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Expert opinion on splinting adult patients with neurological injuries

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ABSTRACT

In the light of a lack of research evidence, this study explored expert opinion for splinting in adults with neurological injuries. An exploratory, descriptive, qualitative methodology was used with 14 occupational therapists, experienced in neuro-rehabilitation. Data were analysed based on a priori themes from two models of clinical practice:-

- *The Model of Practice Development: - themes indicate that most value was placed on personal knowledge gained from experience in the field and being able to individualise treatment for each patient. Procedural knowledge gained from clinical experience; reflection on protocols and working with and learning from others were seen as essential in developing skills required for splinting in adults with neurological injuries.*
- *The Three Track Model of Clinical Reasoning: - Themes indicated that the effectiveness of the splints depended on the patients' context and response as well as the therapists' ability to adapt to their preferences and goals. Procedural reasoning and goals related to client factors should not be considered in isolation and each patient must be considered individually when prescribing splints. Considering the patients' context and the support and resources* they have, is also essential

Outcomes in adults with neurological injuries should consider occupational performance and client satisfaction when evaluating effectiveness of splinting.

Key words: Splinting, Adults with neurological dysfunction or conditions, Clinical reasoning, Professional development

INTRODUCTION

The effectiveness of splinting the hand and upper limb following neurological injury in adults for both stroke and non-progressive brain lesions, such as traumatic brain injury (TBI), remains controversial[1]. Based on the principles of provision of prolonged, low-load, stretch for the reduction of spasticity and to prevent contractures[2], resting splints made of thermoplastic material have been suggested as an appropriate intervention for the upper limbs of patients with neurological dysfunction[3]. However, a number of systematic reviews suggest that the research evidence for splinting patients with these conditions in occupational therapy remains low at best[1,4,5].

Despite this lack of evidence splinting is often used clinically by occupational therapists in adults following brain injury and stroke. The reasons for splinting include affecting spasticity and hypertonia or maintaining joint range and length of soft tissues[5-7] even though research indicates splinting is not effective in improving or changing upper limb function, hand range of motion (ROM), pain or spasticity in adults after stoke and other chronic non-progressive brain lesions[1]. These findings were reinforced in 2015 in guidelines for preventing and reducing contractures in the upper limb of patients with neurological dysfunction, published for occupational therapists and physiotherapists in the United Kingdom[4].

Research on the clinical reasoning used by occupational therapists has however shown that the decision to use splinting with adults with neurological dysfunction appears to be based on a number of factors other than controversial research evidence[8,9]. These factors include the individual differences in dysfunction with which each patient presents[8,9], severity of contractures, the context of the patient and their family and the setting in which the patient is treated[9,10].

This is supported by other studies which found positive results for splinting adults with neurological injury. Andringa et al[11] confirmed that long term splinting might benefit patients after stroke. This was supported by Copley et al.[12] who showed significant and clinically relevant changes in ROM and spasticity in TBI patients when they used a different approach to splinting for each participant in their randomised single subject study. In both studies customised splints as well as an unique splinting programme was used with each participant.

This study therefore explored clinical reasoning and professional development which influence expert and experienced occupational therapists' prescription of splints for adult patients with neurological dysfunction. According to Lo and Field[13] clinical experience can contribute to the development of evidence-based practice in the face of the lack of other evidence and consistent research findings[13]. In the light of this, the current clinical practice of occupational therapists in a South African context was considered.

LITERATURE REVIEW

Systematic reviews completed in 2003 by Lannin and Herbert[5] Strueltjens et al[14] and by Tyson and Kent[1], which appraised best evidence in randomised controlled trials on splinting in adults with neurological dysfunction, indicate this type of splinting is not an effective intervention. This finding was supported by later randomised control trials[15] and a review published by the College of Occupational Therapists and Association of Chartered Physiotherapists in Neurology[4] which considered research in 33 articles at various levels of evidence from very high to very low. They reported that there

is insufficient evidence for the use of splinting with adults with neurological dysfunction. The guidelines from this publication suggest that splinting not be used for intervention for ROM, contractures or spasticity in these patients except to support botulinum toxin A therapy and prevent pain from developing[4].

Copley et al[12] however, found a significant improvement in passive range of motion and other clinical changes with moderate effect sizes using an individual approach to splinting intervention for each of their 10 patients with TBI in a randomised single subject study. This study emphasised that for splinting to be effective in these patients it must be customised in relation to the low load stretch, wearing time and abnormal hand positions[12]. Set regimes and protocols using one type of splint and an inflexible splinting programme normally described in a randomised control trial, should be replaced with determining and achieving individualised goals for each participant.

These findings support the literature on clinical reasoning in occupational therapy which forms the basis of providing individualised intervention[16]. Occupational therapists were found to be more likely to splint if the patient presented with decreased passive range of motion and moderate or severe hypertonicity, They also considered previous history and tolerance of splinting, uncooperative behaviour as well the family's or caregiver's opinion on whether the patient would tolerate a splint. When the patient was over 75 years old, had no caregiver or the outcome for treating the hand was for hygienic reasons, splinting was rarely used[2].

It is important therefore to explore the clinical reasoning and decision making used by occupational therapy clinicians in identifying and determining the factors which contribute to the effectiveness of splinting adults with neurological conditions in clinical practice[9]. It is likely that experienced and expert clinicians in this field have developed the necessary clinical skill to effectively identify these factors and accommodate them in their practice when splinting these patients. An understanding of how this skill and expertise develops was guided by both the Model of Practice Development[17] and the iconic Three-Track Mind Model of Clinical Reasoning[18,19] in this study.

The Model of Practice Development describes the growth of professional knowledge within clinical practice which is built up through professional education (propositional knowledge), actual practice (procedural knowledge) and professional and life experiences (personal knowledge)[17]. The acquisition of professional knowledge occurs during authentic practice, where therapists learn as they do, as well as by the transferring this learning to similar situations. This transfer of learning may be challenged in occupational therapy when treating patients with neurological conditions due to the unique presentation of each patient. Further development of professional knowledge occurs in the professional context when the therapists work in a team, but does rely largely on professional education or propositional knowledge developed over time[20].

Development of clinical expertise is also supported by the development of clinical reasoning which involves the analysis of the knowledge gained as well as the appropriate application of techniques to particular patients[19]. The Three-Track Mind Model of Clinical Reasoning describes three levels of clinical reasoning which develop as an occupational therapy clinician gains experience. The first level is procedural reasoning, aligned to the use of theoretical knowledge[18,19]. Clinical reasoning at this level is concerned with the application of splinting in relation to the following variables: client factors[21], types of splints, wearing schedules and outcome measures. Most research on splinting of the upper limb in neurological conditions reports on these types of variables all of which has been inconclusive in terms of effectiveness.

Interactive reasoning, the second level of clinical reasoning occurs during face-to-face interactions with the patient allowing the therapist to better understand the patient as an individual, build trust and show personal interest in the patient[19]. The effectiveness of splinting is therefore determined by the therapist on an individual basis[22]. The role of other factors in splinting the patient with neurological injury can also be assessed on an individual basis. These factors such as poor cognitive function, oedema, lack of sensory awareness of a limb and shoulder subluxations are often listed as exclusion criteria in studies on the effectiveness of splinting even though they are commonly found as sequelae in in neurological conditions.

The use of interactive reasoning therefore allows the matching of treatment goals and strategies to each individual patient in a remarkably diverse client group where no single procedural theory fits all[6]. Finally conditional reasoning builds on interactive reasoning taking the patient and their whole context into account. There is little information on splinting in the upper limb in neurological conditions related to the patients' contexts and the effectiveness of splinting when the whole context is taken into account[2]. In South Africa this includes challenging social circumstances and poor literacy levels[23].

It has been shown that with the development of clinical expertise therapists are able to practice in a more effective client-centred way as a result of having achieved high levels of both professional knowledge and clinical reasoning. Experienced therapists are more able to appreciate what the patient brings to the treatment situation in terms of their own preferences, concerns and expectations[16].

While the use of professional knowledge and clinical reasoning may not always be a conscious process[19], it does require 'tapping into' the patients' self-perception for the therapist to understand the complete situation. The clinical reasoning process includes a review of factors such as the patients' personal attributes and his/her perception of his/her occupational and performance needs before moving to goal setting with the patients and his/her family members. Treatment planning in relation to splinting in neurological injuries should therefore be individualised as well as contextualised[12].

The objectives of the study were therefore to:

- Explore the current practice of expert occupational therapists (i.e. those with post graduate training and ten or more years of experience[16]), or experienced occupational therapists (ie those having at least 5 years' experience[16]) with regard to splinting following neurological injury in adults.
- Explore the use of professional knowledge and clinical reasoning by expert or experienced occupational therapists' in the prescription of splints for the hand following neurological injury in adults.

METHODOLOGY

The study made use of an exploratory, descriptive, deductive, qualitative research methodology[24]. Focus groups were chosen as the most appropriate method to collect rich thick data from occupational therapists experienced in the field of adult neurology[16].

Sampling

A sample of 14 occupational therapists was purposively selected. Participants were all occupational therapists with at least five years of experience, all of whom had had postgraduate training. All participants lived in Gauteng and they all participated in one of three focus groups.

Data instruments

Two case studies, adapted from cases in an occupational therapy textbook by Curtin et al[25] were used to facilitate discussion in the focus groups. These cases included a patient with a CVA and a patient with a TBI, adapted so that each was reflective of the South African setting in terms of work and living contexts. These case studies were used to explore the manner in which participants made clinical decisions, provided explanations and justified those decisions in terms of splinting the hand in neurological conditions. This was used to stimulate discussions around the key points of controversy about splinting adults with neurological dysfunction. The cases were presented in a simple table format for ease of reading and to allow the participants to refer back to the details of each case.

A discussion guide based on the current literature on splinting in adults with a neurological dysfunction was developed for use in conjunction with the case studies. This assisted in considering aspects of clinical reasoning and professional development and ensured consistency in all three groups[26]. Specific questions were asked related to clinical decisions in terms of the influence of formal education, models and research. Questions were open-ended and related to each case study in terms of clinical decision-making on whether to provide a splint or not. Participants were asked to justify each decision made and the types of materials, splints and regimens they would use were also explored to understand their clinical reasoning and the various factors which influenced their decision making.

Procedure

Ethical clearance for the study was obtained from the Human Ethics Research Committee at the University of the Witwatersrand. The discussion guide and case studies were piloted with a group of occupational therapists who were less experienced, to refine the discussion guide. Selected participants were then invited to attend a focus group at their convenience. The groups took place after work hours and lasted 90-120 minutes.

During the focus groups participants were asked to justify and then discuss the decisions about splinting that they would have made for the two presented case studies. The focus groups were led by the first author and audio recorded. Field notes were made by another occupational therapist, who also played the role of co-leader in the focus groups. These notes were discussed and checked by the first author immediately after the completion of each focus group.

Data analysis

The discussion from each focus group was transcribed and analysed using deductive reasoning into a priori themes based on the Model of Practice Development[17] and the iconic Three-Track Mind Model of Clinical Reasoning[18,19] (*Table 1*).

Trustworthiness was ensured by emailing summaries of the coding to participants for member checking and for additional comments. Peer examination of codes was utilised as findings were discussed with the research supervisor as well as the occupational therapist who assisted with facilitating the focus groups. No more than three focus groups were needed to achieve data saturation. Field notes were used to inform the coding of the data.

FINDINGS

Participants had a mean of 10.2 years of neurological rehabilitation experience ranging from five to 25 years. Nine of the 14 participants had postgraduate degrees, six of these being in the field of neurology. The same number of participants had postgraduate Neurodevelopmental Therapy (NDT) training. All participants had previously worked in the public sector but were presently working in the private sector or academia at universities in Gauteng.

The a priori themes and categories can be seen in (*Table 1*).

Table 1: Themes, categories, subcategories and codes

Themes	Categories	Subcategories	Codes
Professional development	Propositional Knowledge	Poor foundation of practical experience	• Undergraduate training • Postgraduate courses
		Research evidence for practice	• Keeping up to date • Controversy and lack of evidence
	Procedural Knowledge	Experience	• Working with colleagues • Working with the materials • Knowing the outcomes and goals
		Evaluation	• Reflection on successes and errors • Measurement of improvement • Patient response
		Effectiveness	
	Personal Knowledge	Individual growth	• Interpretation
		Listen to patients	• Adapted for preferences • Patient's goals
Clinical reasoning	Procedural reasoning	Client factors	• Range of motion • Muscle tone • Pain and others
		Performance skills	• Motor and praxis skills
	Interactive reasoning	Individual patient - internal performance components	• Personality • Age • Hand dominance
		The risks	• Treating the hand in isolation • Factors affecting splinting and compliance
	Conditional reasoning	Total patient – external performance components	• Family and caregivers • Education • Resources • Preferred alternative treatment
		Therapy comes first	• Therapy more important initially
		The whole picture	• Combination of all factors

THEME 1: Professional Development

Propositional knowledge

Participants indicated that very little knowledge about splinting patients with neurological injuries was obtained in their undergraduate courses. The knowledge and understanding gained around the basic principles and biomechanics that govern splinting did not guide their practice in the field of neurology. Knowledge gained at postgraduate courses was not always considered easy to implement in the clinical setting:

courses are often so complicated that you couldn't after having done one, even under supervision attempt to do it somewhere else again.

While some participants felt knowledge could be gained by keeping up to date and *reading up* on current evidence, there was difficulty with finding consensus on which information in the available literature was of any value.

These experienced participants indicated that there was no set protocol for this type of splinting and their discussion frequently reflected words of uncertainty, such as *I don't know*, *maybe*, *might*, and *hopefully*. Other comments indicating their uncertainty and the lack of any sound research evidence and clear prescription guidelines when splinting patients with neurological conditions are reflected in the following statements

You might actually have a trial of changing the wrist position to see.

I don't know, maybe my theory is a bit

wrong, but for me I like to get the thumb out, that really helps because hopefully then you are going to get an overlap, hopefully there will be some regaining of movement so then they can use the movement during the day… and then leave it on at night.

Procedural knowledge

Participants placed great emphasis on the value of their clinical experience and knowledge gained through actual practice when providing the evidence they use in splinting in neurological conditions. Working with more experienced colleagues, was consistently the most valuable contributor to the development of knowledge and clinical skill in this type of splinting. Participants' experience in working with the actual splinting materials and developing familiarity with techniques on how to use materials more effectively was also highly valued.

The most participants felt the dorsal-volar (anti-spasticity) splint would be more effective in the cases studies presented in the focus groups and the following comments were made:

I've seen successful and unsuccessful splinting and they don't always depend on the splint

the material and type of splint to me is not so much the issue… the design of the splint wouldn't be so much as important as the position, but which design would best support the position that you wanted.

The participants emphasised that achieving specific outcomes or goals was more important than the actual splint itself. The importance of comprehensive assessment and close monitoring in order to determine the need for and purpose of the splint for each patient was stressed above defining the actual splint that should be used. Constant reflection and evaluation of the splint, materials, regimen and patient's response were seen as most important. Some participants did still admit to making use of "*trial and error"*, particularly for TBI patients who *never had a clear picture and are more difficult to predict than stroke*. The therapist's personal experience with using a particular splint effectively was seen as part of this process.

Objective measurement of change or outcomes was also reported as a challenge and led participants to evaluate progress in terms of the patient's response to the splint rather than the change in client factors such as spasticity and ROM.

My patients… generally they all tell (sic) me that it feels better once they have had a splint on for a while, they feel better, because now their hand is open longer, or … now the fingers can open easier, and I'm not quite sure if that is what affects tone…

Personal knowledge

Participants reported that their professional development in learning to splint the hand in neurological conditions was related to their personalised experience with individual patients which allowed critical, evaluative reflection on these experiences. They felt splinting was most effective when they involved close consultation with the patient, listening to their goals, needs and wants and observing what happened to the individual's hand when it was splinted so that treatment could be adapted to the individual patient's specific preferences.

I think it takes you a long time to listen to your patients, because you always think you know it all and sometimes if you really listen I think they have got quite good ideas

Participants indicated that the development of personal knowledge over time contributed most to effective splinting in neurological conditions. This type of knowledge provided confidence in terms of patient related client-centred outcomes which propositional knowledge did not. The component of evidence based practice that accentuated the patients' goals was considered more important than the splint design and the effect on client factors such as range of motion.

THEME 2: Clinical reasoning

The participants' development of expertise in providing evidence for splinting in patients' with neurological injuries was further analysed according to the levels of clinical reasoning.

Procedural reasoning

The components participants discussed under procedural reasoning in terms of their thought processes for their current practice related to problems in client factors and performance skills which included those commonly discussed in the literature.

Range of Motion - loss of ROM was the most common reason for splinting following neurological injury particularly to *maintain the muscle length and the tendon length, maintain the ROM during the chronic stroke phase and throughout all phases following TBI* unless there was active movement present in the hand. Therefore participants suggested splinting only if the passive ROM was compromised. There was also consensus amongst participants that splinting should be used to maintain the muscle length, tendon length and ROM in the presence of spasticity.

Spasticity - the reported effectiveness of splints in reducing spasticity was related to the design of the splint, which should provide *…neutral temperature, circumferential pressure and better alignment which results in a reduction in tone* although improvements in spasticity are better provided by other individual occupational therapy interventions such as neuro techniques and active movement.

Pain – some participants prescribed a splint to reduce acute pain and discomfort and to manage chronic pain for patients. This was achieved by having the splint keep the hand in a good position, by *…trying to get as close as you can to your functional position.*

Voluntary control of movement - there was consensus that a splint was not to be recommended once active, voluntary movement was present following TBI and stroke and thus should not interfere with active movement and functional use of the hand.

In addition to the above-mentioned client factors and performance skills, splinting was suggested for patients only if the splint assisted a motor skill such as improving grasp and lateral pinch or placing the wrist in an extended position to *…promote function of the hand*. This should be combined with a comprehensive functional assessment and the application to a particular motor skill in a functional task. However, participants felt strongly that a splint should not be prescribed at the first assessment. Furthermore, the wearing schedule for any splint needed to be as simple as possible and should be combined with passive stretching.

Interactive reasoning

Interactive reasoning included considering the patients' experience of his/her disability or illness and understanding the patient with a neurological injury as a person with occupational needs. Both the intervention programme and the splint needed to be prescribed for the individual –

Every splint you make is completely individual.

The patient's hand cannot be considered in isolation and participants reported that evidence for splinting was dependent on the patient's personality, hand dominance and age. Understanding whether splinting would affect the patient's ability to function in their daily activities should be a priority.

Numerous concerns related to other factors which may present a risk for the patient need to be considered when prescribing a splint for a patient with neurological injury as these may dictate whether a splint should be provided. The risk factors discussed include increasing age which results in fragile skin, oedema, arthritis which may also compromise joints further, co-existing cognitive problems, behavioural challenges, lack of physical awareness of the limb (loss of proprioception, loss of sensation, hemianopia and neglect), a complex medical history and a history of non-compliance.

Conditional reasoning

Evidence for splinting the patient with a neurological injury when using conditional reasoning, is based on the prognosis of the patient and the impact of the patient's broader context. Effective splinting in the participants' current practice took into account the patients' response to therapy and their tolerance for intensive

splinting protocols, their change in life roles associated with the neurological injury, their life milestones, lack of support systems, loss of independence as well as poorly resourced living conditions and their access to health care.

The influence of family and caregivers emerged as the most important external performance component for consideration when deciding to prescribe a splint, particularly if the patient had cognitive deficits or was dependent on a carer for proper splint application. The family and caregivers influence both effectiveness and compliance when a splint is prescribed for a patient-

His family set up, for me is a bigger determinant, because again, are they going to see he uses the splint and uses it correctly to achieve a change in function

…you actually need to work with the family

or if the patient is at an inpatient facility

[you] need to decide if there is someone to put the splint on for the client because most of our clients don't have the capacity to put it on themselves.

Proper education of caregivers was considered essential for effective splinting and suggestions for this education included provision of a photo with proper application of the splint, training on warning signs for pressure areas and training on the specific programme for wearing. It was felt that social class was not the issue, rather … *Insight* [was] *more important than poverty.*

Participants described the use of low tech splints such as bottles or a soft ball to keep the hand comfortable and prevent the fingernails from digging into the palm when it was not possible to monitor a patient's splint regularly. They felt that the effectiveness of splinting was dependent on follow-up and monitoring at regular out-patient therapy post discharge. One participant felt strongly that splinting a patient with a neurological condition was only effective if the patient attended weekly occupational therapy, which in many South African contexts is unrealistic.

Other participants felt that splinting was not a priority in the treatment of patients with a neurological condition and that they would rather address occupational performance, particularly during the acute rehabilitation stage.

My focus of therapy would be on functional rehab, getting the client transferring, getting the client more aware, so splinting at this stage, unless I see after a week of evaluation, there is a severe deterioration which would limit that functional rehab, it wouldn't be my primary treatment objective at this stage…

There was strong consensus that splinting should be used with great caution. Participants recommended *…a problem solving process* using experience to consider all the factors reported on above if splinting the hand in neurological conditions is to be as effective as possible. This is dependent on an experienced occupational therapist determining a tailor-made solution for the individual patient.

DISCUSSION AND RECOMMENDATIONS

Current level one research evidence in systematic reviews on splinting following neurological injury, reveal that there is insufficient evidence to prove the effectiveness of splinting for client factors such as spasticity, contracture formation and ROM for patients[1,4,14,15]. The experienced and expert occupational therapy participants in this study reported that, in the absence of definitive research evidence for splinting patients with neurological conditions, they rely mostly on their professional development and clinical reasoning skills. This allowed them to evaluate methods suggested in the literature, but they felt they would rather use reflection and experience to make a decision about splinting that would be effective in the treatment for each individual patient.

They acknowledged that their professional knowledge was developed over time, particularly with the skill of making splints and problem solving in this field of practice. They also acknowledge that their greatest learning was achieved through learning from other experienced colleagues and in clinical practice. Participants in this study do not use procedural reasoning considering concrete problems related to client factors and performance skills in isolation. They made use of a combination of procedural and interactive reasoning and interactive and conditional reasoning, as is expected from expert therapists[18].

In support of this, literature reports that therapists with less than five years of working experience use splints more frequently with adults with neurological conditions, than those with more work experience[27], a problem also identified by some of the participants in this study. It was suggested that inexperienced therapists probably chose splints based on guidelines taught at undergraduate level and procedural clinical reasoning so they not only used splints more frequently but may also have used splinting inappropriately. It is recommended that those wishing to practice in this field be required to gain further knowledge and clinical experience specific to splinting and neurological rehabilitation under the supervision and mentorship of expert therapists. Mentoring was seen as the most valuable contributor to the development of professional knowledge[28] and clinical skill for effective prescription of splints in neurological conditions.

Since the goal of evidence based practice is to provide optimal intervention to each patient on an individual basis[29], the challenge remains in adapting the intervention for each case. Participants indicated that each patient should be viewed holistically prior to determining the intervention needed and when deciding to splint. It was felt that splinting should be avoided in the presence of voluntary movement. This is supported by Carr and Shepherd[30] in the motor relearning approach where they propose that soft tissue length should preferably be maintained by active means as placing the hand in a static position contributes to learned non-use and further muscle weakness.

Outcome measures used to assess the effectiveness of splinting in neurological dysfunction, such as torque controlled passive range of motion, and the Modified Ashworth Scale (MAS)[2,31] or Modified Tardieu Scale (MTS)[31], have presented challenges and are seldom practical or reliable as they use subjective evaluation. The participants in this study felt that the subjective experience of the patient when wearing the splint as well as the change in a patient's ability to complete functional tasks should be considered as outcome measures rather than those which measure client factors and performance skills presently reported in research. This is supported by research which shows a significant relationship between expectations, satisfaction and compliance of splint use[32] and provides confirmation in terms of the need to develop better objective functional outcomes measures and adequate training of practitioners in their use.

Participants explained that effective splinting of neurological conditions in South Africa is also dependent on a clear understanding of the patient's background and context[32]. Due to this being a developing country with great variation in patients' level of education and understanding of illness and disability, participants found it important that education and splinting programmes were individualised and provided at the correct level for the patient or caregivers. The participants recognised that the family and caregivers play an essential role in determining the effectiveness of and compliance to the splinting protocol or programme. This requires a good understanding of and involvement of reliable carers or family and education with the emphasis on insight.

With participants drawing from years of experience and knowledge it was clear that as expert therapists they were able to consider the 'bigger picture' and suggest treatments which were most effective in achieving the desired goals when managing the hand after neurological injury. Under most circumstances participants felt that splinting alone was not the most effective means of treatment and emphasis should be on the holistic treatment of the upper limb. Inexperienced therapists and researchers developing research evidence need to take this into consideration.

Limitations of the study

The greatest challenge of this research and for the participants was the difficulty in describing generalised intervention for individuals who present with unique deficits. What is clear is that there is no 'one therapy fits all' and each patient with neurological injury needs specific individual decisions to be made in terms of their personal context and the deficits with which they present. The findings of this study indicate no effective standardised type of splinting procedure can be described for adult patients with neurological dysfunction.

The group of participants was homogenous as most of the participants trained at the same university and all worked in private practice or at universities. Specificity to South African context could have been further explored by asking participants to specify the various contexts in South Africa where each decision could be or has been implemented or by having a more heterogeneous group involving occupational therapists from various settings.

CONCLUSION

This study has presented the challenges faced by occupational therapists when splinting the hand of adult patients with neurological injury. The results indicate this is an area of practice best addressed under the guidance of, or by experienced and expert clinicians who have acquired a high level of professional development and clinical reasoning as each splint needs to take the individual patient and their context into account.

Literature appears to be limited to describing one splinting regime imposed on all participants, a practice which is not supported by this study which found that there is no single solution for prescription of splints for adults with neurological conditions. At present, some of the outcomes measures routinely used are criticised as being impractical and unreliable, because they are not universally applicable and do not consider patients' experience and functional outcomes. Thus, the effectiveness and evidence for splinting patients with neurological conditions needs to rather consider the satisfaction and expectations of the patient and their family or caregivers, in addition to the change in their occupational performance and compliance to the splinting programme.

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