Therapists' perspectives on an interdisciplinary approach of arm-hand rehabilitation in cervical spinal cord injury: a qualitative study

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Title: **Therapists' perspectives on an interdisciplinary approach of arm-hand rehabilitation in cervical spinal cord injury: a qualitative study**

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Abstract

Purpose

To explore therapists' experiences on what elements arm-hand rehabilitation should contain, their importance, and the information needed to apply them in clinical practice.

Materials and Methods

This qualitative study, with an exploratory approach, used focus group discussions with purposive sampling. Based on Braun and Clarke's methodology, inductive thematic analysis was employed to develop themes, subthemes, and categories. The study included seven physiotherapists and seven occupational (≥ 2 years experience) therapists from three spinal cord rehabilitation wards in Belgium and the Netherlands.

Results

The data analysis revealed five major themes, i.e., gathering knowledge, the process of thinking and acting, practice beyond therapy, and motivation. The first theme involves collecting information about the person and their client system. The second focuses on the goal-setting process for a patient-tailored therapy plan, described in the third theme as goal task-oriented with an individualized therapy dose. The fourth theme highlights meaningful activities to enhance performance beyond therapy, while the fifth emphasizes maintaining motivation through rehabilitation.

Conclusion

Therapists highlight centralizing the person and their social environment in arm-hand rehabilitation, leading to a personalized goal-setting process and a patient-tailored therapy plan

incorporating meaningful tasks. This approach can increase therapy dose and improve patients' motivation.

Key words: spinal cord injuries, practice-based evidence, therapist's perspectives, upper extremity, neurological rehabilitation, task-oriented training, goal-oriented training

Introduction

Spinal cord injury (SCI) had a global incidence of 909.000 in 2019 [1]. Out of these cases, 54% involve people with a cervical spinal cord injury (PwC-SCI). These persons experience arm-hand problems, which significantly impact independence in activities of daily living, like self-care, work, and leisure [1-3]. PwC-SCI prioritizes enhancing arm-hand functioning as a crucial goal in their functional recovery, ultimately contributing to an improved quality of life [4,5].

Arm-hand rehabilitation improves arm-hand functioning by enhancing neuroplasticity in the brain and spinal cord [4,6-8]. Motor training, the most common method [9,10], leads to improved muscle strength, muscle grade, and performance in activities of daily living for PwC-SCI [2,11,12]. However, no definite conclusion could be reached about the superiority of specific training programs or the ideal training doses [3,12]. A recent systematic review by Bertels et al. (2023) investigated the effect of three essential training variables for arm-hand training, i.e., motor training strategies, therapy dosage, and motivation, based on principles of motor learning [6,13,14]. It emphasized the importance of incorporating skill training alone or in combination with strength and endurance exercises. Additionally, it underscored the necessity of diverse, task-oriented training components and recommended a minimum training duration of eight weeks [13]. However, these results were based on limited clinical and randomized controlled trials with little description of task-oriented training components and aspects of therapy dose, such as difficulty or intensity. Although evidence is limited, information on training variables is crucial for optimizing rehabilitation interventions; therefore, insights from clinical experts regarding effective interventions on patient outcomes are valuable [15].

Three qualitative studies explored therapists' perspectives on activity-based therapy in SCI rehabilitation [16-18]. Overall, therapists emphasize the significance of a client-centered approach with individual treatment plans, diverse exercises, and the use of technology [16]. In acute settings, they stress the importance of the patient's social support in increasing the therapy dose [17], while in rehabilitation, they consider acceptance, motivation, and tolerance when determining the application of activity-based training [18]. The abovementioned studies focused on activity-based therapy for SCI in general. However, no information is available on arm-hand rehabilitation and the significance of specific training variables.

The current literature lacks sufficient detail on the training variables necessary for the complex arm-hand intervention in the rehabilitation of PwC-SCI [2,3,11,12]. As this information is essential to guide clinical practice in constructing an optimal arm-hand motor training program, the present study aims to explore the perspectives of experienced therapists in SCI on the best practical application of arm-hand rehabilitation in PwC-SCI. The objectives of this exploratory qualitative research are: (1) identifying the key elements in arm-hand rehabilitation according to experienced therapists, (2) exploring why these elements are important, and (3) exploring which information is needed to apply these elements in clinical practice according to therapists.

Materials and methods

This qualitative study was conducted with an explorative approach and reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ) [19]. The Social and Societal Ethics Committee (SMEC) of Hasselt University approved the study protocol (REC/SMEC/2022-23/07). All participants provided written informed consent before participating in the study.

Participants and study context

This study occurred in the context of hospitals with SCI rehabilitation wards associated with the 'Dutch-Flemish Spinal Cord Society,' which adopted joint rehabilitation guidelines and processes for PwC-SCI. The three rehabilitation wards, two in Belgium (University Hospital Leuven and University Hospital Ghent) and one in the Netherlands (Adelante Zorggroep), are involved in this study. Participants were recruited using purposive sampling. Physiotherapists and occupational therapists working in the selected rehabilitation wards who met the inclusion criteria were invited to participate either through a personal conversation with the researcher or via an email invitation. The aim was to recruit at least four therapists from each participating rehabilitation ward, including a minimum of one physiotherapist and one occupational therapist, all with at least two years of experience in SCI rehabilitation. Table 1 describes the characteristics of the fourteen participants: ten women and four men. Among them, seven were occupational therapists, and seven were physiotherapists. On average, the therapists had 11.5 years of experience in arm-hand rehabilitation for PwC-SCI. One therapist had less than two years of professional experience but had experience in cervical SCI within international internships. Therapists are referred to by pseudonyms to ensure confidentiality.

Table 1. Demographic data participants (n=14)

Data collection

Data was collected through three focus group discussions, one in each participating rehabilitation ward, with each lasting 60 to 90 minutes. Data collection took place between December 2022 and February 2023. Each focus group discussion had four to six participants to ensure dynamic group interactions and was conducted in a quiet room in the rehabilitation ward with only participants and researchers present.

The study involved four female researchers. The main researcher (N.B.) is a PhD student, and the last author (A.S.) is a professor in rehabilitation science and physiotherapy with a background in occupational science, assisted by two master's students in occupational science. Focus group discussions were led by the first or last author, assisted by the master students who were trained to perform the focus group discussions.

Focus group discussions were recorded using audiovisual and audio methods to ensure accuracy in data collection. Audiovisual recordings were captured using a video camera on a tripod, while audio recordings were conducted using Microsoft's audio program on a laptop. These complementary recording methods supported precise transcription by accurately capturing spoken content and speaker identification. One study assistant took field notes of the interactions during the focus group discussions. The focus groups started with a moderator-led introduction of the topic, followed by explaining the practical rules of the focus group. For each focus group, a topic list (see appendix 1) was prepared [20], and data were analyzed immediately to allow for topic adjustments if more exploration was needed. Transcripts were returned to the participants for member checking.

The first author had a relationship with the participants from UZ Leuven, therefore, she did not participate in this focus group discussion. There were no other relationships with the participants prior to the data collection.

Data analysis

Researchers transcribed the audio recordings verbatim in Microsoft Word, verified accuracy with the audiovisual recordings and field notes, and imported the transcripts into NVivo 12. Data analysis began after the first focus group discussion. The transcripts of the focus group discussions were analyzed using thematic inductive analysis, according to Braun and Clarke (2013), focusing on identifying, analyzing, and reporting patterns in the data [21]. Later, these patterns transformed into themes. The inductive thematic analysis provided a descriptive representation of what emerged from the data and focused mainly on the detailed interpretation of the data collected [20]. The inductive thematic analysis involved six sequential steps, i.e., data familiarization, initial coding, search for themes based on the initial coding, review of themes, theme definition, and labeling and report writing [21]. Initial coding was performed independently by the first author (N.B.) and two master's students involved in the focus group discussions and the initial coding process. Regular debriefing sessions with all four researchers, were held to review and discuss the coding, ensuring consensus. Based on these discussions, the first author (N.B.) and the master's students revised the coding accordingly. After the initial coding phase, N.B. and A.S. continued the thematic analysis based on the codes derived from the initial coding. To increase credibility, one participant from each focus group discussion participated in an online meeting to discuss the findings until an agreement was reached.

Results

The data analysis revealed five major themes (i.e., gathering knowledge, the process of thinking and acting, practice beyond therapy and motivation), as described by therapists in which eight subthemes are allocated. Figure 1 explains the main themes together with the subthemes and categories.

Figure 1. Representation of the themes, sub-themes, and categories

Theme 1: Gathering knowledge

This theme portrays therapists' descriptions of knowledge gathering about various aspects of the person and the client system, which are crucial for arm-hand rehabilitation.

1.1. The person

Therapists described gathering *implicit knowledge* primarily through communication during therapy. Understanding a person's personality is seen to be essential, as it influences whether individuals adopt an active or passive role in rehabilitation, with varying needs of encouragement during therapy. Furthermore, therapists collect information about how the person accepts and copes with their cervical SCI, as well as their emotional processing. They believe these factors may influence a person's motivation to train.

B27: It's difficult to compare, but if you have two patients who should be able to reach the same level regarding lesion height, you may notice that you sometimes have to pull much more on one than the other to help them achieve their theoretical potential.

(OT)

The therapists also described the collection of *explicit knowledge* concerning motor, sensory, skill performance, and tonus regulation, primarily obtained through assessments and

complemented with observations. The assessments are repeated frequently to monitor the patient's progress and performance capacity, which will impact the patient's tailored plan. Another essential aspect of explicit knowledge involves understanding personal needs. Initially, it is assessed through semi-structured interviews like the Canadian Occupational Performance Measure or informal communication. Their needs may change as rehabilitation progresses, and therapists gather updated information through informal therapy communication. Therapists noted that all mentioned knowledge elements impact goal-setting.

Therapists want to explore additional aspects of the person to enhance rehabilitation effectiveness. One key aspect is understanding the person's learning strategy, which informs the selection of the most appropriate relearning approach and influences the chosen training strategy. For example, determining whether trial-and-error learning is more effective or if the person requires more structured guidance. Another important factor is awareness of the person's problem-solving abilities, impacting the chosen training strategy. Some patients can quickly conceptualize and visualize tasks in their home environment, while others may require more guidance and support.

A12: We briefly talked earlier about someone's learning strategy. Is it someone who, uh, let's say, needs to make mistakes to understand what needs to be done? Or is it someone who requires a bit more guidance?

(PT)

Understanding a patient's optimal load capacity is essential for maximizing functional outcomes. However, therapists lack concrete methods to determine load capacity and adjust the therapy dose to this. The situation is further complicated because therapists observe daily

fluctuations in a patient's load capacity, varying at different times throughout the day. To assess load capacity, therapists rely on personal strategies and intuition, including evaluating the patient's well-being, pain levels, fatigue, and feedback from previous sessions. They also monitor compensatory behaviors and movement quality during sessions. Despite these efforts, therapists express the need for more objective methods to assess load capacity, which would enable them to adjust training loads more effectively and ultimately enhance rehabilitation outcomes, as discussed in section 3.2

A312: I find estimating the hardest, especially the load capacity, to determine how much exercise he can handle in an hour. I need to know what he did that day to ensure he does not overload his shoulder or determine the ideal dose. Unfortunately, I don't think there will be one correct answer.

(PT)

1.2. The client-system

Therapists expressed the importance of getting to know the client system, particularly significant others like life partners and close family members. They are crucial collaborators in rehabilitation, but their involvement can be supportive or obstructive. Therapists assess their roles and emotional responses to the person's disability, particularly when they engage in therapy and transfer relearned skills to the home environment. However, it is essential that significant others not solely become caregivers.

Patients are influenced by peers, fellow rehabilitation patients, and C-SCI experts at the rehabilitation unit. Therapists recognize the significance of peer counseling in motivating patients and exchanging expertise among patients. For therapists, building trust with the patient

through positive, open communication is crucial, helping the patient feel comfortable expressing their desires and preferences.

Theme 2: The thinking process

This theme explained the joint goal-setting process and the dynamics between patient and therapist while adopting a holistic approach, examining all collected knowledge, incorporating their insights into the goal-setting process, and creating a patient-tailored therapy plan.

2.1. Goal-setting process

Therapists noted the significance of focusing on personal goals as they believe they motivate the person and generate implicit training moments. These personal goals often involve activities that patients are more likely to perform frequently, such as eating.

Therapists emphasize realistic goal-setting; the therapist must guide them into what is possible based on their motor, sensory, and skill performance. Goals are adjusted as the patient progresses.

A14: A patient decides for themselves what is important. One wants to operate a telephone quickly, while another may want to tickle their nose, write, or do something else. You start with that instead of imposing as a therapist; I think the most important skills are… . Recently, it has focused on what is important for the rehabilitant because, like A12 mentioned, it leads to higher motivation.

(PT)

2.2. Patient-tailored plan

A patient-tailored plan is a therapy plan developed based on information gathered about the person, their client system, and their goals. This therapy plan translates the collected data into a personalized action plan that addresses the person's specific needs and is designed to achieve personal and realistic goals. It specifies the therapy content and dosage necessary to meet the goals and is continuously adjusted to reflect the patient's progress throughout the rehabilitation.

Theme 3: The acting process

This theme portrays the patient-tailored therapy plan developed during the thinking process implemented in the acting process with attention to the training content and dosage.

3.1. *Training content*

Therapists believe in the importance of a *goal and task-oriented approach* in arm/hand rehabilitation, emphasizing the importance of the goal-setting process outlined in theme two. Practicing meaningful tasks encourages the persons' engagement during therapy and promotes continued practice outside therapy, indirectly increasing the dose.

A12: I believe you get a lot more density by focusing on valuable and meaningful tasks, so people do the task a lot. As A14 also mentioned, this approach extends beyond typical therapy frequencies and integrates into ADL. I think you get more effective training moments by training in task-specific ways.

(PT)

Although therapists acknowledge goal- and task-oriented training as the most important, other *training modalities* like analytical, sensibility, endurance, strength, and skill training enable skill acquisition. Tasks may be first relearned by using assistive devices or assistance from a

caregiver. During the rehabilitation, the tasks need to be reassessed based on the patient's motor, sensory, and skill performance, and, if possible, the assistance should be reduced gradually.

Therapists use varied *training strategies* to facilitate task relearning while ensuring the patient remains motivated. They employ the shaping principle to decrease difficulty, encourage small successes, and enhance motivation. Variety in training content, achieved by providing exercises and using different objects for the same goal, supports the application of relearned skills to various tasks and helps maintain the patient's motivation. Therapists value variety in context to enable patients to perform learned tasks in their daily living environment and believe this should be done more frequently.

In arm/hand rehabilitation, therapists employ various *training forms*, like individual, group, or autonomous training, and different *training techniques,* such as technology, electrostimulation, or hydrotherapy, that support conventional motor training. To individualize the training and help the patients achieve their goals.

3.2. *Training dosage*

Participants discussed the importance of providing a tailored therapy program that meets the patient's needs. The rehabilitation team determines the *weekly amount of therapy dosage* based on the *patient's personal load capacity*, as outlined in section 1.1, within the healthcare policies, which vary by country.

Further, tailoring consists of varying session length and breaks between sessions. At the start of rehabilitation, therapists may prefer to give shorter therapy sessions or provide more breaks between sessions. To increase overall intensity, therapists occasionally schedule consecutive therapy sessions. Session lengths can vary depending on the task exercised during the training

because therapists strive for a realistic duration for activities like, for example, eating or cooking.

Therapists aim to further tailor training sessions based on the personal load capacity. They emphasize that optimizing the therapy dose to align with the personal load capacity is crucial for achieving the best rehabilitation outcomes. However, therapists acknowledge the challenges in objectively determining personal load capacity and therapy dosage during arm/hand training, which is currently guided primarily by intuition, as outlined in the subtheme of the person in section 1.1.

B313: We spread therapy sessions out and also schedule rest moments. If we know someone gets overloaded quickly, we often plan an hour of rest after physical therapy or after lunch.

(OT)

A14: Surely it is fingerspitzengefühl. Isn't it?

(PT)

Theme 4: Practice beyond therapy

Theme four explains the therapy beyond the supervised training by therapists, i.e., the training process at the rehabilitation ward and the process after patient discharge.

4.1. Training moments at the rehabilitation ward

A goal- and task-oriented approach trains patients in meaningful tasks essential for daily life activities, preparing them for independent practice beyond therapy hours, which is crucial for arm/hand rehabilitation. The active involvement of nursing staff in supporting and encouraging patients to perform tasks independently would be the ideal situation, but therapists feel this is lacking due to inadequate information transfer to the nursing staff and insufficient exercise

during therapy in the rehab ward. Another obstacle is the limited time in the morning for patients to perform activities of daily living independently, as they must prepare for scheduled therapy sessions.

4.2. Training moments after discharge

Another issue that therapists pointed out is that as patients are discharged, new needs often emerge when applying relearned skills in their environment, necessitating further practice. Ideally, patients would return to the rehabilitation unit, where the therapist can review the thinking and acting process. However, the opportunities for re-admission are limited.

Theme 5:Motivation

Therapists consider motivation a crucial factor in the rehabilitation process because it may influence patients' engagement in the rehabilitation process. However, they clarify they don't believe they impact the patient's self-motivation. Nevertheless, therapists can influence the patient's autonomous motivation through goal-oriented training and individualized training strategies, providing positive feedback, offering future perspectives, and highlighting the progress made during rehabilitation.

B27: Trying as much as possible to work on their request. And the more motivated they are or want something, the easier it goes. If it aligns with their field of interest, you can really notice that they are more motivated.

(OT)

Discussion

Rehabilitation approaches promoting repetitive motor activity, such as motor training, are considered the 'golden standard' for improving arm-hand functioning in PwC-SCI [22]. However, the literature provides a superficial description of motor training strategies and therapy doses used in arm-hand motor training programs. Rehabilitation is a complex intervention which can benefit from more guidance in clinical practice. To the best of our knowledge, this qualitative study is the first to identify the elements in arm-hand rehabilitation in PwC-SCI, explore why these elements are important, and determine which information is needed to apply these elements in clinical practice, according to experienced therapists. The experienced therapists identified five major themes, i.e., gathering knowledge, the thinking process, the acting process, practice beyond therapy, and motivation, in which the different elements (subthemes) were allocated and visualized in figure 1. The therapist gathers specific knowledge about the person and client system; this information is necessary for the goal-setting process incorporating personal and realistic goals. These goals are the foundation of a patient-tailored therapy plan with individualized therapy content and dosage. While training at optimal dose levels is important for improving rehabilitation outcomes, determining the patients' optimal load capacity can be challenging. Incorporating meaningful activities is of utmost importance as they enhance motivation during therapy and increase the likelihood of these activities being performed beyond therapy (e.g., on the ward and at home). This will lead to an increased therapy dose, time on task, which might result in better rehabilitation outcomes. Rehabilitation is an ongoing process with patients facing new needs after discharge that require continued practice. Throughout the rehabilitation process, maintaining motivation is very important.

Person centered rehabilitation with active goal setting

In this study, we found that therapists emphasize the importance of centralizing the patient and client system to set goals that express the person's needs, values, and expectations and to construct a patient-tailored rehabilitation plan. In the first theme, gathering knowledge, therapists suggested considering elements such as acceptance of SCI, motivation, and perceived load capacity, which aligns with findings from a former study [17]. However, the current study added personality, coping, emotional processing, performance capacity, and personal needs as necessary knowledge. In the second theme, the thinking process, preferences, and goals are integrated into the goal-setting process, resulting in a patient-tailored therapy plan focused on self-selected activities. Personal goals are crucial for motivation, creating implicit training moments during and beyond therapy, and increasing the overall training dose. A recent study highlights goal-setting as a top motivational factor [23]. Subacute stroke patients emphasized that personal goals influence their motivation [24]. Therefore, active patient participation in goal-setting is essential, as customized training on their goals improves their life situation [25].

In the current study, therapists acknowledged the significance of patient involvement in goal-setting but stressed the need for realistic goals, highlighting the importance of the therapist's input based on the patient's performance. A systematic review showed that while therapists recognize the importance of patient involvement for motivation, barriers such as lack of expertise, confidence, unrealistic expectations, and insufficient cooperation hinder the patient's active engagement [25]. Patients chose goals to improve participation, while professionals focused on impairment and activity levels. Consequently, therapists did not explicitly incorporate patients' occupational and social needs into the goals. Evidence recommends using tools like the Canadian Occupational Performance Measure (COPM) [25]. The COPM, combined with the Goal Attainment Scale, was used in the ToCUEST program, a client-centered, task-oriented upper limb training program in PwC-SCI, which proved beneficial for improving self-selected goals [26,27].

Person-centered rehabilitation acknowledges the impact of social, mental, and emotional needs [28]. However, in rehabilitation, it is also necessary to recognize the extended family involvement and the changing personal needs [29]. Therapists corroborate this in the current study, but they expressed the challenge to involve the family in the rehabilitation process as the client system can be a supportive (enhance motivation) or obstructive (reduce motivation by pushing them too hard or overprotecting them) factor, as also mentioned previously [30]. Conversely, stroke patients in the subacute phase report that the client system is encouraging in their rehabilitation [24].

Task-oriented training

Following the goal-setting process, therapists create a patient-tailored plan, utilizing a task-oriented approach. Relearning meaningful activities for the patient and client system facilitates patients to perform tasks beyond therapy, which is the ultimate goal of rehabilitation. Simultaneously, it leads to more therapy dosage. Motor learning literature in SCI and stroke stressed the importance of task-specific training to drive neuroplasticity, the underlying mechanism of relearning skills in neurological conditions [6,14]. However, the concrete elements of task-specific training remain unclear in the literature. During the focus groups, therapists indicated their training strategies, highlighting that they want to train more in the context, but this is not always possible due to time and distance limitations. Therapists mention task-oriented training as a key approach in their practice; only a few studies have evaluated its effectiveness in SCI. Spooren et al. (2011) assessed a task-oriented and client-centered training module for the upper extremities in PwC-SCI and found a significant improvement in self-chosen activities [27]. Although therapists believe in the effectiveness of task-oriented training in SCI, they stress that it is also crucial to establish optimal conditions for training tasks. This includes muscle strengthening and analytical exercises, movements without a goal, usually in

one single movement plane and often targeting single joints [31]. Nevertheless, the ideal balance between training to create optimal conditions and skill training has not been thoroughly researched, leading therapists to rely on intuition.

Optimal load capacity

Therapists indicate that a certain load is necessary but believe more in an individualized dose based on personal load capacity than a predetermined dose. However, they don't know how to determine the optimal load for the training based on the patient's specific training goals. Different studies highlight the importance of high-intensity training to improve arm-hand functioning [32]. In contrast, a systematic review found no significant effect favoring intensive or less intensive training [3]. However, this review described a unidimensional approach to therapy dose, considering only the duration and number of movement repetitions of arm/hand training. A study on intensive stroke rehabilitation found differing views: patients favor higher intensity, while therapists were cautious, citing concerns about movement quality [33]. Additionally, a study in subacute arm-hand rehabilitation of PwC-SCI showed that therapists tend to overestimate the actual arm-hand active time systematically [34]. The results of this study reveal that therapists need an objective way to measure the load capacity of a patient to be able to individualize the load of the therapy.

Motivation

In this study, therapists noted the crucial role of motivation in rehabilitation. Motivation may induce behavioral changes and predict improved outcomes [24,35,36]. However, therapists believe they do not directly influence patients' self-motivation, which is also reported in other studies indicating that this is partly determined by the patient's personality [30]. According to self-determination theory, three basic psychological needs: autonomy, competence, and

relatedness are described in SCI [37]. Therapists may impact these needs during training by integrating goal-oriented training (impacts autonomy), providing positive feedback (impacts competence), fostering engagement with peers and experts, and promoting a sense of belonging (impacts relatedness). Meeting these needs enhances autonomous motivation [37]. This aligns with the former research indicating that techniques promoting autonomous motivation include positive feedback, varied exercises, understanding exercise purpose, and experiencing successs [24].

Future research

This study's findings result in several suggestions for future studies. First, the therapists highlighted the importance of motivation in rehabilitation and the potential effect on rehabilitation outcomes. Different elements that may affect patients' motivation were described. However, SCI rehabilitation research has given this topic limited attention. Second, therapists indicated the importance of a task-oriented approach, but evidence on its impact on arm-hand outcomes in SCI rehabilitation is limited, primarily due to small sample sizes in existing studies. Third, the optimal proportion of training on optimal conditions and skill training has not yet been researched. Lastly, therapists believe in an individual rehabilitation approach, especially for therapy doses. However, how to measure a patient's optimal load capacity and which individual therapy dose may improve rehabilitation outcomes is not yet clear.

Methodological considerations

Qualitative research with focus groups is a valuable method for exploring complex interventions and getting a deeper understanding of the clinical experts regarding these interventions. However, some methodological issues must be addressed to interpret the study

findings. First, the study conducted focus groups in Belgium and the Netherlands, where rehabilitation centers follow similar methodologies under the 'Dutch-Flemish Spinal Cord Society.' The study's findings were not checked in other regions, limiting their transferability. Secondly, the data analysis was performed by the first and last authors, who are experienced SCI rehabilitation therapists familiar with the practice in Belgium and the Netherlands, which may lead to bias in the analysis and interpretation. The credibility of the study findings was ensured by using member checks, independent data analysis by more than one researcher, field notes, and peer debriefing. The inclusion of an audit trail guaranteed the dependability of the data. The method section provides a thorough description of the analysis process and researchers' background, enhancing the confirmability of the findings.

In conclusion, therapists identified five major themes within arm-hand rehabilitation, each involving different elements. They highlight the importance of gathering knowledge of the person and the client system. This information is used in the thinking process for a goal-setting process with personal and realistic goals to make a patient-tailored therapy plan. This approach improves patients' motivation, leading to enhanced engagement in rehabilitation. In the acting process, therapy content is organized with a goal- and task-oriented approach and a therapy dose tailored to the patient's personal load capacity, which remains challenging to determine. This approach aims to guide the patient in participating in meaningful tasks both during and beyond therapy. The training moments beyond therapy are necessary to increase therapy dose and optimize functional outcomes.

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Appendix 1

Opening question

How is arm-hand rehabilitation with a focus on motor training addressed in individuals with cervical spinal cord injury on the rehabilitation ward?

Transition question

From your own expertise, what does the ideal arm-hand training look like?

Key questions

1. The literature suggests that the skill, strength, and endurance training "content" of arm hand training is task-specific. How do you view this from your own expertise?
2. The literature focuses little on the "dose" of arm-hand training. Where do you stand on this from your own expertise?
3. The literature suggests that "motivation" improves the overall rehabilitation process and outcomes. How do you view this from your own expertise?
4. What information would you need from the patient or the training in order to provide the ideal arm-hand training in the future?

Ending question

Would anyone like to add anything else that was not covered today but that you think might be important?

Table 1. Demographic data participants (n=14)

Rehabilitation center (country)	Profession	Number of participants	Years of experience mean (SD)
Adelante Zorggroep (NL)	OT	2	18.8 (5.3)
	PT	2	16 (5.7)
University Hospital Ghent (BE)	OT	2	8
	PT	2	16 (14.1)
University Hospitals Leuven (BE)	OT	3	7 (5)
	PT	3	7.8 (6.3)

Abbreviations: OT; occupational therapy, PT; physiotherapy, NL; the Netherlands, BE; Belgium

Figure 1. Representation of the themes, sub-themes, and categories