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CURRENT TRENDS IN SPLINTING THE HAND FOR CHILDREN WITH NEUROLOGICAL IMPAIRMENTS

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INTRODUCTION

- Splinting in neurological impairment = controversial area of practice (Neuhaus et al, 1981; Langlois, Pederson & MacKinnon, 1991)
- Base practice on scientific evidence. (Sandin, 2012; Girard, Rochette, Fillion, 2013)
- Compensation → minimise impairment & focus on function

- ‘Neurological impairments’ = conditions where there has been an insult to the CNS.
  - cerebral palsy, pervasive developmental disorders, genetic disorders, degenerative conditions, and may also include traumatic brain injuries and HIV related conditions
- Experience = justification for splinting
- This study thus explored the current splinting practices of OTs within the South African context with children with neurological impairments.

LITERATURE REVIEW

- Experience with splinting:
  - (i) normalise tone in order to prevent or correct contractures
  - (ii) increase function within the affected arm through improving movement whilst protecting the integrity of the joint
  - (iii) decrease pain (Lannin & Ada, 2011)
- Little research evidence (Adrienne & Manigandan, 2011)

- Splinting in stroke (Hoffman et al, 2013; Khatri et al, 2013):
  - Main aims of splinting:
    - Prevent deformity and soft tissue contractures
    - Improve hygiene and functional needs
    - Maintain muscle length
- South African study (Chazen, 2013):
  - Splint if active movement is present

- Other survey studies (Adrienne & Manigandan, 2011) :
  - Decrease pain (refuted by Lannin et al, 2011)
  - Maintain the hand or arm in a comfortable position

- Various studies have begun to identify the value of a number of splints in neurological conditions

- No current literature that documents the splints used in practice within a South African context in the paediatric neurologically impaired population.

- Functional resting splint
  - Indication: moderate to severe increased tone and severely decreased tone, for the prevention of contractures and for hygienic purposes
  - Effectiveness (Pizzi et al, 2005): significant difference in passive wrist extension and spasms

- Wrist extension splint
  - Neutral wrist splint were more compliant than those wearing a wrist extension splint.
  - No significant impact on function was noted (Lannin et al, 2007)

- Other prominent splints:
  - Weight-bearing splint
    - tasks requiring weight-bearing (Gabriel, 2008)
  - Anti-spasticity splint
    - Effective → functional position, improved hygiene & prolonged stretch (Chazen, 2013)
  - Serpentine splint.
    - Minimise adduction contractures of the thumb
    - Stabilisation of the thumb during activities (Darcera, 2012)
  - Dynamic Splints
    - Better post-splint grip & fine motor skills (Burtner et al, 2008)

- Soft splint advantages:
  - Prolonged stretch for normalisation of tone without restricting movement (Fedrizzi, Pagliano, Andreucci. 2003)

- Limited research in the value of splinting in neurological conditions
- Unknown frequency and type in SA for paediatric neurological impairments

METHODOLOGY

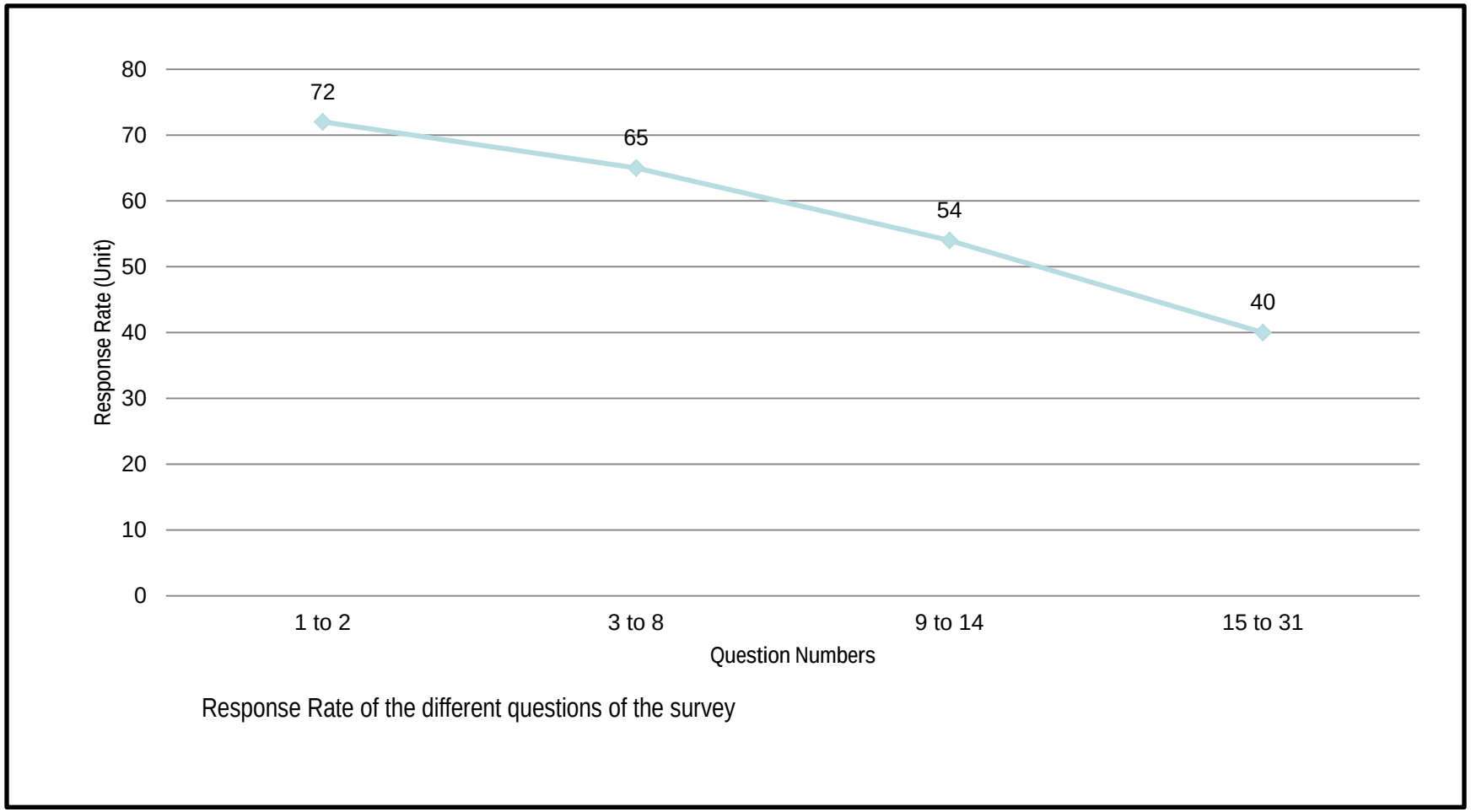
Aim

- ***To explore the current splinting practises of OTs in hand therapy intervention for children with neurological impairments within the South African context.***

- A cross sectional survey was conducted nationally amongst Occupational therapists registered with the Health Professional Council of South Africa (HPCSA).

Population and Sampling

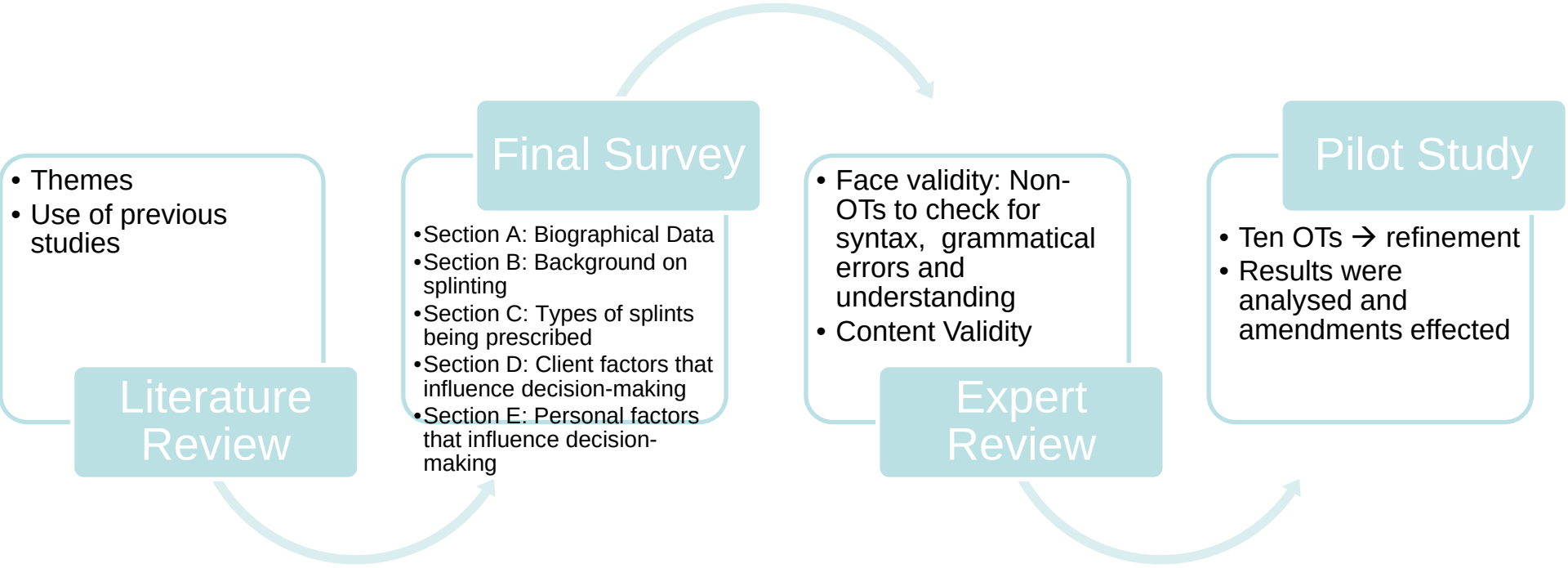
- The target population = all OTs working in the field of paediatric neurological rehabilitation in South Africa.
- No prior knowledge – no specialist register
  - INSTOPP (private practitioners)
  - SASHT
- Convenience and snowball sampling
  - (i) Registered as community service or independent practice with the HPCSA,
  - (ii) Undergraduate and/or postgraduate degrees in OT (iii) were currently working with children with neurological impairments at least twice per week



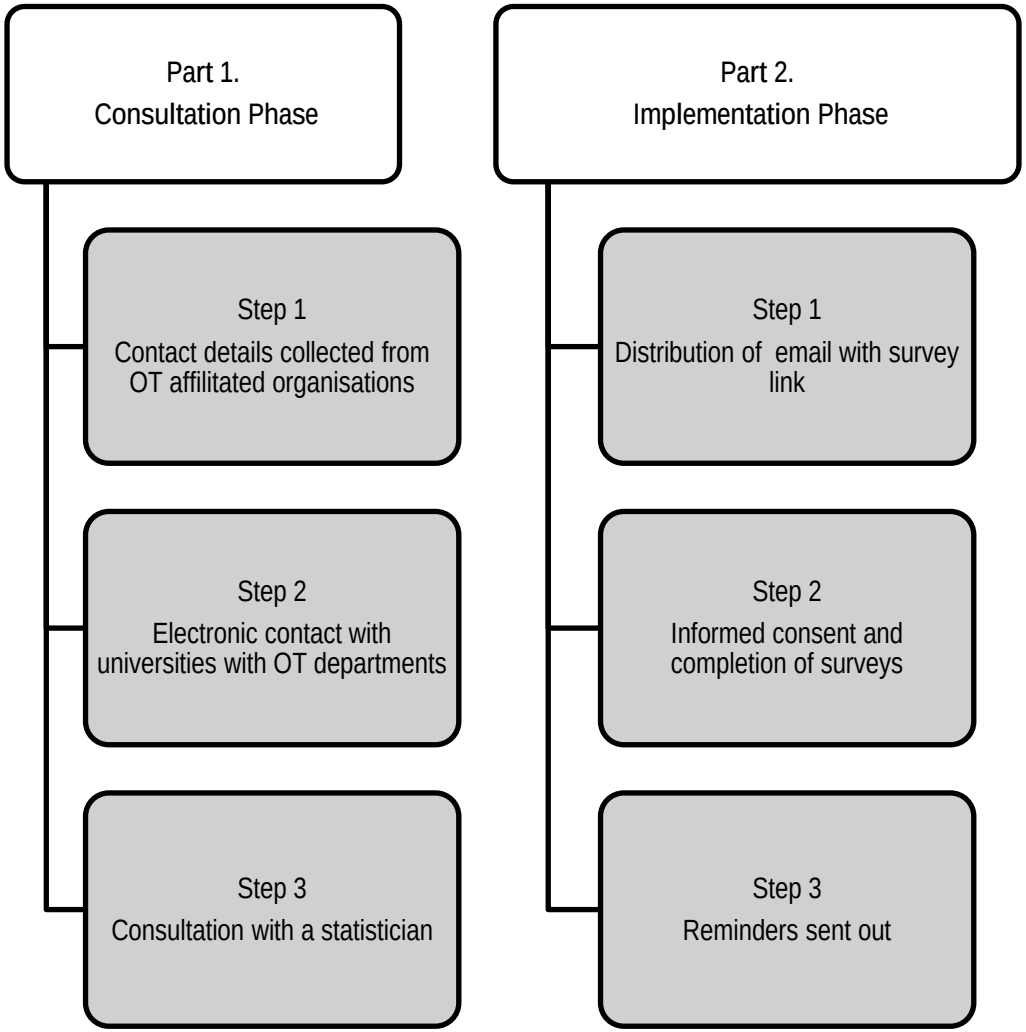
Response Rate of the different questions of the survey

Instrument Development

- Themes from questionnaires designed for previous studies in Canada (Reid, 1992), Ireland (Adrienne & Manigandan, 2011) and the United Kingdom (Kilbrade et al, 2013) were considered.


Literature Review
• Themes
• Use of previous studies
Final Survey
•Section A: Biographical Data
•Section B: Background on splinting
•Section C: Types of splints being prescribed
•Section D: Client factors that influence decision-making
•Section E: Personal factors that influence decision-making
Expert Review
• Face validity: Non-OTs to check for syntax, grammatical errors and understanding
• Content Validity
Pilot Study
• Ten OTs → refinement
• Results were analysed and amendments effected

Data collection



Data analysis

- SurveyMonkey → Excel Spreadsheet
- Data changed to numerical values
- Statistician was consulted for data analysis with the principal author being responsible for the final analysis.
- Nominal and ordinal data
- Bar graphs / pie charts
- Central tendency → mode

Ethical Considerations

- Biomedical Research Ethics Committee (BREC) at the University of Kwa-Zulu Natal (Ref: BE319/14).
- Ethical principles:
  - Respect for persons (informed consent, issues around beneficence and confidentiality)
  - Justice (voluntary participation, right to withdraw, scientific honesty and integrity)

RESULTS

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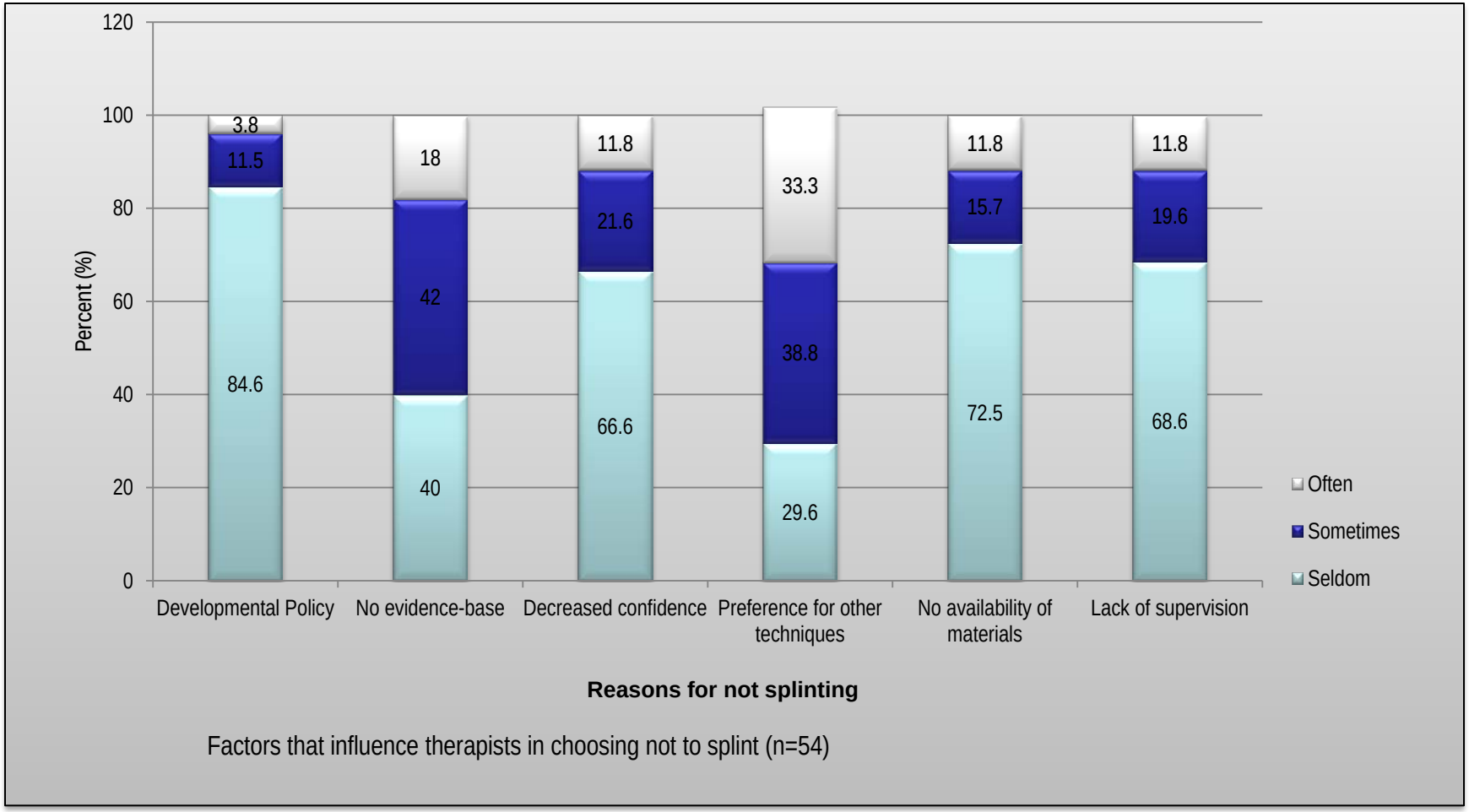
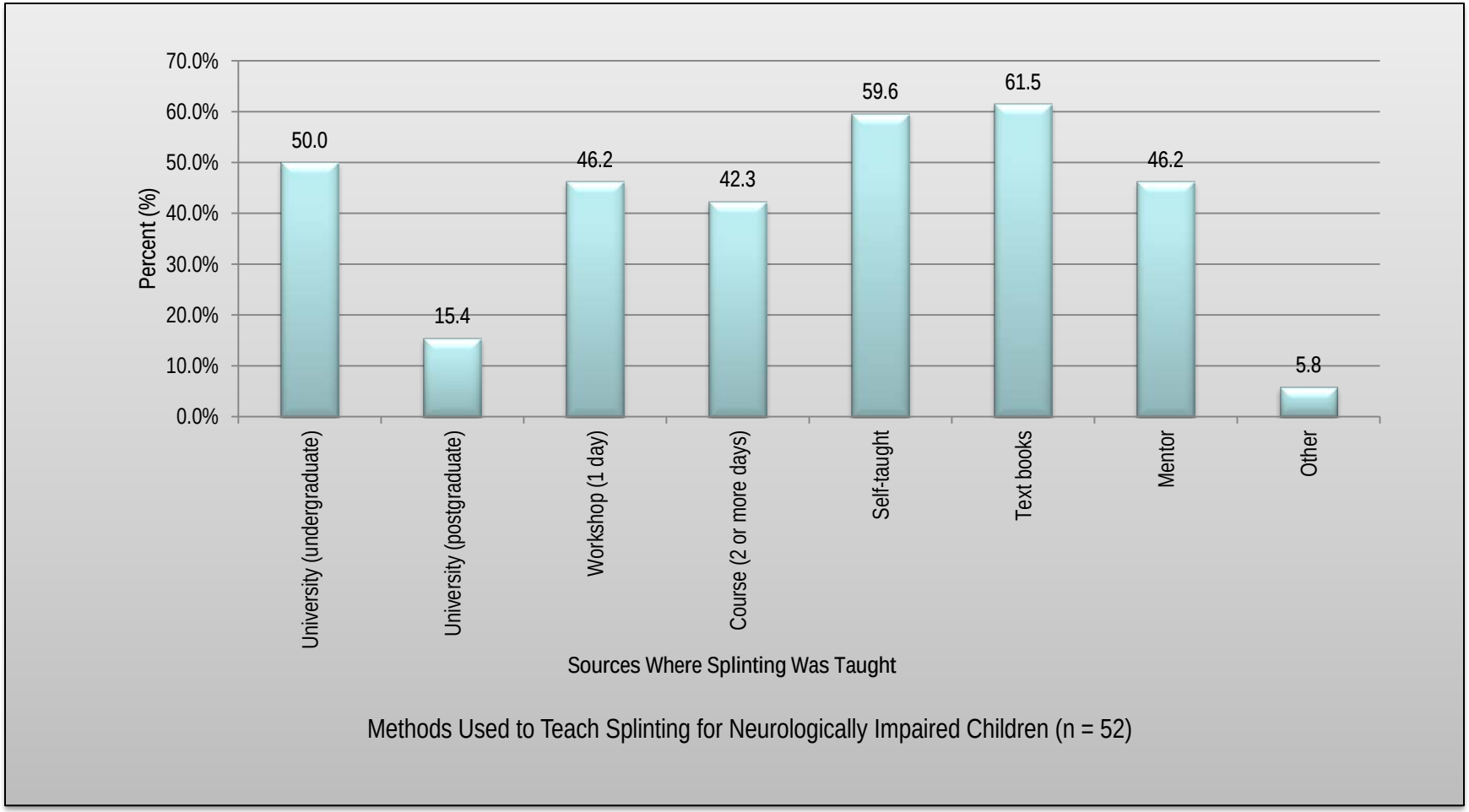
UKZN INSPIRING GREATNESS

Background on splinting experience

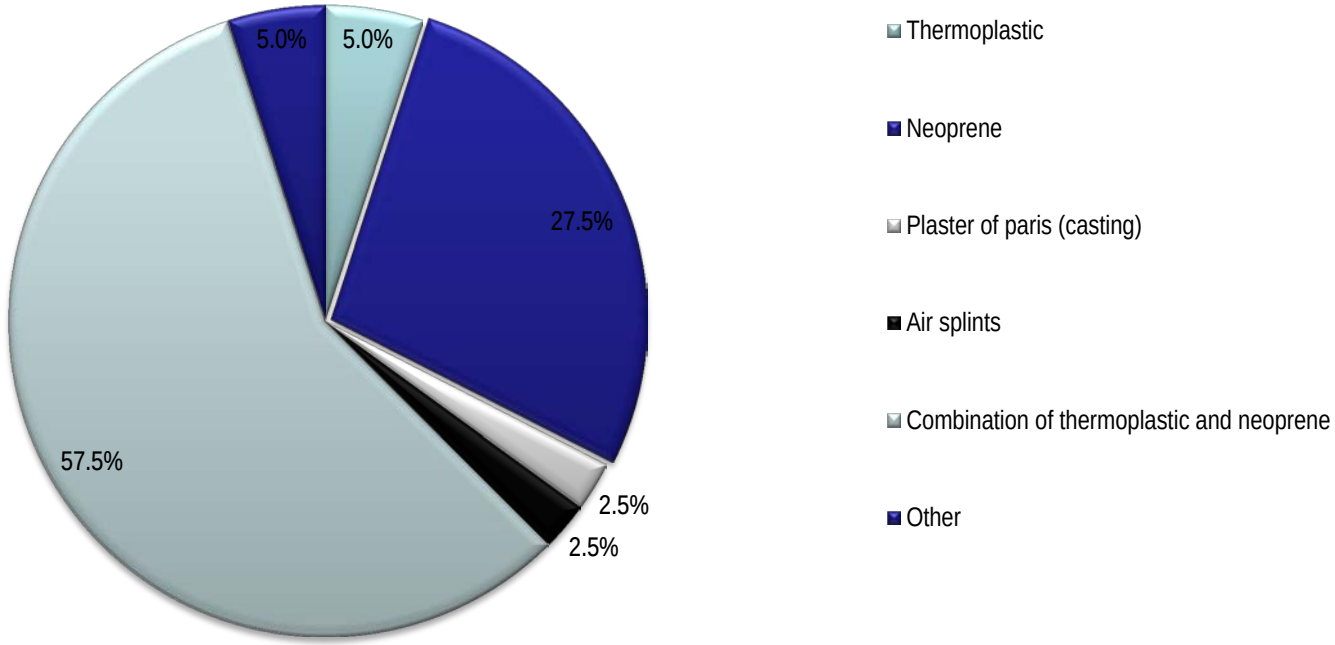


Factors that influence therapists in choosing not to splint (n=54)

METHODS USED TO TEACH SPLINTING



Preference of splinting material:



Types of Material Preferred by Therapists in the Production of Splints for Neurologically Impaired Children (n = 40)

Types of Splints

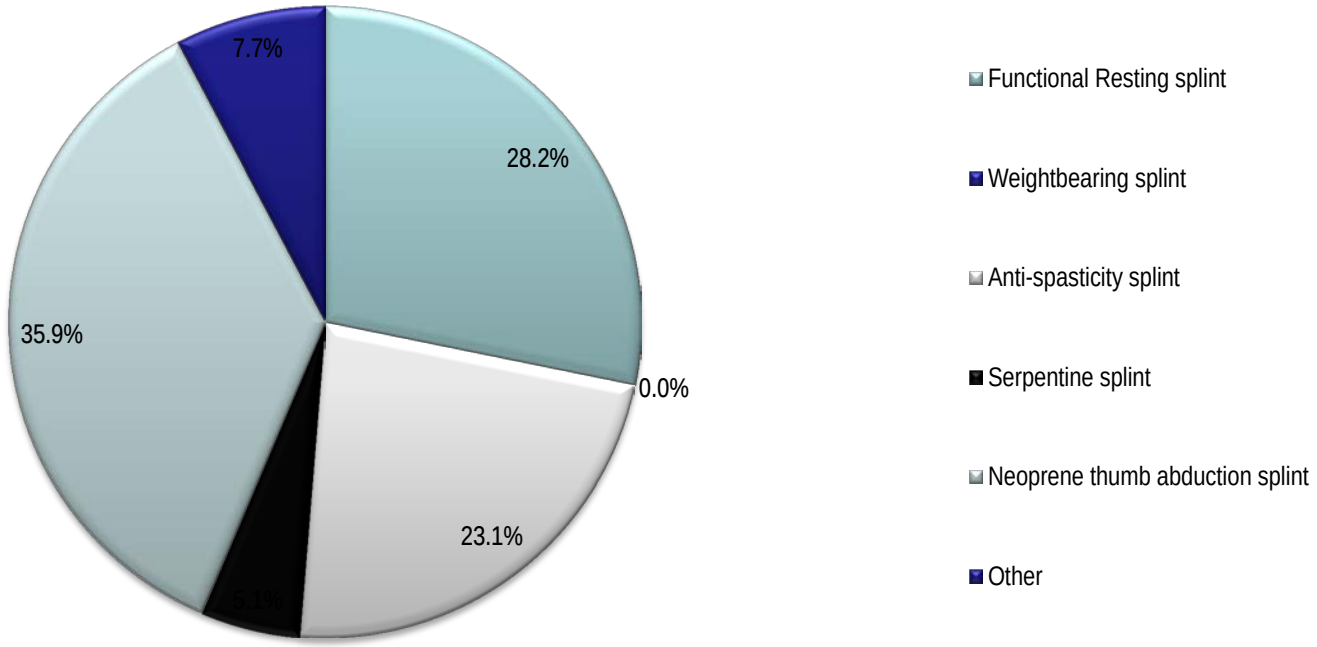
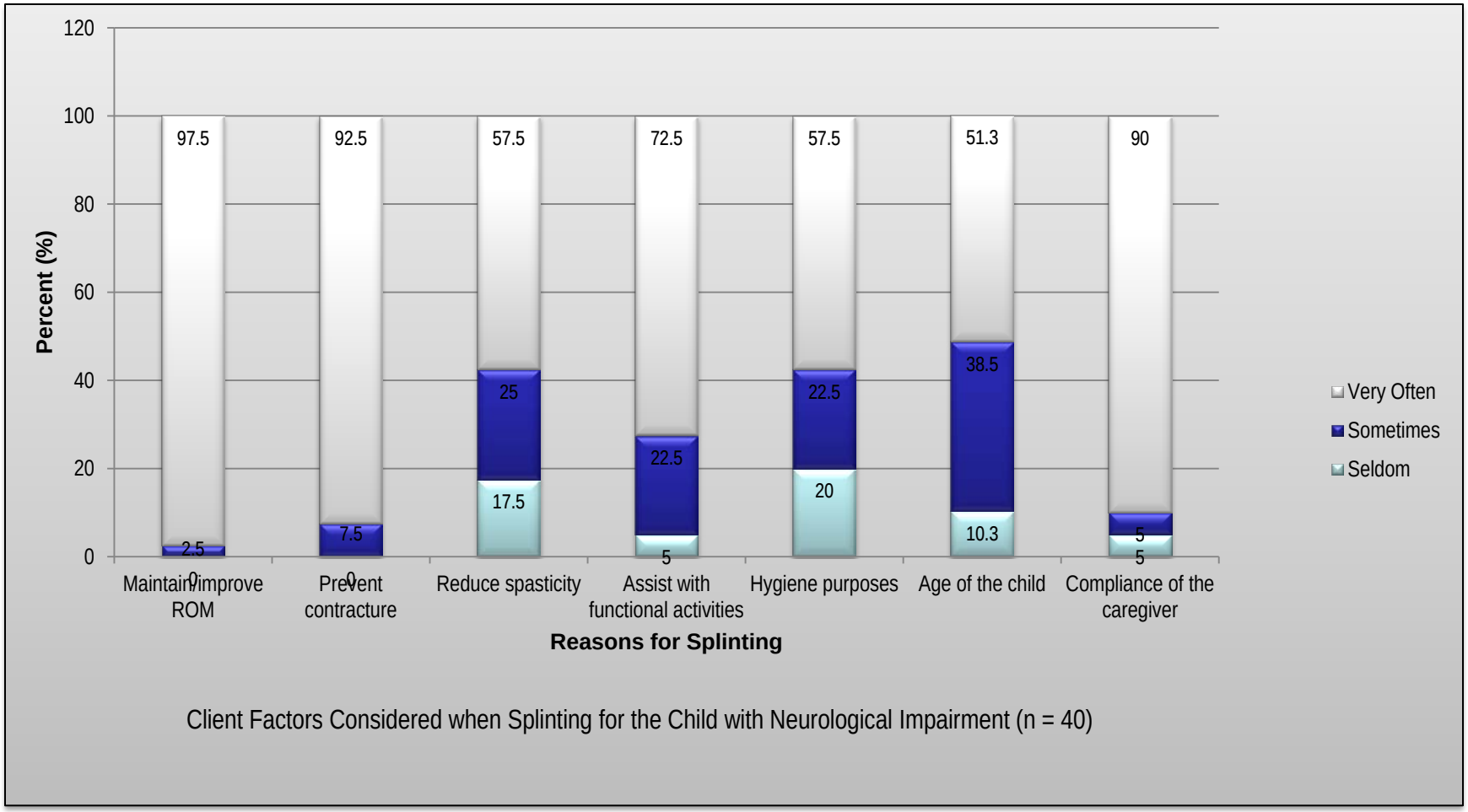


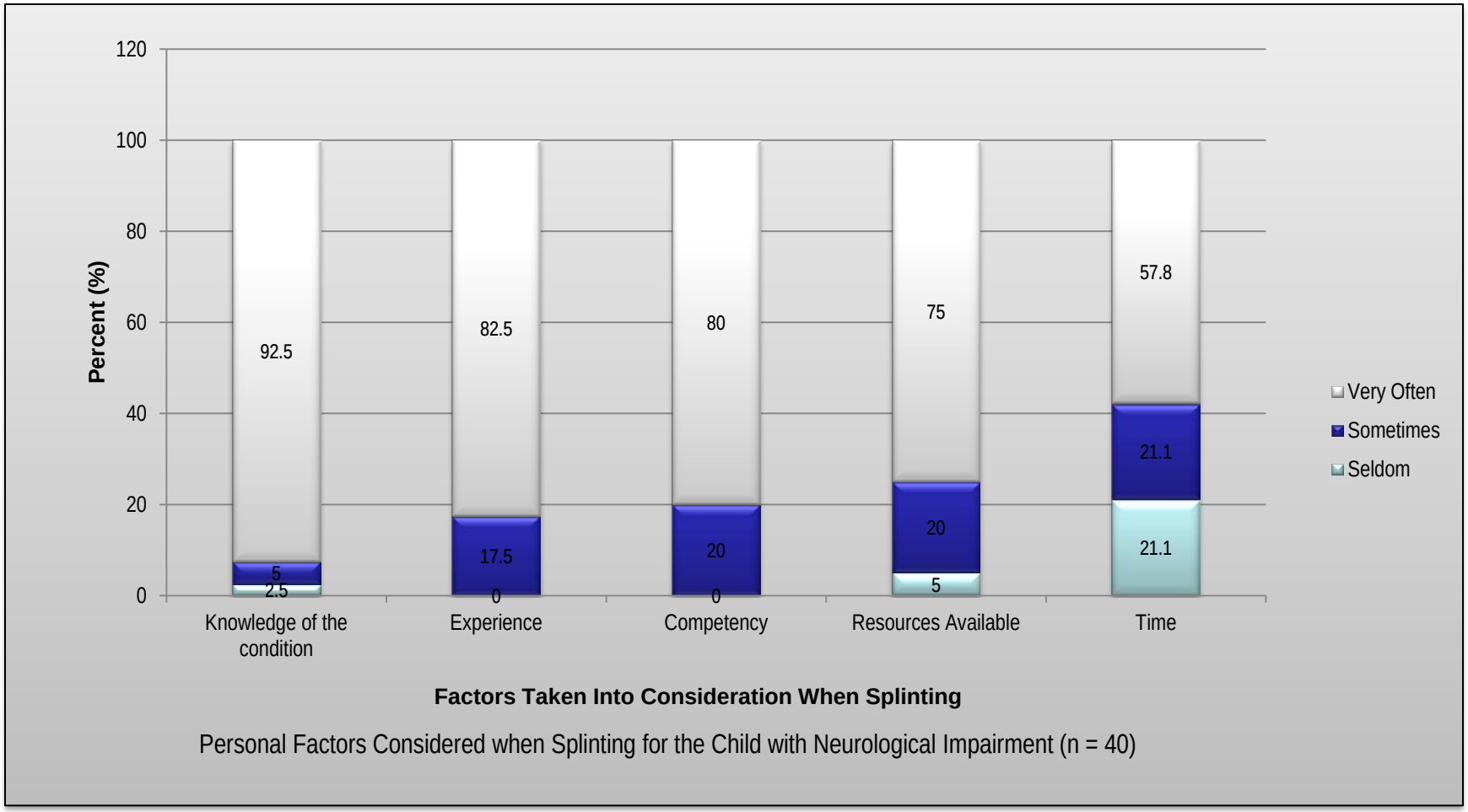
Figure 4.18 Types of Splints Prescribed the Most for Children with Neurological Impairments (n = 40)

Rationale for splinting based on client's condition:



Client Factors Considered when Splinting for the Child with Neurological Impairment (n = 40)

Rationale for splinting according to personal factors:



Personal Factors Considered when Splinting for the Child with Neurological Impairment (n = 40)

DISCUSSION

- 100% preference for custom-made splints
  - Different from other studies in which 30% of OTs prefer off-the-shelf static splints (Kilbrade et al, 2013) and another showed differences in preferences amongst different groups of OTs (Adrienne & Manigandan, 2003)
- Resource strained contexts that many South African OTs work in → affinity to custom-made splints.

Use of materials based on previous results:

Thermoplastic	• In alignment with Hoffman et al (2013)
Neoprene	• Similar number of therapists • More recent studies are investigating the effectiveness of soft splints (Hughes, 2013)
Combination of neoprene and thermoplastic	• Soft splints gaining popularity (39.5%) → seen as more effective (77.5%)

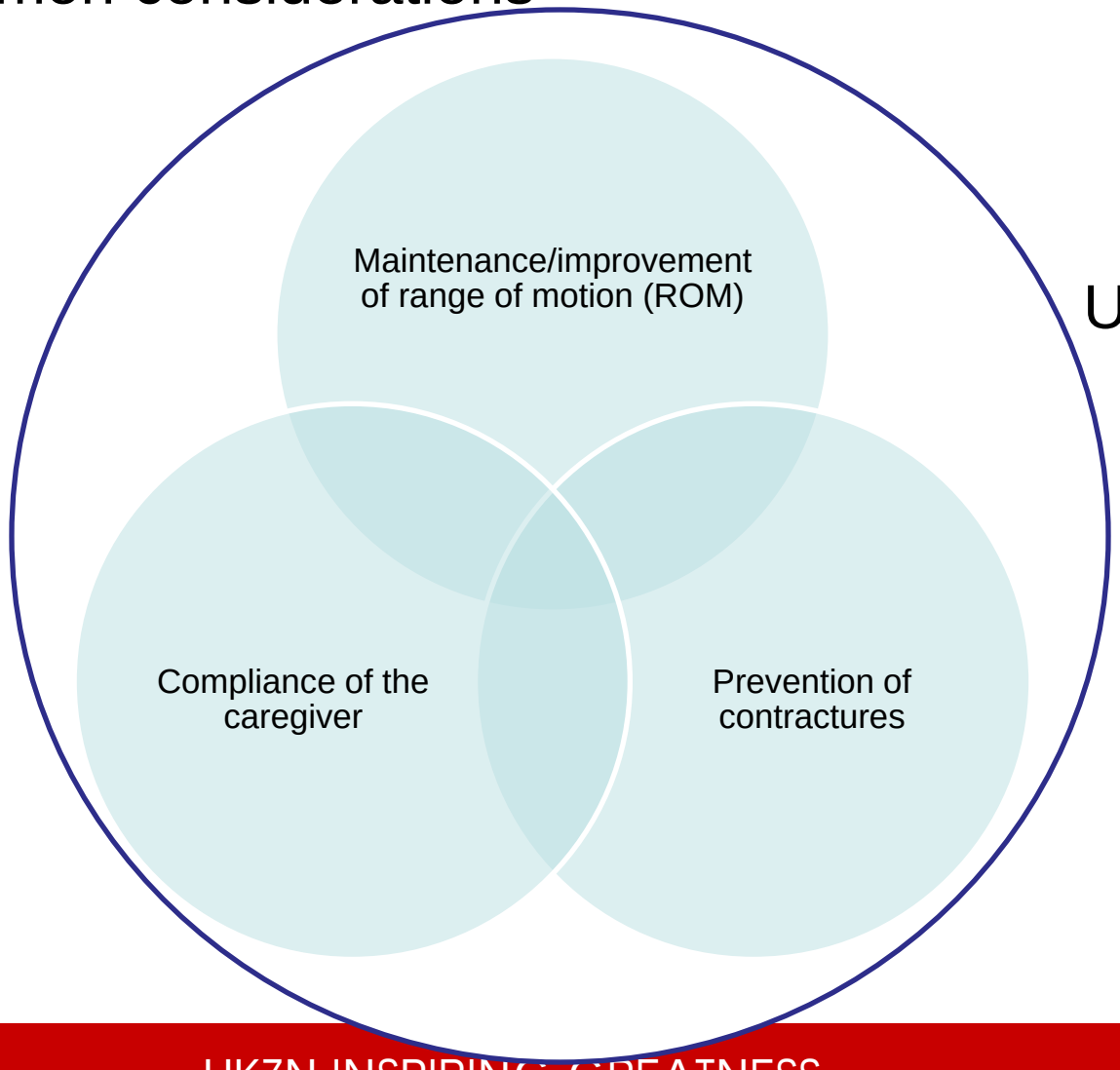
- Systematic review: Weak evidence despite therapists being of the opinion that the soft material is better tolerated by children.
- Marked preference for three splints:
  1. Functional resting splint (preferred and second most prescribed)
  2. Neoprene thumb abduction splint (preferred and most prescribed)
  3. Anti-spasticity splint (next most prescribed)

CLIENT FACTORS

- Knowledge → guide future splinting protocols or guidelines.
- Therapists mainly splint for children with

	Thermoplastic	Soft
Cerebral Palsy	72.5%	80%
TBI	62.5%	42.5%

3 most common considerations



PERSONAL FACTORS

- In order to achieve aims or goals in therapy, an OT requires integration of theoretical knowledge and practice. Thus, OTs need knowledge of both the condition and types of splints available prior to splinting. Practical experience will therefore lead to greater feelings of competency and confidence.

- Important factors:
  - Knowledge of the condition
    - Different presentations
  - Knowledge of hand development
    - Influence the choice of splints
    - Type of materials
  - Knowledge of different types of splints
    - Appeared confident in knowledge of different splints
    - Fair knowledge on neurological splinting

- Therapists rely on: experience and clinical observations (Adrienne & Manigandan, 2003)
- Experience
- Prior training & experience of more regard than evidence-base (Sweetland & Craik, 2001)

Holland, Middleton & Uys, 2012).

- Did not depend on available resources
- Knowledge → competency → experience → availability of resources
- This may be due to the South African context, especially as the majority of the therapists work in public hospitals; certain materials may not always be easily available.

CONCLUSION

- Splinting is occurring despite a lack of evidence-based research
- Infrequent basis → 1 to 5 splints per month
- Smaller numbers or preference for other methods
- Custom-made: Both thermoplastic and neoprene materials are being used individually and in combination

- Three main splints identified
- Many factors considered before splinting
- Personal experience & theoretical knowledge
- Scientific proof for the benefits of splinting is yet to be established
- Therapists remain active in prescribing splints for the maintenance of range of motion, prevention of contractures and reduction of spasticity.

- Provided data towards understanding current practices in splinting of neurological conditions in the paediatric population by OTs in South Africa
- Assisted in identifying gaps that require further research and inquiry especially in terms of the efficacy of splinting in these particular conditions.

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