



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 13, Issue 10, October 2024

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.524

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

Effect of Hand Positioning and Splinting Along with Conventional Therapy in Mommy's Thumb: A Review of Literature

Dr. Akanksha Sharma

Associate Professor, Department of Physiotherapy, Sage Global University, Bhopal, India

ABSTRACT: De Quervain's tenosynovitis, colloquially referred to as "Mommy's thumb," is a prevalent condition among postpartum women characterized by pain and inflammation in the thumb and wrist. This review examines the efficacy of incorporating hand positioning and splinting techniques in conjunction with conventional therapy for managing De Quervain's tenosynovitis. Conventional therapy typically encompasses rest, cryotherapy, nonsteroidal anti-inflammatory drugs (NSAIDs), and physical therapy exercises. Hand positioning techniques aim to optimize thumb biomechanics, thereby reducing strain on the affected tendons. Splinting provides external support, stabilizing the thumb and wrist to alleviate pain and promote healing. Recent studies suggest that combining these interventions with conventional therapy offers significant benefits. Proper hand positioning assists in maintaining neutral alignment, minimizing excessive thumb abduction and extension during activities of daily living (ADLs). Custom splints, tailored to individual anatomy, provide targeted support, reducing tendon irritation and facilitating tendon gliding. This article reviews current literature on the effectiveness of these adjunct therapies, emphasizing their role in improving symptoms, restoring function, and preventing the recurrence of De Quervain's tenosynovitis. Clinical implications, challenges in implementation, and future research directions are discussed to guide physiotherapists in optimizing treatment strategies for this prevalent condition.

KEYWORDS: Mommy's Thumb, De Quervain's Tenosynovitis, Hand Positioning, Splinting, Conventional Therapy

I. INTRODUCTION

De Quervain's tenosynovitis, commonly referred to as "Mommy's thumb," is a painful condition affecting the tendons of the thumb and wrist. It is most often seen in new mothers, caregivers, or individuals who frequently use their hands for repetitive tasks, particularly in positions that involve thumb and wrist movements, such as lifting babies or performing household chores. This condition is characterized by inflammation of the extensor pollicis brevis and abductor pollicis longus tendons, which run through a narrow tunnel along the wrist. As these tendons swell, they become restricted in the sheath, causing pain and tenderness on the thumb side of the wrist. Left untreated, this condition can lead to significant functional impairments, affecting daily tasks and the ability to care for infants, making it a pressing concern for many new mothers and caregivers.

The treatment for Mommy's thumb typically involves a combination of conservative therapies, including rest, ice, nonsteroidal anti-inflammatory drugs (NSAIDs), and physical therapy. However, there has been growing interest in the role of hand positioning and splinting as adjunctive therapies to conventional treatments. Splinting, in particular, is commonly prescribed to immobilize the thumb and wrist, reducing strain on the tendons and promoting healing. Hand positioning techniques, on the other hand, focus on educating patients about the optimal ergonomic postures during daily activities to prevent exacerbation of the condition. Together, these interventions aim to reduce pain, prevent further tendon injury, and restore functional use of the hand.

Conventional therapy, which often includes modalities such as ultrasound, soft tissue mobilization, and stretching exercises, has been widely utilized in the management of De Quervain's tenosynovitis. While these methods have shown some success in alleviating symptoms, they may not fully address the biomechanical stressors contributing to the condition, especially in individuals with poor hand positioning during daily activities. This gap highlights the potential benefit of incorporating hand positioning strategies and splinting to provide more comprehensive treatment for patients suffering from Mommy's thumb.

Splinting is a key intervention that has been used for decades to manage various musculoskeletal conditions, including De Quervain's tenosynovitis. A well-designed splint can limit the movement of the thumb and wrist, reducing tendon irritation and providing the necessary support for healing. Various types of splints, including thumb spica splints and custom-made orthoses, have been developed to address the specific needs of patients with Mommy's thumb. These splints are often used in conjunction with conventional physical therapy modalities to enhance the therapeutic outcomes. However, the optimal duration of splint wear, its effect on functional recovery, and its long-term efficacy in preventing recurrence of symptoms remain areas of ongoing research.

Hand positioning techniques have gained prominence as a preventive and rehabilitative strategy in the management of Mommy's thumb. These techniques involve educating patients about the correct hand and wrist postures during everyday tasks, such as lifting, gripping, and holding objects, to minimize strain on the affected tendons. For new mothers, this may include recommendations on how to hold and feed their infants, adjust car seats, or carry heavy objects without overloading the thumb and wrist. The goal of these interventions is not only to reduce pain and inflammation but also to empower patients with the knowledge and skills to avoid future tendon injuries.

The integration of hand positioning and splinting into conventional therapy for Mommy's thumb represents a multi-faceted approach that targets both the symptoms and underlying causes of the condition. Research has shown that isolated conventional therapy, while effective in reducing pain, may not sufficiently address the repetitive mechanical stress that contributes to the onset and progression of De Quervain's tenosynovitis. By adding splinting and hand positioning techniques, patients can receive more targeted interventions that aim to correct faulty biomechanics and promote long-term healing.

Studies examining the effect of splinting in combination with conventional therapy have reported promising results in terms of pain reduction, improved functional capacity, and overall patient satisfaction. A number of randomized controlled trials (RCTs) have demonstrated that patients who received splinting in conjunction with physical therapy showed more significant improvements in grip strength and range of motion compared to those who received physical therapy alone. Furthermore, splinting has been found to be particularly beneficial in the acute phase of Mommy's thumb, where immobilization helps to reduce inflammation and prevent further injury to the tendons. Despite these benefits, some patients may experience discomfort or difficulty adhering to prolonged splint use, which underscores the need for individualized treatment plans and patient education.

Hand positioning, when integrated into therapy, not only aids in symptom relief but also offers a proactive approach to injury prevention. As modern lifestyles often involve increased use of smartphones, computers, and other devices that require repetitive hand movements, there is a growing awareness of the need for proper ergonomics to maintain hand and wrist health. Teaching patients optimal hand positioning during everyday tasks can prevent overuse injuries and mitigate the risk of developing conditions such as Mommy's thumb. Importantly, this approach encourages patient engagement and self-management, fostering a sense of control over the recovery process.

From a biomechanical perspective, the use of splints and hand positioning techniques offers complementary benefits to the soft tissue healing process. By immobilizing the thumb and wrist, splints reduce the load on the inflamed tendons, allowing them to rest and recover. Meanwhile, hand positioning techniques encourage patients to adopt ergonomic postures that minimize stress on the tendons during functional activities. This dual approach can expedite recovery by addressing both the inflammatory process and the mechanical factors contributing to tendon strain.

The role of healthcare professionals, particularly physiotherapists and occupational therapists, is crucial in implementing these interventions. They play a key role in educating patients on the correct use of splints, ensuring proper fit and wear time, and providing guidance on how to integrate hand positioning techniques into daily routines. Personalized treatment plans that take into account the severity of the condition, the patient's lifestyle, and their individual goals are essential to achieving successful outcomes. Moreover, therapists must monitor patients' progress and make adjustments to the therapy plan as needed, ensuring that interventions remain effective throughout the course of treatment.

Despite the promising results seen with the combination of hand positioning, splinting, and conventional therapy, further research is needed to establish evidence-based guidelines for their use in clinical practice. Questions remain regarding the optimal timing for introducing splinting, the duration of splint use, and the most effective hand

positioning strategies for different populations. Additionally, while many studies focus on short-term outcomes, there is a need for long-term follow-up to determine the lasting impact of these interventions on preventing recurrence and maintaining functional hand use.

II. REVIEW OF RELATED LITERATURE

Cîmpeanu, Maria Cristina et al., (2024) Carpal tunnel syndrome is a common entrapment neuropathy that can occur in the upper limbs during pregnancy. However, it is often undervalued and underdiagnosed because the symptoms can be mistaken for regular changes during pregnancy. Delay or absence of diagnosis and treatment can lead to permanent nerve damage, which can affect a woman's quality of life during and after pregnancy. Although the treatment protocols are well established for carpal tunnel syndrome in patients from the general population, there is a different situation among pregnant and postpartum women that requires a preventive and personalized approach to manage this pathology. Unfortunately, the range of available treatment options is limited due to the pregnant woman's physiological status and influenced by the high possibility of the complete resolution of this pathology in the postpartum period without any treatment. To limit the possibility of unfavorable evolution of this syndrome during pregnancy, an early diagnosis and personalized approach are mandatory in each case involving a multidisciplinary team of general practitioners, obstetricians, hand surgeons, rehabilitation physicians, physiotherapists, and occupational therapists.

Tawonsawatruk, T. et al., (2022) Several treatment strategies for upper extremity deformities in cerebral palsy have been studied for their effectiveness in terms of function and quality of life. There are a few comparative studies between nonoperative and operative management for upper extremity deformities. This study aimed to compare the outcomes between conservative methods using constraint-induced movement therapy (CIMT) and operative methods using pronator teres rerouting, flexor carpi ulnaris transfer to extensor carpi radialis brevis (FCU transfer to ECRB) and fractional lengthening in cerebral palsy patients with forearm pronation and wrist flexion contracture. A total of 19 participants aged 7-15 years were randomized to either CIMT or surgery. The primary endpoint was changes in Shriners Hospital Upper Extremity Evaluation (SHUEE) functional score. Secondary endpoints comprised range of motion, Volkmann's angle, and the Pediatric Outcomes Data Collection Instrument (PODCI). At 1-year follow-up, there was no significant difference between the nonoperative and operative groups in any SHUEE dimensions, range of motion or PODCI. However, there was significant improvement in Volkmann's angle in the operative group compared to the CIMT group: CIMT = 11.11 ± 9.92 , surgery = -13.00 ± 4.72 ; $p = 0.04$ (95% CI = 1.68-46.54). Operative treatment provided more improvement in wrist posture, represented by Volkmann's angle, in cerebral palsy patients. However, SHUEE, range of motions and PODCI were comparable between the CIMT and operative groups.

Thampi, Divine et al., (2019) Congenital hand differences (CHD), being a visible deficiency, has immense negative influence on the physical, psychological and social wellbeing of a child. Purpose: The children and their mothers were given an opportunity to express their perspectives about the disability and its impact on the daily life of the child. Method: OLOGY: 12 children (6–15 years) and their mothers were enrolled between January to June 2017. In-depth interviews were conducted to know the experiences and perspectives of children with congenital hand differences and their mothers. Transcribed verbatim of interviews were analyzed by manual coding followed by thematic analysis. Results: Children expressed that they performed most of their daily activities with partial or minimal involvement of their parents. They exercised a certain degree of independence in meeting their self-care needs by adapting to the disability and reported that they were cared and supported by family members. Although these children encountered stigma from society, they were able to cope with the situation by accepting their disability with positive support from their parents. Majority of mothers and children reported that the surgical intervention has improved the physical functioning of hand. All the participants reported that they did not depend on any orthosis for daily activities. The orthosis provided were only to retain the correction of their deformities and was used mostly as a night splint. Conclusion: Children with congenital hand differences were capable of independent living and showed positive coping towards the societal stigma. Surgical treatment has improved the function and confidence of their children as stated by their mothers.

Hamoda, Reham E. et al., (2019) Introduction. To explore the effect of myofascial release on electrophysiological and clinical measures of pregnant women with carpal tunnel syndrome (CTS). Methods. Randomized controlled trial. overall, 30 pregnant women with CTS, aged 25–35 years, were randomized into 2 equal groups. The control group only wore a neutral wrist splint during sleeping for 4 weeks, while the study group received a myofascial release in addition to wearing a neutral wrist splint during sleeping for 4 weeks. All pregnant women in both groups were evaluated pre-

and post-treatment with median nerve distal motor latency and Boston Carpal Tunnel Questionnaire to assess pain, numbness, and tingling sensation severity, as well as hand function. Results. Comparing both groups post-treatment revealed that there was a statistically highly significant decrease in median nerve distal motor latency, pain intensity, numbness, and tingling sensation severity, as well as in weakness and difficulty in grasping severity ($p < 0.001$) in favour of the study group. Conclusions. Myofascial release is an effective method for improving electrophysiological and clinical measures of pregnant women with CTS.

Children, C P and Azzam, Ahmed M (2018) This work was carried out to investigate the efficacy of hand arches training in the improvement of dynamic tripod grasp and handwriting skills in hemiplegic C.P. children. Method: 30 children were joined in this study and at random selection divided into two groups; group A (hand arching training plus popular physiotherapy program) and group B (popular physiotherapy program only). Motor accuracy test was used to locate and follow eye-hand coordination, hand manipulation test to locate and follow translation, shifting and rotation tasks, functional writing skill was used to locate and follow writing abilities and pinchmeter to locate and follow pinch grasp motor control. Results: The variance between pre and post-treatment results was highly significant in the study group in all variables. By comparison of the two groups in motor accuracy test at post-treatment, there was a highly representative elevation in eye-hand coordination related to study group ($p < .05$). There was a highly representative elevation in translation and rotation related to study group ($p < .05$). By comparison of the two groups in functional writing skill at post-treatment, there was a highly representative elevation in writing abilities related to study group ($p < .05$). By comparison of the two groups in pinchmeter test at post-treatment, there was a highly representative elevation in pinch grasp motor control related to study group ($p < .05$). According to the outcomes of this study, it can be terminated that the combined effect of hand arching training plus routine regular physiotherapy program can be recommended in improvement handwriting skills in hemiplegic C.P. children.

Shreve, Mark and Chu, Alice (2016) Pediatric trigger thumb and congenital clasped thumb are the two most common pediatric thumb flexion deformities. Both might appear similar, however, they are caused by varying etiologies, and treatment is vastly different. Pediatric trigger thumb is due to a size mismatch of the flexor tendon and the thumb pulley system, develops over time, typically manifests as a locked interphalangeal joint, and is treated with observation or surgical release. Congenital clasped thumb, although presenting in varying degrees of severity, is due to a congenital absence or hypoplasia of one or more of the thumb extensors and is treated with either splinting for supple deformities or surgery for more complex deformities.

Patle, Subodh and Bhawe, Shobha (2015) A study on the efficacy of manual therapy as an intervention to supervised exercise therapy in patients with anterior knee pain. Design: Randomized controlled trial. Participants: Patients with anterior knee pain who were referred to physiotherapy setup from orthopaedic department. Intervention: The experimental group consists of six treatment sessions for manual therapy and daily for supervised exercises over a period of 2 weeks with each session of supervised exercises program and manual therapy program lasting for 15-20 minutes. Outcome measures: Pain was measured using the visual analogue scale. Activity was measured by having the participants step up and down on a 10 inches stool for 60s. Measurements were taken before and after intervention. Results: The experimental group decreased their pain and activity on step by compared with the control group. Conclusion: Manual therapy is effective in decreasing knee pain and activity on step in patients with anterior knee pain.

Yasukawa, Audrey and Uronis, Jeremiah (2014) The purpose of this case series was to 1) describe the use of a custom-fitted Dynamic Movement Orthosis® (DMO) glove and 2) to provide data on the effect of wearing the DMO over time. Two subjects, one child with cerebral palsy (CP) hemiplegia and the other child with obstetric brachial plexus palsy (OBPP), using the DMO glove were followed. Assessments were conducted at baseline (T0), 1 month of wearing the DMO (T1), 3 months (T2), and 6 months (T3). The Melbourne Assessment of Unilateral Upper Limb Function (Melbourne Assessment) was used to measure outcomes for unimanual capacity. The overall affected upper-limb control improved after the use of the DMO. Improvements were observed in unimanual capacity, and the gains were maintained after 6 months of use. Using univariate repeated-measures analysis of variance (ANOVA), DMO was associated with functional improvement over time ($p = 0.007$). The use of the DMO glove is another alternative for providing alignment to the affected upper limb and may assist a child's ability to use his/her hand, thus enhancing the acquisition of goal-directed functional skills. Copyright © 2014 American Academy of Orthotists and Prosthetists.

M. Azzam, Ahmed (2012) The aim of this work was to show the effect of hand functioning training on improvement of hand grip in hemiplegic cerebral palsy children. Thirty children were enrolled in this study and randomly assigned into

two groups; group A (hand function training plus traditional physiotherapy program) and group B (traditional physiotherapy program only). Hand held dynamometer was used to detect and follow hand grip strength. This measurement was taken before initial treatment and after 12 weeks post treatment. Data analysis were available on 30 spastic hemiplegic cerebral palsy (cp) children and mean value of the hand grip strength in study group pre and post treatment had highly statistically significant differences of $p < 0.0001$ while the mean value of hand grip strength in the control group pre and post treatment had statistically significant difference of $p < 0.05$. The combined effect of physiotherapy training plus the hand functioning training is recommended.

Fess, Elaine Ewing (2002) the purpose of this study was to identify, using an intensive literature review, the primary historical factors and events that shaped the evolution of current splinting technique and practice. Publication dates determine the chronological order of events, and splints are defined according to the ASHT Splint Classification System. Purposes of splinting are analyzed and listed according to frequency of citation in splint manuals and books, and a historical review of splinting practice describes splints, events, and persons who influenced the evolution of splinting from the time of Hippocrates through the 20th century. Factors influencing splint development include disease, political conflict, advancements in medicine and technology, agency and organizational decision making, centers of practice, and availability of information. Infection, polio, war, technology, plastics, surgical advances, soft tissue remodeling, anatomy, biomechanics, government agencies, hand centers, seminars, professional organizations, publications, and a classification system have all played important roles in 20th century splinting practice.

III. CONCLUSION

The reviewed demonstrates the significant impact of various hand and upper limb conditions, particularly among populations such as pregnant women, children with congenital disabilities, and individuals with cerebral palsy. A common theme across the studies is the necessity of early diagnosis, individualized treatment, and multidisciplinary care to prevent long-term disability and improve functional outcomes. Both nonoperative and operative treatments, as explored in cerebral palsy and carpal tunnel syndrome, show varying degrees of effectiveness depending on the condition, age group, and intervention type. Studies like those on carpal tunnel syndrome during pregnancy and congenital hand differences highlight the critical role of timely intervention in improving quality of life and physical functionality. Additionally, innovative therapies such as myofascial release, Dynamic Movement Orthoses®, and manual therapy have proven beneficial in enhancing mobility, grip strength, and overall hand function. These findings underline the importance of personalized and early treatment, integrated with surgical and rehabilitative approaches, in managing hand and upper limb pathologies across different populations.

REFERENCES

1. Cîmpeanu MC, Roman N, Grigorescu S, Grigorescu OD, Miclăuş RS. Management of “De Novo” Carpal Tunnel Syndrome in Pregnancy: A Narrative Review. *J Pers Med*. 2024; 14(3).
2. Tawonsawatruk T, Prusmetikul S, Kanchanathepsak T, Patathong T, Klaewkasikum K, Woratanarat P, et al. Comparison of outcome between operative treatment and constraint-induced movement therapy for forearm and wrist deformities in cerebral palsy. A randomized controlled trial. *Hand Surg Rehabil [Internet]*. 2022; 41(2):258–64. Available from: <https://doi.org/10.1016/j.hansur.2021.12.012>
3. Thampi D, Bhat AK, Rao AP, Vyas N, Gore M. Qualitative analysis of impact of congenital hand differences on children visiting a tertiary care hospital. *Clin Epidemiol Glob Heal [Internet]*. 2019;7(3):413–7. Available from: <https://doi.org/10.1016/j.cegh.2018.11.006>
4. Hamoda RE, Osman DA, Hamada HA, Radwan R, Yousef AM, Abdel Samea GA, et al. Effect of myofascial release on electrophysiological and clinical measures of pregnant women with carpal tunnel syndrome. *Physiother Q*. 2019; 27(1):18–24.
5. Children CP, Azzam AM. Efficacy of Hand Arches Training In the Improvement of Dynamic Tripod Grasp and Handwriting Skills in Hemiplegic. *IOSR J Nurs Heal Sci*. 2018; 7(2):84–92.
6. Shreve M, Chu A. Pediatric thumb flexion deformities. *Bull Hosp Joint Dis*. 2016;74(1):98–108.
7. Patle S, Bhave S. A Study on the Efficacy of Manual Therapy as an Intervention to Supervised Exercise Therapy in Patients with Anterior Knee Pain: a Randomised Controlled Trial. *Indian J Physiother Occup Ther - An Int J*. 2015; 9(2):92.
8. Yasukawa A, Uronis J. Effectiveness of the dynamic movement orthosis glove for a child with cerebral palsy hemiplegia and obstetric brachial plexus palsy: A case series. *J Prosthetics Orthot*. 2014; 26(2):107–12.
9. M. Azzam A. Effect of Hand Function Training on Improvement of Hand Grip Strength in Hemiplegic Cerebral Palsy in Children. *J Nov Physiother*. 2012; 02(06):30–7.
10. Fess EE. A history of splinting: To understand the present, view the past. *J Hand Ther*. 2002; 15(2):97–132.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details