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Hand Splint: A Review

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Abstract: A splint is a device consisting of bone, wood, metal, polymers, composites, or plaster of Paris that is used to stabilise, join, or protect a damaged body part. It may be movable or immovable. There are numerous methods of rehabilitation currently in use, but we are going to specifically study hand splints with their definition, advantages, disadvantages, uses, etc. in this review paper. We are also going to review the literature that is available in bibliographic databases and compare their findings. The search for these splints was conducted through bibliographic databases and internet searches until May 2022. These searches were also backed by scanning their references one by one, personal reference collections, and talking to physiotherapists. All static splints used in this review paper have been shown to be effective in reducing pain during any motion as well as at rest.

Keywords: Stroke, Splints, Hand Motion, Wrist Extension, Spasticity.

I. INTRODUCTION

In stroke, not only are the abilities to stand, balance, and walk affected, but also the ability to use the upper limb and hand in their diversity of functions in everyday life. Loss of upper limb freedom causes significant functional handicap, jeopardising quality of life and independence in "basic" (washing, grooming, feeding, dressing, and so on) and "instrumental" (shopping, home/financial management, and so on) daily activities [1]. The patient's ability to do daily duties may be harmed if he or she suffers a stroke in the dominant hand. In fact, 80% of stroke patients have severe limitations in activities of daily living that require the use of upper limbs [2]. There has been extensive research on the factors that influence QOL in stroke patients. ADL and depression are perhaps the most important factors affecting QOL after a stroke. However, no studies have investigated whether loss of function in the dominant hand affects QOL [3]. Treatment of these patients relies on rehabilitation. The cornerstone of this strategy is helping patients adapt to impairment, while treatments aimed at reducing impairment are less well developed. This will require a better understanding of impairment and, more significantly, recovery mechanisms.

Hand and wrist splints are a common component of occupational therapy programmes for people with strokes. Recent literature suggests splinting has the potential to improve hand function by attempting to support the proximal joints, applying counterbalanced force to deforming joints, and improving biomechanical advantage. Hand splints have both biomechanical and biological rationales for their use and action. However, evidence to support their clinical effectiveness is still emerging [4]. The hand and wrist splints can be used for decreasing soft tissue and joint pain [5], for resting weakened joint structures and decreasing local inflammation [6], for correctly positioning joints [7], for increasing joint stability [8], for increasing hand function (e.g., grasping or pinching) [5], for contributing towards self-management strategies in long-term disease management [9], for minimising joint contractures and hand deformities [10]. In this review paper we are going to identify, describe, and state their limitations.

II. TYPES OF SPLINTS

A. *Static Hand Splint*

Static resting splints are external devices applied to a body segment, whose aim is to decrease localised pain and inflammation by resting the joint in a correct anatomical position, and realigning drifting metacarpophalangeal [MCP] joints by providing an ulnar border to the splint and restricting carpal movement [11]. It helps maintain a biomechanically functional hand unit [12]. These splints do not permit wrist and hand movement and are recommended to be worn whilst resting and/or during the night. A static hand splint can indeed be recommended to rest an injured and postoperative hand. Resting splints for soft tissue injuries to the hand, like bruises, lacerations, or scars, facilitate the process of healing. Circumferential splinting to maintain postbone fracture reduction is applied to humeral and forearm sites [13].

Fig. 1 Static Hand Splint

B. Static Progressive Splint

The employment of inelastic components to provide torque to a joint in order to statically place it as close to the end of this range as possible is known as static progressive splinting. It maximises total end range time, thus increasing passive range of motion. In static progressive splinting torque is applied with accurate position of the joint to create an approach powerful enough to succeed when no other treatment approach does [14]. Static progressive splint applies stress on subjected tissues due to which that tissue gets elongated after that doctor or patient can strengthen the stress for making the subjected tissue more tolerable. Unlike dynamic splinting where load is placed constantly on the tissue, here it is stretched from time to time.

Dynamic splints have an advantage over static progressive splints because dynamic splints have moving parts that allow the individual a range of voluntary controlled movement, which can prevent contractures while allowing resultant muscle force to counter the force of the spastic muscle. Results suggested more normalised muscle activation with the device application. Another study utilising static hand splints found decreased motor activation, which can also contribute towards neglected degeneration in the wrist muscles and misuse of much more distal muscles over time. In contrast, dynamic wrist splints that provide wrist support for more optimal hand function allowed some movement, may not produce this additional strain on proximal muscles [15].

C. Serial Static Splint

A serial static splint aids in tissue elongation by bringing soft tissues to the threshold of their range of motion. Serial splinting has been characterised as a pre-surgical treatment method for contractures. The timing of surgical intervention in post-burn abnormalities is a point of contention. Some authors urge early surgical intervention, while others prefer to wait for the scars to settle for roughly half a year. It has been reported that waiting for some time decreases the risk of postoperative infections [16].

D. Dynamic Hand Splint

A dynamic splint is a splint made of springs or elastic bands that assists in movements initiated by the patient by regulating the plane and range of motion. Tension on joint tissues causes them to react, and an appropriate extension force has been demonstrated to improve flexion contracture [17]. Dynamic splints are most typically used for protection following tendon reattachment (a flexible but inelastic cord of strong fibrous collagen tissue connecting a muscle to a bone). Dynamic splinting provides the advantages of early mobilisation without the hazards of early free active movement, which can result in increased stress, tendon ischaemia, and decreased tensile strength. To encourage compliance, the optimal dynamic extension splint should deliver a continuous and uniform force across its therapeutic range of digit and be simple to apply. Splints on the market now stretch a spring or an elastic band using a stationary outrigger pulley. Dynamic splinting can aid in the treatment of flexion contractures. Some studies argue against using dynamic splints to treat stiff elbows because they produce swelling and pain, causing patients to discontinue use [18].

Fig. 2 Static Progressive Splint

E. Passive Dynamic Hand Splints

Dynamic hand splints are mechanically responsive orthoses that are traditionally used to recover fingers or the entire hand in accordance with predefined permitted motions. In particular, so-called "passive dynamic hand splints" frequently include elastic bands or springs, which merely exert a passive resistance to voluntary elongations of one or more fingers. These types of orthotic systems allow for the treatment of fingers that can still move independently against the negating elastic component's recovery force. The greatest forces generated by commercial splints for this purpose are typically in the range of 1–10 N. Although such a technique is a relatively simple and effective way to execute basic rehabilitation activities, it is bound by an obvious limitation: the inability to modulate the counteracting action. In fact, the mechanical compliance of the system is pre-defined by the fixed mechanical properties of the adopted elastic component [19].

F. Active Dynamic Hand Splint

Of course, the solely manual restrictions required for passive splints have inherent limits in comparison to the far more helpful electrical restrictions. Such functionality is offered by ‘active dynamic hand splint’. They're designed as orthotic systems with incorporated electromechanical actuation mechanisms, with the goal of allowing electrical control of the system's most important mechanical aspects. Active splints, for example, are designed to provide therapeutic forces that can be accurately and constantly controlled by an electrical input, even in closed-loop systems. As a result, the patient can receive precise rehabilitation programmes by keeping track of the most important rehabilitation criteria. These could include things like the waveform, amplitude, frequency, duration, rising time, and repetition rate of a force signal, among other things. These parameters might be selected from established sets or continuously adjusted during the training phase, depending on the patient's particular response. The choice of actuation technology is critical for the efficacy of the resulting system when developing active orthoses. So far, several electromechanical transduction techniques have been investigated to provide hand systems (not necessarily a splint) with actuation functionalities. These technologies include pneumatic devices [20], electromagnetic motors [21] and shape memory alloys [22]. Additionally, useful means to electrically modulate resistive forces for hand rehabilitation devices have been demonstrated recently by using electrorheological fluids [23]. Given the appealing performance characteristics of all of these actuation methods, these techniques are often characterised by larger, rigid, and bulky devices. They obscure the structure of the orthotic system, making it difficult to wear and transport.

G. Wrist Extension Splint

A wrist splint is a brace that looks like a glove but has no fingers. It keeps your wrist steady while it is straight or slightly inclined. Wrist splints ease pressure on the median curve, provide relaxation from activities that aggravate carpal tunnel syndrome, and can stabilise the wrist in a physiologically beneficial wrist position (10–15 degrees), allowing the extrinsic finger flexors to improve muscular endurance [24]. They are also useful for limiting wrist circumduction and decreasing torque during heavy wrist chores [25]. Wrist extension splints are often prescribed and delivered to stroke patients. Wrist splints, as opposed to static resting splints, are intended to allow the user to continue functioning while reducing discomfort and providing support for the wrist. Normally, patients must wear them during strenuous duties, which might lengthen the time it takes the wearer to complete such tasks. Splints can also become unusable due to dirt. Thus, depending on the sorts of activities that patients engage in, both the wearing duration and the quantity and type of stress on the joints would vary significantly across patients. There are researches that underline the need for standardised wearing time [26]. It is more difficult to standardise the amount of tension applied to the joints.

Commercial wrist extension splints have been demonstrated to increase power grip strength in those who have had a mild to severe stroke. According to the findings of this research, prescribing wrist extension splints is not an easy task. To design the daily wear schedule, the occupational therapist and the patient must collaborate. There is limited data to support the long-term effectiveness of wrist extension splints, and the quality of evidence provided suggests that these splints have moderate clinical effectiveness [27].

Fig. 3 Wrist Extension Splint

H. Finger Splint

Finger splints are devices that keep a damaged finger immobilised and stable. Mallet finger injury, ligamentous sprain and dislocation of the proximal interphalangeal [PIP] joint of fingers, etc., are very common types of simple hand injuries where we can use finger splints. If we protect the injured area and correct the alignment of the joint immediately, we can facilitate early joint movement while maximising functional recovery. There are three simple finger splints to tackle these injuries for quick and effective conservative treatment.

I. Mallet Finger Splint

“Drop finger” and “baseball finger” are other names for mallet finger. Due to extensor tendon mechanism damage, the end of a finger cannot be actively straightened out. Treatment involves at least six weeks of splint use. Surgical fixing is sometimes employed [28]. About half of the cases might be cured or considerably improved by simple splintage. According to the studies, the Stack splint is also chosen for the patient's comfort and convenience [29]. This splint has been shown to be quite effective in both tendon injuries and fracture cases, with no need for open reduction of even substantial fracture fragments without distal phalanx dislocation. Despite the fact that this splint was initially published in 1969, specific results and approaches have not yet been described [30].

J. Buddy Splint

These involve two fingers taped together. When a person has a stretched finger, they use buddy splints. For example, as a result of a jamming (when the tip of the finger is compressed towards the hand) injury. For fractured fingers, this splint is not suggested. The splints are made of rigid material, which optimises the transmission of forces from the uninvolved to the involved digit. The splints are aligned with the anatomic axis of the joints, allowing for finger length discrepancies. The splints distribute the stress over a broader surface area, reducing the amount of strain on the skin. When the buddy splints are utilized on the distal phalanx, the splints do not migrate distally [31].

III. COMPARISON OF LITERATURE AVAILABLE OF SPLINTS

Sr. No.	Name of Author	Title	Method of Analysis	Result	Conclusion
1	Natasha A. Lannin, Anne Cusick, Annie McCluskey and Robert D. Herbert (32)	Effects of Splinting on Wrist Contracture After Stroke.	63 patients with strokes. They were assigned to one of two groups: control (routine treatment) or intervention (routine therapy with splint in either a neutral or extended wrist position). For 4 weeks, splints were worn at night for an average of 9 to 12 hours. Assessment was done by a Blind Assessor.	When compared to the control condition, neutral wrist splinting increased wrist extensibility by 1.4° (95 percent CI, 5.4° to 8.2°) after 4 weeks, while splinting the wrist in extension reduced wrist extensibility by 1.3° (95 percent CI, 4.9° to 2.4°).	After a stroke, splinting the wrist in either the neutral or extended position for four weeks did not reduce wrist contracture. This data shows that routine wrist splinting should be discontinued immediately after a stroke.
2	Fujiwara T, Liu M, Hase K, Tanaka N, Hara Y (33)	Electrophysiological And Clinical Assessment of a Simple Wrist-Hand Splint For Patients With Chronic Spastic Hemiparesis Secondary To Stroke.	15 patients with hemiparetic stroke. The time from stroke onset was over 120 days. Assessment was done by electromyography (EMG) of flexor digitorum sublimus (FDS), extensor indicis proprius (EIP), flexor carpi radialis (FCR), extensor carpi radialis (ECR), brachioradialis (BR), and triceps brachii (Tri) during active finger extension and shoulder flexion, without and with the wrist-hand splint.	FCR and BR muscle activities were reduced during shoulder flexion with the splint, while FDS, FCR, and BR muscle activities were reduced during finger flexion with the splint. The H/M ratio of FCR was likewise lowered when the splint was attached.	The wrist-hand splint has been shown to help patients with spastic hemiparesis improve upper limb motor function.
3	Yong Jae Jung, Ji Heon Hong, Hyeok Gyu Kwon, Jun-Chan Song, Chulseung Kim, SoHyun Park, Yeung Ki Kim, Sang	The Effect of a Stretching Device on Hand Spasticity in Chronic Hemiparetic Stroke Patients.	21 chronic hemiplegic stroke patients with significant finger flexor spasticity. The intervention group had 11 patients, and the control group had 10 patients. The stretched condition was maintained for 30 seconds, followed by 30 seconds of relaxation.	At Pre-1 and Pre 2, the average mean MAS score in the intervention group was 2.83 and 2.93, respectively. Using the one-way repeated measures ANOVA test for evaluation of the effect of intervention across all time-points, this increased considerably to 1.97 at Inter-1, 1.55 at Inter-2, 1.20 at Inter-3, and 1.97 at Post-1	This stretching device was shown to be useful in reducing hand spasticity in chronic stroke patients. Further research into the device's use for other individuals with spasticity, such as those with cerebral palsy, spinal cord damage, or traumatic

	Ho Ahn and Sung Ho Jang (34)		For 20 minutes, this stretching and relaxation routine was repeated (one session). For the intervention group's patients, the stretching exercise was done twice a day, six days a week for three weeks. The assessment has been done by (MAS) score of finger flexor muscles and (ANOVA) test for evaluation of the effect of intervention.	(P<0.001).	brain injury, is encouraged.
4	Jong-Bae Choi, Sung-Ryoung Ma and Bo-Kyoung Song (35)	The Effect of Resting Hand Splint on Hand Pain and Edema among Patients with Stroke	The experiment group (n = 15) and the control group (n = 15) were assigned to the participants at random. For 12 weeks, all participants received general rehabilitation therapy for 30 minutes each day, five days per week. Additionally, the experiment group's participants wore resting hand splints. Analysis using SPSS version 18.0.	Significant differences were not found between the two groups in the homogeneity test before intervention. Significant variations in VAS (Visual Analogue Scale), hand volume, and MAS were seen in the experimental group before and after the intervention. The control group, on the other hand, showed no significant variations in VAS, hand volume, or MAS before or after intervention. Significant variations in VAS and hand volume were identified in the experiment group but not in MAS, when the changes between the groups were compared.	Hand discomfort and edema were significantly reduced in the group that received a combination of general rehabilitation treatment and resting hand splints, but not in the control group that received only general rehabilitation treatment.
5	Bürge E, Kupper D, Finckh A, Ryerson S, Schnider A, Leemann B (36)	Neutral Functional Realignment Orthosis Prevents Hand Pain in Patients with Subacute Stroke: A Randomized Trial.	16 patient standard rehabilitation care, 15 patients and a wrist neutral functional realignment orthosis for 13 weeks: Hand pain at rest (VAS), wrist range of motion (FMA), and edema of hand and wrist (circumferences).	At the start of the study, two patients in each group complained of a sore hand. Hand discomfort was reported by 8 participants in the control group and 1 participant in the orthosis group after 13 weeks. In both groups, mobility and edema progressed in a comparable way.	In the subacute period of recovery, neutral functional realignment orthoses have a preventive impact on poststroke hand discomfort, but not on mobility and edema.
6	Eun Hyuk Kim, Min	The Effect of a Hand-Stretching	8 patients to an intervention group and 7	At pre-1 in the intervention group and at 1st assessment	In chronic hemiparetic stroke patients, the

	Cheol Jang, Jeong Pyo Seo, Sung Ho Jang, Jun Chan Song and Hae Min Jo (37)	Device During the Management of Spasticity in Chronic Hemiparetic Stroke Patients	patients to an control group. The stretched condition was maintained for 10 minutes during each exercise session, and the activity was done twice a day for four weeks. Assessment is done by MAS. Patients in the intervention group were examined twice (pre-1 and pre-2) before beginning the stretching exercise and once (post-1) thereafter.	in the control group, mean MAS (mMAS) scores were not substantially different (p>0.05). Furthermore, no significant differences were seen between the intervention group's mMAS scores at pre-1 and pre-2 (p>0.05). However, in the intervention group, mMAS scores at post-1 were substantially lower than those at pre-2 (p>0.05). There were no significant differences in mMAS scores between the first, second, and third evaluations in the control group (p>0.05). Furthermore, the intervention group's mMAS scores at post-1 were substantially lower than the control group's at the third assessment (p>0.05).	designed stretching device was proven to successfully reduce hand spasticity.
7	Aukje Andringa, Ingrid van de Port, and Jan-Willem Meijer (38)	Long-Term Use of a Static Hand-Wrist Orthosis in Chronic Stroke Patients: A Pilot Study.	11 patients and 1 caregiver. All patients were in chronic stage after stroke and were advised to use the static orthosis for at least one year ago. SPSS 18.0 was used for the analysis.	Three patients continue to wear the static orthosis at night after receiving it for at least a year, with varying levels of comfort. Four patients wore the orthosis for at least eight hours each day, and all reported satisfactory comfort. Due to poor comfort, two patients were unable to use the orthosis for the recommended 8 hours each day. The orthosis was discontinued by two patients, one due to increased spasticity and the other due to increased discomfort.	Number of chronic stroke patients are unable to sustain a static orthosis for at least 8 hours per day for at least a year. It is useful to look for alternate therapies that these stroke patients can tolerate.
8	Eun-Ha PARK; Jin-Young KANG; Min-Ho CHUN (39)	Effects of Resting Hand Splint in Early Stroke Patients	The participants were divided into intervention group (splint group) and control group with hemiplegic stroke. Individual motor training and upper limb stretching exercises were	The circumferences of the splint and control groups were 6.7+/-0.5 cm and 6.7+/-0.8 cm, respectively, before treatment. Both were 6.8+/-0.6 cm and 6.8+/-0.8 cm after 4 weeks, indicating no significant differences	For early stroke patients, a night-time splint-wearing regimen may not be therapeutically useful.

			done in both the splint and control groups. For four weeks, the splint group's individuals wore resting hand splints for a maximum of 12 hours each night. Pain in the hemiplegic upper extremity was assessed using a (VAS), spasticity at the wrist was assessed using the (MAS), passive range of motion at the wrist was assessed using a goniometer, and functional hand use was assessed using the manual function test (MFT). All measures were obtained at the start and conclusion of a 4-week therapy session as part of normal rehabilitation.	between the groups. For all parameters, the effects of splinting were statistically insignificant between the control and splint groups.	
9	Erel Suat, S. I· brahim Engin, Bek Nilgün, Yakut Yavuz and Uygur Fatma (40)	Short- and Long-Term Effects of an Inhibitor Hand Splint in Poststroke Patients: A Randomized Controlled Trial	19 chronic stroke patients were randomly assigned to the control group with 9 patients and research groups with 10 patients. Patients in the splinted group were instructed to wear their splints for at least 2 hours each day, either during ambulation or whenever they felt the need. The Berg Balance Scale, Functional Reach test (FR), Timed Up and Go test (TUG), and L test were used to assess subjects at the start and after 2, 4, and 6 months of splint use. The control group was evaluated using the same tests. For early stroke patients, a night-time splint-wearing regimen may	The control group exhibited no differences over the time interval in timed within-group tests. In the study group, there was a positive difference in some of the FR, TUG, and L test ratings. The only difference between the groups was detected for TUG values at the fourth evaluation in favour of the study group, according to intergroup comparisons. Patients were cooperative and usually satisfied with their splints, according to qualitative assessments.	In chronic poststroke patients, hand splints with reflex inhibitory properties had no influence on balance or functional ambulation activities. More research on their impact on pain and related reactions in this patient group is needed.

			not be therapeutically useful.		
10	Janet L. Poole, Susan L. Whitney, Nancy Hangeland, Carol Baker (41)	The Effectiveness of Inflatable Pressure Splints on Motor Function in Stroke Patients	18 patients with hemiplegia. Intervention group 9 patients and control 9 patients. Scores on the (FMA). Subjects were then randomly assigned to a non-splint or splint condition. For three weeks, the splinted group had the splint applied for 30 minutes, 5 days a week. 2 groups 3 people with right hemiplegia and 6 people with left hemiplegia.	For the upper arm (F = 8.11, df = 1, 8, P< .05, effect size = .95), wrist and hand (F = 8.36, df = 1, 8, p< .05, effect size = .96), and feeling (F = 5.45, df = 1, 8, P< .05, effect size =.78), there was a significant main effect for time. These variables' overall averages grew considerably from week 0 to week 3 independent of condition. Although the impact size was moderate, there was no significant change in the mean pain score over time.	This study used 18 hemiplegic subjects matched for upper extremity motor function before being randomly assigned to the splint or non-splint conditions.
11	Mohamed E. Khallaf, Mariam A. Ameer and Eman E. Fayed (42)	Effect of task specific training and wrist-fingers extension splint on hand joints range of motion and function after stroke	24 patients, randomly assigned into two equal groups. the study (intervention) group received task specific exercises five times a week for an hour concurrently with wrist/fingers extension splint which was used two hours for each three hours (day and night) excluding exercises and sleeping hours for 16 weeks. the control group received traditional passive stretch and range of motion exercises. assessment using FMA and nine holes peg test.	Post-intervention and follow-up results showed significant improvements in nine holes peg test, Fugl-Meyer upper extremity and hand scores, and ranges of motion when compared to pre-intervention (P< 0.05).	The findings of this study show that task-specific training and wrist/finger extension splints can help improve finger dexterity, upper extremity function, and wrist/hand range of motion.
12	Jang, W. H., Kwon, H. C., Yoo, K. J., & Jang, S. H. (43)	The effect of a wrist-hand stretching device for spasticity in chronic hemiparetic stroke patients	Patients with chronic hemiparetic stroke (n=21). Stretching was done with a wrist and hand stretching apparatus, and one session lasted 14 minutes. Stretching was done three times a day, six days a week for four weeks. The assessment	Significant changes in wrist MAS were found in the intervention group between pre (1.72) and post-2 weeks (0.91), as well as between pre (1.72) and post-4 weeks (0.82) (P0.05). Significant variations were also seen in the hand MAS (P0.05) across three evaluation intervals (pre; 2.00), (post-2	The author came to the conclusion that this stretching gadget is useful in decreasing spasticity and improving motor function.

			is done by MAS, FMA, AROM.	weeks; 1.36), and (post-4 weeks; 0.90). Between the three evaluation intervals (pre; 2.82), (post-2 weeks; 4.00), and (post-4 weeks; 4.63), significant variations in wrist FMA were identified (P0.05). We found a significant difference between three evaluation times (pre; 5.55), (post-2 weeks; 6.18), and (post-4 weeks; 6.90) (P0.05) in the hand FMA. Mean values rose with time in the wrist and hand AROMs, but no significant differences were seen ($P>0.05$). There were no variations in MAS, FMA, or AROM between the three evaluation periods in the control group ($P>0.05$).	
13	Aukje S. Andringa, Ingrid G.L. van de Port and Jan-Willem G. Meijer (44)	Tolerance and effectiveness of a new dynamic hand-wrist orthosis in chronic stroke patients	6 chronic stroke patients with upper limb spasticity, provided with a custom-made dynamic orthosis. A goniometer was used to assess the contracture of the wrist and finger flexor muscles. Spasticity in the elbow flexors, wrist flexors and fingers flexors were assessed by the (MAS).	During the 6-month period, five patients were able to tolerate the dynamic orthosis without pain for 6 hours each day, when compared to wearing the static orthosis, self-reported spasticity and discomfort decreased considerably ($p< 0.05$). The maximal passive wrist extension increased considerably from 29 to 12 ($p<0.05$) as compared to baseline.	The innovative dynamic orthosis was tolerated by the majority of chronic stroke patients for at least 6 hours daily, and its usage dramatically decreased wrist contractures over a 6-month period.
14	Assunta Pizzi, Giovanna Carlucci, Catuscia Falsini, Sonia Verdesca, Antonello Grippo. (45)	Application of a Volar Static Splint in Poststroke Spasticity of the Upper Limb	47 patients with hemiplegia and upper-limb spasticity. Patient wore splint for 90 minutes daily for 3 months. Modified Ashworth Scale (MAS), passive range of motion (PROM) at the wrist and elbow, (Hmax/Mmax ratio), using a visual analogue scale, rate the discomfort in your	There was a reduction in elbow spasticity (F=5.39, P=.002), wrist pain (F=2.89, P=.04), and spasms (F=4.33, P=.008), as well as a substantial improvement in wrist PROM (F=8.92, P=.001) with bigger reductions in extension than in flexion. The Hmax/Mmax ratio of the flexor carpi radialis reduced considerably (F=4.2, P=.007). The effects	RIS might be utilised as part of an overall therapy plan for post-stroke upper-limb stiffness. It can be administered at home in selected individuals who lack effective hand motions and in circumstances where antispastic medications have had a poor response or tolerance.

			shoulder, elbow, and wrist.	of RIS (reflex inhibitory splinting) were well tolerated. Two patients' toxin injections were reduced.	
15	Johan A. Franck, Annick A.A. Timmermans and Henk A.M. Seelen (46)	Effects of a dynamic hand orthosis for functional use of the impaired upper limb in sub-acute stroke patients: A multiple single case experimental design study	8 people who have had a subacute stroke. The orthosis was worn for six weeks, five days per week, and 45 minutes each day. Action Research Arm Test (ARAT), ABILHAND, and Intrinsic Motivation Inventory were used as outcome measures (IMI).	Patients improved on ARAT (p = 0.001) and ABILHAND (p = 0.005) at the group level. Three patients whose baseline ARAT altered slightly (0–3 points) improved at follow-up, whereas four stayed the same in terms of detrended ARAT findings. ABILHAND mean detrended findings were greater during follow-up in four individuals with comparison to the starting point.	Patients who show little/modest improvement in their ability to conduct tasks or their perceived level of daily performance in the early subacute period following a stroke appear to gain the most from training using a dynamic arm orthosis. Patients reported a high level of intrinsic drive and self-control.

IV. DISCUSSION

While static splinting has been one of the most popular methods of splinting in order to improve hand mobility after a stroke, the evidence backing its efficacy is mixed. Many studies have shown that participants often experience pain or discomfort while wearing the orthosis, limiting its efficacy. Dynamic splints, on the other hand, are generally shown to be effective at improving range of motion, dexterity, and grip and finger strength. Importantly, dynamic splints do not cause as much discomfort as static splints and are generally more affordable. However, the research on dynamic splints and their efficacy is limited.

In this review paper, apart from classifying different types of splints, there is also a collection of data for the effects of splints or orthosis. It has been taken as separating patients into two groups; one is the intervention group, in which orthosis happens, and the control group, which is unexperimented. The analysis is done by different means: Fugl-Meyer Assessment (FMA), Modified Ashworth Scale (MAS), Action Research Arm Test (ARAT), Visual Analog Scale (VAS), Electromyography (EMG), analysis of variance (ANOVA), etc. Splinting is far more effective in improving and maintaining the patient's functional abilities in hand abnormalities following stroke. The relevance of the Assistive device as a compensation for activity limitations has been highlighted in studies. Functional limits and illness severity have been found for predictive application. Because of the link between particular constraints and the use of adaptive devices, it's possible that assistive device prescriptions should be restricted to patients who have impaired or limited device-related activities now or in the future. For certain stroke patients who can tolerate this low-cost orthosis, a static orthosis can be an effective way to avoid contractures. However, there is a subset of chronic stroke patients who cannot tolerate a static orthosis and require further treatment to avoid contractures in the upper limb. Stepped care can be employed in this group; if static orthoses are not tolerated, another intervention, such as a dynamic orthosis, would be used.

V. CONCLUSION

In this review paper we have studied about six broad types of splints and their seven different sub-types collectively. also compared the efficacy of various hand splints. From the above assessment, we can conclude that throughout the years, splinting techniques have advanced exponentially from various static splints to dynamic splints with their extensions. Every splint serves a different purpose, such as static splints are useful for hands which are in rest position, dynamic splints are useful for the patient who requires some amount of motion, wrist splints, as the name suggests, give assistance to the wrist portion with its extensions, finger splints are used for individual fingers, thumbs specifically, and metacarpal ulnar deviation splints for the metacarpophalangeal joints. But with these studies, one thing is clear, which is that it takes a long time to keep it wearing. Hence, there is a lot of scope for developing dynamic hand splints or dynamic hand splints with finger extension to be used for better recovery, less time consumption, and less dependency on others.

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