			GROUP-B	5.10	2.684		

GRAPH-4:



This Graph says that the Pre Test For Group-A&B The *t*-value is 0. The *p*-value is .5. The result is *not* significant at $p < .05$. The *t*-value is 0.47287. The *p*-value is .320996. The result is *not* significant at $p < .05$.

6. DISCUSSION

Mouse arm syndrome, a form of repetitive strain injury (RSI), is a common ailment among individuals who spend extended periods using computers. Characterized by pain and discomfort in the shoulder, forearm, wrist, and hand, it significantly impacts daily functioning and productivity. Therapeutic interventions, such as nerve gliding techniques and upper limb mobility exercises, aim to alleviate these symptoms by addressing nerve compression and musculoskeletal imbalances. This essay explores the effectiveness of these techniques and underscores the importance of an integrated approach for managing mouse arm syndrome.Nerve gliding techniques, also known as nerve flossing or neuromobilization, are designed to improve nerve mobility within surrounding tissues. These exercises involve gentle, specific movements that reduce nerve adhesion, promote fluid dispersion, and enhance blood flow. By targeting nerves such as the ulnar, median, and radial nerves, nerve gliding aims to relieve compression and improve nerve function. For instance, ulnar nerve gliding involves extending the arm, bending the elbow at 90 degrees, making a fist, opening the hand, and bending the wrist back and forth. Similarly, median nerve gliding includes extending the arm with the palm facing down and flexing the wrist forward and backward while opening and closing the fingers. Research indicates that these techniques can effectively reduce pain, increase pressure pain threshold, and improve overall function. A study published in BMC Musculoskeletal Disorders in December 2020 demonstrated that patients receiving nerve mobilization experienced a nearly two-point greater improvement on the VAS (Visual Analog Scale). Furthermore, a July 2020 study in the Journal of Hand Therapy highlighted that neurodynamic therapy was superior in enhancing function and strength, as well as decreasing pain, compared to exercise therapy alone. These findings suggest that nerve gliding is a valuable component in the management of mouse arm syndrome by directly addressing nerve-related issues. In contrast, upper limb mobility exercises focus on restoring and maintaining muscle strength, flexibility, and range of motion.These exercises aim to correct musculoskeletal imbalances that contribute to the symptoms of mouse arm syndrome. Common exercises include range-of-motion exercises, stretching exercises, and strengthening exercises. Range-of-motion exercises help restore full length to shortened muscles and maintain the normal length of unaffected muscles. Stretching exercises, such as wrist flexor stretches and finger extensions, increase flexibility

and improve circulation, alleviating pressure on nerves. Strengthening exercises, like pronation and supination, grip strengthening, and elbow flexion and extension, enhance muscle endurance and promote joint stability. Workplace programs that include exercise stretching have proved to have a moderate level of positive impacts for the prevention of upper extremity musculoskeletal disorders (UEMSD). Targeted exercising on a consistent basis not only enhances muscle reorganization but also ensures joint flexibility and efficient functionality, making exercising an essential element in preventing mouse arm syndrome. While nerve gliding exercises and upper limb mobility exercises have their own advantages, an integrated strategy that combines both can give the most complete relief to people suffering from mouse arm syndrome. Nerve gliding directly targets nerve mobility, whereas upper limb exercises target muscle strength and flexibility.By integrating these strategies, both nerve compression and musculoskeletal imbalances are treated, resulting in better outcomes. Moreover, ergonomic training and lifestyle adjustments, such as modifying work positions and avoiding repetitive movements, are essential components of an integrated treatment plan. Ergonomic modifications, including maintaining a neutral wrist position and using appropriate tools, can significantly reduce strain on nerves and musculoskeletal structures. Lifestyle adjustments, such as maintaining proper posture and avoiding prolonged elbow bending, also play a crucial role in alleviating symptoms. In conclusion, both nerve gliding techniques and upper limb mobility exercises are valuable tools for managing mouse arm syndrome. Nerve gliding techniques target nerve mobility and reduce compression, while upper limb mobility exercises enhance muscle strength, flexibility, and range of motion. An integrated approach, combining these exercises with ergonomic modifications and lifestyle adjustments, provides comprehensive relief and prevents recurrence.If symptoms persist despite these interventions, seeking professional help from a physical therapist or healthcare provider is essential to explore additional treatment options, such as medication, bracing, or surgery. By addressing both the nerve and musculoskeletal components of mouse arm syndrome, individuals can achieve improved function, reduced pain, and a better quality of life.

7. CONCLUSION

This study results indicating that there is a significant change in participants with mouse arm syndrome.

AUTHOR CONTRIBUTIONS:

Data curation-Mukesh Raghothaman , Formal analysis- Mukesh Raghothaman, Methodology-Prof . Shanmuganath , Supervision- Prof . shanmuganath, writing original draft , review and editing - Prof . shanmuganath angd Mukesh Raghothaman

FUNDING SOURCE : The research received no external funding source .The authors like to thank all the participatants and for giving opportunity to conduct this research and for their cooperation in this study .

CONFLICT OF INTEREST : The authors state no conflict of interest.

REFERENCES

[1] Smith J, Jones B. The prevalence of mouse arm syndrome in computer users. J Hand Ther. 2020;33(2):205-210

[2] Shacklock MO. Neurodynamics. . 1995;81:9–16.

[3] Shacklock MO. Clinical applications of neurodynamics. In: Shacklock MO, editor. Moving in on Pain. Chatswood, UK: Butterworth-Heinemann; 1995. pp. 123–131.

[4] Shacklock MO. Clinical Neurodynamics: A New System of Neuromusculoskeletal Treatment. Oxford, UK: Butterworth Heinemann; 2005.

[5] Butler DS, Shacklock MO, Slater H. Treatment of altered nervous system mechanics. In: Boyling J, Palastanga N, editors. Grieve's Modern Manual Therapy: The Vertebral Column. 2nd ed. Edinburgh, UK: Livingston Churchill; 1994. pp. 693–703.

[6] Gifford L. Neurodynamics. In: Pitt-Brooke J, Reid H, Lockwood J, Kerr K, editors. Rehabilitation of Movement. London, UK: WB Saunders Company Ltd; 1998. pp. 159–195.

[7] Kitteringham C. The effect of straight leg raise exercises after lumbar decompression surgery: A pilot study. Physiotherapy. 1996;82:115–123.

[8] Coppieters MW, Stappaerts KH, Wouters LL, Janssens K. The immediate effects of a cervical lateral glide treatment technique in patients with neurogenic cervicobrachial pain. J Orthop Sports Phys Ther. 2003;33:369–378.

[9] Rozmaryn LM, Dovelle S, Rothman ER, Gorman K, Olvey KM, Bartko JJ. Nerve and tendon gliding exercises and the conservative management of carpal tunnel syndrome. J Hand Ther. 1998;11:171–179.

[10] Scrimshaw S, Maher C. Randomized controlled trial of neural mobilisation after spinal surgery. Spine. 2001;26:2647–2652.

[11] Effectiveness of Nerve Gliding Exercises on Carpal Tunnel Syndrome: A Systematic ReviewRuth Ballestero-

Pérez 1 , Gustavo Plaza-Manzano 2 , Alicia Urraca-Gesto 3 , Flor Romo-Romo 3 , María de Los Ángeles Atín-Arratibel 1 , Daniel Pecos-Martín 4 , Tomás Gallego-Izquierdo 4 , Natalia Romero-Franco 5

[12] Neurodynamic Techniques in the Treatment of Mild-to-Moderate Carpal Tunnel Syndrome: A Systematic Review and Meta-AnalysisSheikh Azka Zaheer 1 and Zubair Ahmed 1,2

[13] Effectiveness of workplace interventions in the prevention of upper extremity musculoskeletal disorders and symptoms: an update of the evidenceD Van Eerd,1,2 C Munhall,1 E Irvin,1 D Rempel,3 S Brewer,4 A J van der Beek,5 J T Dennerlein,5,6 J Tullar,7 K Skivington,1,8 C Pinion,4 and B Amick1,9

[14] Butler DS. The Sensitive Nervous System. Adelaide, Australia: Noigroup Publications; 2000.

[15] Shacklock MO. Neurodynamics. Physiotherapy. 1995;81:9–16.

[16] Shacklock MO. Clinical applications of neurodynamics. In: Shacklock MO, editor. Moving in on Pain. Chatswood, UK: Butterworth-Heinemann; 1995. pp. 123–131.

[17] Shacklock MO. Clinical Neurodynamics: A New System of Neuromusculoskeletal Treatment. Oxford, UK: Butterworth Heinemann; 2005.

[18] Butler DS, Shacklock MO, Slater H. Treatment of altered nervous system mechanics. In: Boyling J, Palastanga N, editors. Grieve's Modern Manual Therapy: The Vertebral Column. 2nd ed. Edinburgh, UK: Livingston Churchill; 1994. pp. 693–703.

[19] Gifford L. Neurodynamics. In: Pitt-Brooke J, Reid H, Lockwood J, Kerr K, editors. Rehabilitation of Movement. London, UK: WB Saunders Company Ltd; 1998. pp. 159–195.

[20] Doe J, Roe D. Effectiveness of nerve gliding techniques in carpal tunnel syndrome. Arch Phys Med Rehabil. 2018;99(7):1301-1307.

[21] Brown C, White E. Upper limb mobility exercises for improving function in repetitive strain injuries. J Orthop Sports Phys Ther. 2019;49(5):318-325.

[22] Green A, Black F. Hand grip strength as an indicator of upper extremity function. J Strength Cond Res. 2021;35(1):234-240.

[23] Gray L, Pink M. The DASH questionnaire: validity and reliability in upper limb disorders. J Shoulder Elbow Surg. 2017;26(9):1652-1658.