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Steps to Follow: Developing a Model for Individualized Self-Training Programs Based on the Bobath Concept

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Abstract: *Objective:* Therapy interventions aimed at enabling people with chronic stroke to meet their own personal goals require tailoring of interventions to the person's individual situation. The purpose of this qualitative study was to identify key elements of self-training programs based on the Bobath concept, and how these were modified in relation to the individual requirements of the participants. *Method***:** Qualitative study design. A self-training program was developed based on the Bobath concept to minimize the impact of body impairments and maximize activity and participation levels, in order to facilitate personal goal achievement. As a training medium, an individually devised folder with annotated photos of the participant performing the exercise was used. The folder contained information on how to perform the exercise, adaptations of the exercise and recommendations for the number of repetitions. For the qualitative evaluation, all photos and descriptions were translated into a descriptive structure. The study utilized both pre-determined comparisons, coding the exercises with reference to the Bobath Concept, and the use of "grounded theory" to gain insights into the data without anticipating the content interpretation by the researcher. *Results*: Fifty-five participants with chronic stroke received a total of 503 individual exercises. The therapeutic methods and techniques used in the self-training programs were clearly assigned to the Bobath concept. The self-training was demonstrated to be based on the personal goals, on the individual needs and the abilities of the participants. Key aspects of the Bobath concept were revealed and can be identified Based on the gained knowledge, a model for creation of a self-training program was developed. *Conclusion*: This qualitative study unpacked the therapy component provided, in order to elaborate the principles utilized to construct and individualize interventions. The model developed has potential to improve the specificity and tailoring of self-training exercises for individuals with stroke.

Keywords: Bobath, Self-Exercise Program, Goals, Qualitative Research, Stroke

1. Introduction

1.1. Implication for Physiotherapy

This paper presents the investigation of the effectiveness and content of an individualized learning and exercise program based on the Bobath concept for enhancing personal goal achievement in people with chronic stroke. It unpacks the therapy component provided, in order to elaborate the principles utilized to construct and individualize interventions, to inform clinicians interested in exploring this approach and to assist replication of the study.

Therapy interventions in the chronic phase after stroke should focus on identifying goals relevant to the person and tailoring the intervention to the person's individual situation [1]. Factors that need consideration include ability level, impairments limiting activity and participation, personal motivations and environmental factors. This article is the second component of a mixed methods study, exploring the effect of an individual learning and exercise program on performance of personally

relevant and important activities in people with chronic stroke This qualitative method of the study unpacks the therapy component provided, in order to elaborate the principles utilized to construct and individualize interventions.

The interventions explored in this study were based on the Bobath Concept, defined "as an inclusive, individualized, problem-solving, living concept based on a systems approach to motor control, with particular emphasis on movement analysis and motor recovery from the perspective of the integration of postural control, task performance and contribution of sensory inputs" [3]. The aim of the Bobath approach is to optimize performance to improve participation and quality of life in people with chronic stroke and their families [4]. The Bobath concept is individually tailored to each person [5] and utilizes a behavioral-therapeutic orientation [6]. This is essential for the transfer of learned functions into 24-hour everyday life [7]. In Bobath concept, importance is placed on differentiating strategies focused on resolution of impairment for reacquisition of movement patterns, from compensation strategies that have evolved in response to neurological damage [8]. Strategies that focus on resolution of impairment as far as is possible are favored [9] without excluding use of compensation where necessary. Also important are the cognitive emotional status and personal and environmental resources of the person and these are incorporated into the selection of interventions. The person with stroke is an active partner in the therapy and is responsible for his or her own functional recovery [10].

Tailoring of therapy to the individual presents special challenges to research into efficacy of interventions [11]. In rehabilitation research, the extension to the CONSORT guide to clinical trials recommends inclusion of description of different components of the interventions and procedures for tailoring the intervention to individual participants [11].

In the qualitative component of this mixed methods study, the purpose was to explore the features that characterize and identify the self-training programs and establish whether a systematic approach to the selection of individual exercises can be demonstrated. This qualitative component can be assigned to the paradigm of a "complementary" mixed methods design where the purpose is to elaborate and illustrate the area of study to increase interpretability, meaningfulness and validity [12]. It allows for the consideration of different aspects of a phenomenon in order to gain a deeper understanding of the whole process [12]. In mixed methods research, including a formative component (how or why a program succeeded or failed) is recommended to accompany the summative component (did the program work?) [13]. In this study, participant assessment documentation and the individually developed self-training programs formed a rich data source for formative analysis.

The aims of the study were fourfold:

1. to elaborate the individually prescribed interventions delivered in this study
2. to examine treatment fidelity, i.e. can key components of the Bobath concept be identified in the intervention?
3. to determine whether specific intervention approaches can be identified oriented towards specific impairments of functions of the Central Nervous System (CNS) and Neuromuscular System (NMS).
4. to implement the findings of the study to create a model for developing individualized self-training programs for patients with chronical stroke.

1.2. Intervention

In five Bobath Advanced Courses, 59 therapists (36 PT, 23 OT) were trained to create an individualized self-training program for participants with chronic stroke. During the Advanced Courses, the participants with stroke received 90 minutes of therapy each day for five days. Participants were assessed with regard to body impairment, activity limitation and participation and their personal goals were established. A self-training program was developed based on the Bobath concept in co-operation with the participant, to minimize the impact of body impairments and maximize activity and participation levels, in order to optimize the person's potential to improve their performance in activities that were important to them. The focus of therapy was on learning a self-training program, which the participants with stroke then carried out with or without the help of their relatives for three months.

1.3. Data Material

As a training medium, an individually devised folder with annotated photos of the participant performing the exercise was used. The folder contained information for each exercise on how to perform the exercise and recommendations for the number of repetitions. Also included were adaptations to each exercise to make it more challenging ("a", "b" and "c" versions), so the participant could attempt more difficult versions of the same exercise if the original exercise was no longer challenging, or, drop down to an easier level for a time period if performance became too difficult. Patients documented the performance of their exercises on a prepared 92 day calendar sheet as "a", "b" or "c". The participant could then visualize their performance as they were ready to attempt more challenging versions of the exercises, providing motivational feedback (examples of self-training program folders can be obtained from author G. E.).

2. Method

Design: Mixed method study. This project received ethical approval from Human Research Ethics Committees in Germany (Ethics Committee at Physio-Akademie of the German Physiotherapy Association (ZVK e. V.)) and Japan (Ethical Review Board of Juntendo University Nerima Hospital), conforming to the Declaration of Helsinki. Written informed consent was gained from all participants.

2.1. Qualitative Analysis

The self-training folders of the participants with stroke served as "raw data" and could be viewed from different

perspectives, discussed and evaluated according to qualitative and quantitative criteria. "Pattern recognition" is the ability to recognize in a set of data regularities, repetitions, similarities, or laws [14], according to which the applied therapeutic means could be explored. In order to make differences more transparent, words, terminology and descriptions in the sense of descriptive linguistics were used for a semantic analysis [15]. In reference to Mayring [16] the content analysis steps paraphrasing, categorization and coding came into action (figure 1).

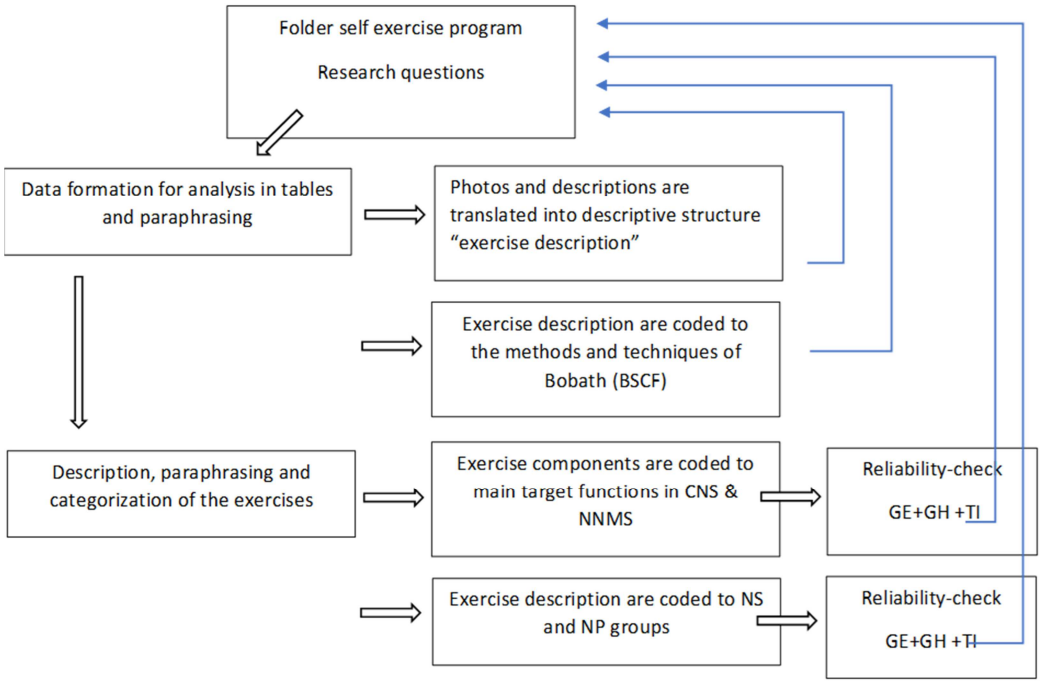

Figure 1. *Flow chart of deductive category application (MAYRING 2019).*

2.2. Data Formation for Analysis

All photos and descriptions were translated into a descriptive structure with a standardized format by one investigator (G. E.), defining the personal goal, the exercise related to and the movement activities and the movement sequences included (table 1: Exercise description).

Table 1. *Exercise description. Identifying the movement activities and movement sequences related to specific participant goals.*

Participant's goal	Requirements of the goal	Movement sequences	Photos from the folder
Mr. T is able to surf with his surfboard in three months	Bending and balancing	In sitting, lying supine and sidelying; both hands on one foot or both feet, long back for bending	
	Balance in single leg stance	Standing; Standing on one leg – stepping the other leg on and off the bench, using arms for balance	

2.3. Exercise Description Coded to Bobath Concept

A previously developed theoretical model of the Bobath concept was utilized to examine treatment fidelity; the Bobath Concept Structural Framework (BCSF [17]). This model has four levels; conceptual level (leading thoughts), principle level (a guide for action), methodological level (systematic procedures) and technical level (therapeutic means). The components of each of these strata are shown in figure 3.

This framework provided a classification system to enable identification of key aspects of the Bobath concept in the interventions delivered. A table of "Exercise components" was developed utilizing the "Methods" and "Techniques" levels of the BCSF to determine whether specific aspects of practice in the Bobath concept could be identified. One example is shown in table 2.

Table 2. *An example of "Exercise components". Components of the BCSF "Methods" are represented in the first row, components of BCSF "Techniques" are represented in the first column.*

Exercise – Surfing Sidelying; bending and balancing	**activation**	**shaping**	**repetition**
environment arrangement	Lying on left side, both legs bent to 90°		
assignment of task	Take your right foot in both hands	b)* plus bend your right leg and straighten c)* increase the range of your right leg movement	3x10
communication	Keep right hand on foot!		
Facilitation	Help of wife to keep right hand on foot	Less help of wife to keep right hand on foot	

*More difficult versions of this exercise

2.4. Exercise Components Target to Impairments

In the next phase of analysis, the data in the "Exercise Components" table was examined to determine for each component the main target functions in the central nervous and neuromuscular systems (CNS & NMS) (compare with Hengelmolen-Greb & Jöbges [18]). The tables were scanned and logged by two raters (GE & GH or GE & TI). Four functions were examined; motor function (inclusive of biomechanics), sensory function, perceptual function, and cognitive/ emotional function.

Table 3. *Keywords linked to target CNS and NMS functions (based on Hengelmolen-Greb & Jöbges 2018).*

Target CNS and NMS system	**Keywords**
Motor: Neuromuscular, biomechanical, Muscle activation and/or mobilization (muscle, joint, tissue)	to do a movement/ activity activate muscles, keep going, strengthening, lengthening, shortening, positioning, stretching, to do something alone, without help
Sensory: Sensing, perceiving, proprioception, stereognosis	weight bearing, shift the weight, pressing, touching, feeling, sensing, hands on help of carer
Perceptual: Body schema; body in space orientation	differentiation of body parts, 3 dimensional, diagonal, rotation, turning
Cognitive / emotional: Attention, memory, imagination, curious, fear, planning	pay attention, exclamation mark (!), be aware of, take care, consciousness, think about, realize, reflect, do it slowly, breathing, do it equally, simultaneously

Different views were discussed in person or via Skype and a consensus was found. In total, 58.19% of all tables were reviewed by two raters. Since the agreement of the raters was > 80% in this subsample, further dual review of the remaining tables was omitted. Processing of data was supported by computer-aided software (MAXQDA 11 [19]).

2.5. Participants Are Coded in 2 Groups

Following the comprehensive initial assessment of all participants, the treating therapists were required to list the main problems/impairments affecting the participant's ability to perform their personal goals [4, 20, 21] (table 5).

These criteria were examined to identify participants whose performance was limited by perceptual or cognitive abilities. Based on this assessment, all participants were divided into two groups; people with predominantly neuromuscular, sensory and/or biomechanical problems (NS group, N = 39) and those with predominantly neuromuscular, perceptive and/or cognitive problems (NP group, N = 16).

3. Results

55 people with chronic stroke participated in the project, 25 women and 30 men, with an average age of 56.87 years (SD 13.29). The average time since onset of stroke was 7.12 years (SD 6.67). For further demographic and medical information regarding the participants with stroke, please see Part I of this mixed method study [2]. Each participant with stroke had a self-training program folder, containing an average of 8.98 individually devised exercises (SD 2.56, range 4 – 17) in relation to their personal goals. In all, 503 individual exercises were developed and utilized as data in the analysis.

3.1. Phase 1: Exercise Description and Categorizing

Using the "Exercise descriptions" (table 1), all exercises (N = 503) were examined and clustered according to movement activities. Eight main activities could be identified:

1) Turning and moving in lying positions (N = 157)
2) Sitting, including leg and arm activities (N = 115)
3) Standing, including leg and arm activities (N = 73)
4) Lying positions, leg and arm activities (N = 46)
5) Transfer from lying position to sitting, side sitting or kneeling (N =36)
6) Sit to stand (N = 31)
7) Steps and walking (N = 30)
8) Grasping and hand manipulation (N = 15)

Although the exercise descriptions could be coded into task categories, within each category, there was wide variability in how the task was performed with regard to starting position, movement requirement, use of environmental cues and instructions. For example, for sit to stand tasks, these variations were observed for six different sit to stand task options. Furthermore, descriptions of tasks were characterized by including exact specifications as to how the exercise should be performed, with a focus on the interactions of multiple body segments and minimizing compensation. Both features can be observed in table 6.

3.2. Phase 2: Analysis of Bobath Methods

In the BSCF method "activation", the purpose is to enable the patient to activate himself and to control his body in the field of gravity [22]. Analysis of the data showed that exercises were designed to elicit optimal movement patterns, with a focus on muscle activation and co-ordination of muscle activity over multiple joints, often involving the whole body. Strategies were put in place to minimize the use of compensation.

"Shaping" is defined in the BCSF in accordance with the original definition by Taub [23] as approaching a desired motor or behavioral objective in small steps by successive approximations, with a focus on enhancing the likelihood of success in performing movements that are relevant to everyday life. Shaping elements were included in the instructions for performing the exercises. Table 7 shows examples of keywords regarding the four aspects of the BSCF "Techniques"; assignment of tasks, communication, environment arrangement and facilitation, related to the BSCF Method of shaping. This analysis of keywords demonstrates the different and variable ways exercises were tailored to the individual.

Additionally, all exercises in the self-training program included more challenging and easier options of the same exercise for the participant to self-match their exercises to their performance level on any day. The shaping elements for attempting the more challenging version of the exercise were coupled in the self-training folder to "if, then sentences..."

1) ... if you can get up from the chair without holding your breath, then increase to "b"...
2) ... if you can turn right without the right arm flexing, then increase to "c"....
3) .... if the opposite shoulder can be left, then increase to "b"...
4) ... if the arm no longer needs support from your wife, then increase to "c"
5) .... if you can stand stable, and look right and left, then increase to "b"

For the BSCF Method "repetition", recommendations varied between number of repetitions (76.7%), a time interval (6.7%) and integrating the exercise into the daily routine (17.6%). The number of repetitions ranged between <5 to 60 repetitions, with an average number of 17.43 (SD 10.03). Time intervals ranged between 2 seconds to 20 minutes, with an average time of 8.07 minutes (SD 7.42). Participants were provided with specific suggestions for implementation into the daily routine (e g. if you stand up…, if you go to the bathroom…, whenever you have visitors).

Review of participant calendars showed that the homework program was carried out on average 73.04 days (SD 19.85) in whole or in part, during the study period of 92 days. Almost all of the participants self-reported completing the program on at least 40 days (N =48), with 37 achieving 66 days (5 x week). Four participants did not return calendars.

3.3. Phase 3: Attribution of Exercises to Target CNS and NMS Function

In the third phase of analysis, the "Exercise components" were reviewed to identify which functions in the CNS and NMS were being targeted within the individual exercises by using for keywords for each CNS and NMS function.

Table 4. *Analysis of BCSF "Techniques" according to motor disorder group.*

	NS* group (n = 39)	**NP# group (n =16)**
Assignment of task	daily life tasks, part tasks, selective movement, external cueing	rotation, differentiation of body parts, eye movements, slowly, attention to body, internal cueing
example	move your right knee, bend both legs, tilt the box	roll in both elbows, turn your head left and right, turn your eyes without moving your head, sense where your feet are standing, control the legs
Communication	imagination, encouraging to be more active, commands, explanation	realize, pay attention, important to think about what you are doing, control, important to get midline
example	do it separately, do it without thinking, don't initiate with speeding up from right side, don't extend your elbow with your back muscles, if you are using your power to pull down, it means, you are using the wrong muscles.	pay attention to the middle, sense the base of support, concentrate of every part of the movement
Environment arrangement	linked to task, base of support, to make it safe	environment supports close to the body or further away, to make it safe
example	on chair, on couch, pillow under armpit, rollator in front	hands on table, stool behind, hand under face, in front of table, box beside
Facilitation	help of carer or own hand to stabilize	help of carer to avoid risk to fall
example	help of own hand, help on part of body from carer	help on left side

* NS = Predominantly neuromuscular, sensory and/or biomechanical problems; # NP = Predominantly neuromuscular, perceptive and/or cognitive problems.

The result showed that every exercise program of each participant was individually structured and adapted to CNS and NMS function. Considering all exercises, 97.32% were targeted at neuromuscular/ biomechanical functions, 53.74% were targeted at cognitive/emotional functions, 28.74% were targeted at sensory functions and 20.19% were targeted at perceptual function.

If these results are transferred to the 2 groups of participants (NS, NP group) (table 4), the therapy targeted to perception occurred three times more often in the NP group.

Differences between the two groups were also examined for BCSF "Techniques", demonstrating that "facilitation" by a relative was more common in those in the NP group (Figure 4+5).

3.4. Steps to Follow

Reflecting the individual phases 1-3 described above, the following flow chart (figure 2) is intended to summarize and visualize the procedure and serve a more transparent use (steps to follow). The flow chart follows the specifications of the MBCP (assessment, movement diagnosis, identification of potential, working hypothesis) and the findings of the study (classification of patients into NS and NP groups and the individual adaptation of a self-training program).

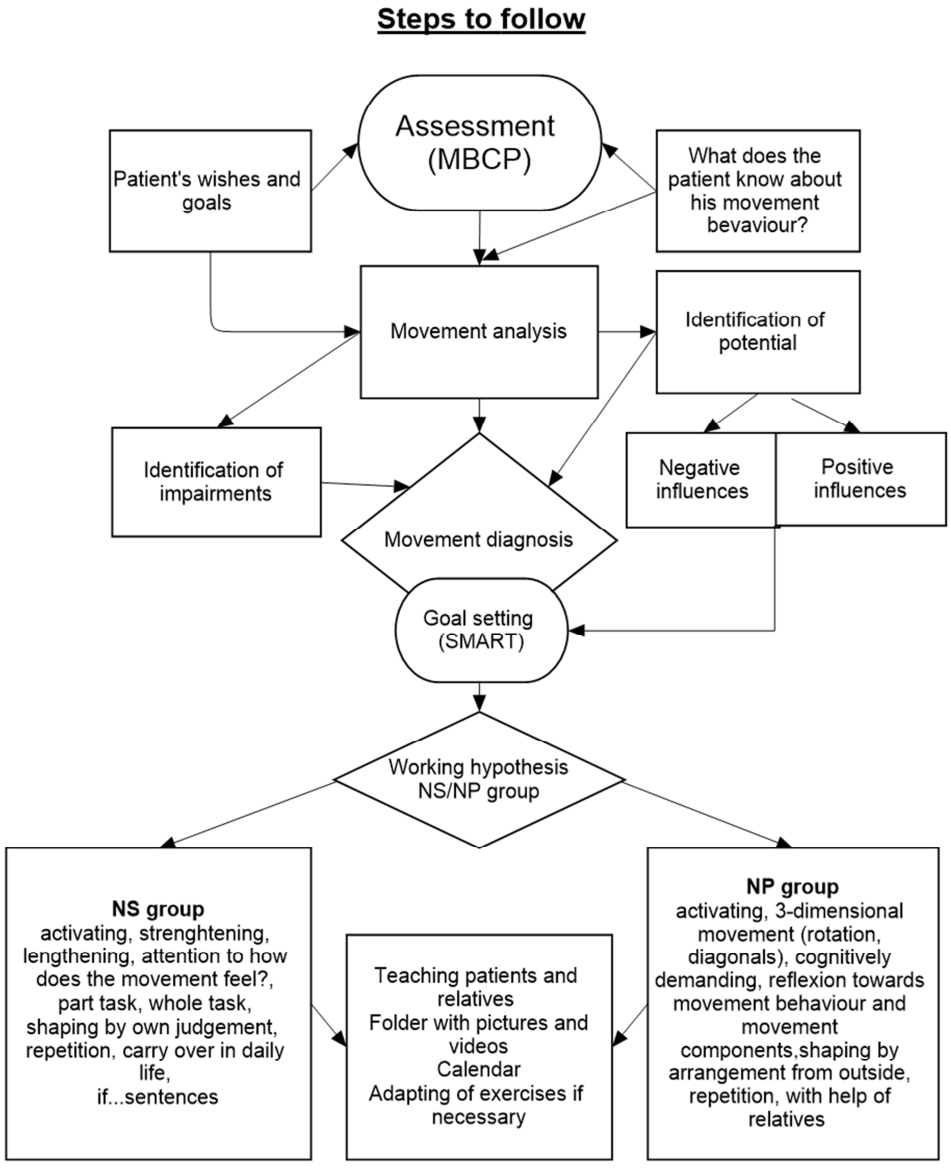

Figure 2. *Steps to follow an individual self-exercise program.*

4. Discussion

The outcomes of the qualitative analyses demonstrate that the self-training programs in this intervention were tailored to the individual. The examination of the self-training programs showed a systematic procedure for developing the exercises. Out of 503 exercises of the 55 participants, a great variability was observed in the nature of the tasks, in the specific exercises, in the descriptions of the implementation of the exercise, the adaptations to performance with improved competence and in the support requested by the relatives.

Exercises also differed in the targeting of different neurobiological systems (motor, sensory, perceptual, cognition /emotion). The self-reported utilization of the self-training showed that it was possible to motivate the participants with stroke to show a great sense of responsibility towards themselves and to work regularly.

4.1. Exercise Components According to the Bobath Concept

Components of the exercises could be attributed to the BCSF domains of "methods" and "techniques", demonstrating that the self-training programs reflected key aspects of the Bobath concept. The element of 'shaping' was observed consistently

and systematically in the learning process of the participants with stroke, with each exercise offered in three difficulty levels (a-b-c) and explained through photos and descriptions. This made it clear to participants that learning does not take place just by practicing the desired result, but must be acquired in stages through training. Each step had to be "skillful" before the increase could be made to the next level of performance. The "ability" had to be reflected and judged by the participants themselves. This self-assessment was facilitated by specific instructions developed as "if...., then....." sentences. This shaping method strongly reflects the Bobath concept, which focuses on the quality of performance of a movement and patient self-reflection and personal responsibility [10, 6]. The acquired level of performance was documented daily by the participant in a calendar sheet. For many participants, this resulted in a performance curve rising with ability level and thus motivating the participant (Figure 6).

Repetition is a necessary strategic means for the establishment of learned movements [23]. However, the repetition of wrong movement strategies can damage structures, limit the quality of life and have a negative impact on the recovery of impairments [8, 24, 2]. Self-training programs should therefore be targeted and oriented to the potential of the patient, as far as possible to avoid compensation strategies and to consolidate the performance level at the individual's performance limit. Direct implementation of exercises into daily life was included, making the relevance obvious and without requiring additional time in their personal daily routine.

4.2. Attribution of Exercises to Target CNS and NMS Functions

The data demonstrated differences in the approach to self-training for participants with and without perceptual and/or cognitive deficits. For the NS-group, therapeutic procedures such as activating, strengthening, lengthening and directing attention to the feeling of the movement were common. The chosen exercises suggested that the actual action is in focus of attention in the neuromuscular-sensory-biomechanical group. The description calls for the exact and active performance of the exercise, utilizing environmental adaptation to simplify or increase the difficulty of the action [25]. The facilitation provided by the relatives enabled stabilization of individual sections of the body to encourage mobility of other body sections.

For the NP group, the exercises included activating components and three-dimensional movements (rotations, diagonals). The tasks and descriptions directed attention to body movement. Rotations and slow, controlled movement of individual sections of the body allow gravity to be experienced as a condition of movement and establish the relationship of one's own body to the personal space of movement [26]. Environmental adjustments are utilized as reference points for spatial orientation and for safety. The treatment component "facilitation" was used twice as often in the NP group as in the NS group. This shows that, according to the Bobath therapists, participants in the NP group needed more help from their relative or caregiver to perform their exercises. Conversely, this means that participants without neuromuscular-perceptual-cognitive disability seldom required assistance from relatives to complete self-training programs. Both groups benefited from cognitively demanding and movement reflecting stimuli.

The focus on neurological impairments identified in this study is a point of difference to other studies and protocols investigating exercise based interventions in chronic stroke. A common approach is to use a standardized exercise program such as the Weight Bearing Exercise for Better Balance (WEBB) program [27], the Task Oriented Functional Training (TOFT) program [28] and the ReTrain program [29]. These programs do include tailoring of the interventions. However this is described primarily in terms of ability level rather than in response to the underlying neurological deficits. Both TOFT and ReTrain focus on personal goal setting as a means to improve adherence to the programs; however, the exercise interventions were not developed in the context of achieving specific personal goals. These aspects of tailoring interventions to both the person's neurological deficits and their personal goals are key features of the self-training approach delivered in this study. The exercise programs developed in this study meet recommended exercise training principles for stroke survivors [30]. These include "specificity" of exercise to body components, exercise "progression" and "overload", requiring the exercises to be challenging for training adaptation.

4.3. Training of Therapists

The experienced therapists participating in the Advanced Bobath course received five days of training in developing self-training programs. The training focused on facilitating person centered goal setting, clinical skills of assessing how underlying impairments affect movement in daily tasks and impede goal achievement, evaluation of the person's potential to improve to enable goal achievement, and the development of a highly specified, individualized self-training program. The delivery of this intervention required a high level of skills from the therapists.

5. Limitations

Limitations of the study include the involvement of three of the authors both in the teaching of the Advanced Bobath courses and the development of self-training programs and the qualitative analysis. The positive aspect of the "insider" status is deep knowledge of the Bobath concept and its application to self-training, the negative aspect is bringing preconceived ideas and opinions to the subject matter. The resulting distortion in the evaluation and interpretation of the data was reduced by the involvement of other experts (K. B.) in the analysis who did not take part in the delivery of the intervention.

A second limitation is the attribution of perceptual and cognitive deficits to participants with stroke through clinical assessment and clinical reasoning rather than objective tests. However, the interest in this study was on the therapists tailoring of self-training programs according to their

understanding of the individual's clinical presentation and the effect of their impairments on goal performance. Inclusion of objective tests of perception and cognition in future studies would allow further examination of this aspect.

A key finding of the study was the involvement of relatives in the self-training program, potentially adding an additional burden of care. A systematic review by Vloothuis et al. [31] established that caregiver mediated interventions can be effective for balance, gait and some aspects of quality of life, without an increase in carer burden. However, future studies in this field should investigate the perspectives of relatives, both in terms of time burden and relationship consequences of this involvement. Future studies should also investigate the experiences and perceptions of participants regarding the self-training, including their views on other factors that impede goal achievement, particularly factors that may be amenable to interventions.

6. Conclusion

In this iterative research approach, the therapeutic methods and techniques used in the self-training programs were clearly assigned to the Bobath concept. The self-training described in the research is based on the personal goals, the individual abilities and neurological impairments of the participants. Key aspects of the Bobath concept were revealed in the qualitative analysis and this individualized self-training approach can be identified as an integral part of the 24 hour approach in Bobath therapy [3].

With the completion of the study, the basis has been created to provide therapists with a model for the creation of an individual self-training program for chronic stroke patients. In addition, a comparative study between a standardized and an individual self-exercise program can be carried out on this background knowledge.

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Appendix

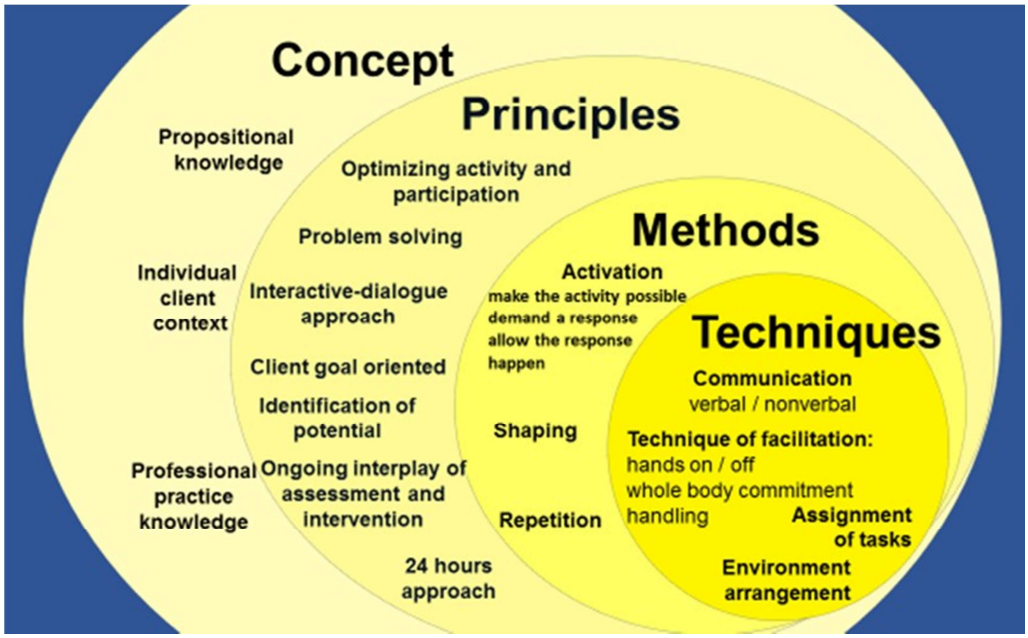

Figure 3. *Model of Bobath Structural Framework (MBSF), Eckhardt et al., 2018.*

Table 5. *Criteria for assigning CNS and NMS functional impairments in participants as NS (Neuromuscular, sensory, biomechanic deficits) or NP (Neuromuscular, perceptive, cognitive).*

Neuromuscular-sensory-biomechanic (NS) group [20]	Neuromuscular-perceptive-cognitive (NP) group [21]
Minus-symptoms, plus-symptoms, hypersensibility, hyposensibility, contractures, weakness, less strength (paresis), Clumsiness by limiting selective muscle activability, prenature fatigue, disorder of force dosing, temporal sequencing of muscle activations, anticipatory innervation disturbance, contraction / deceleration retardation, muscular hypertension / spasticity, self-reflex enhancement, clonus, associated reactions, pathological reflexes, spasticity synergies, pathological co-contractions.	Visual -, spatial -, motoric neglect, body-body disorientation, body-space disorders, deficient one-sided attention deficit disorder, anosognosia, modal and crossmodal extinctions and concomitant cognitive limitations such as attention and concentration deficits in activities of daily living.

Table 6. *Three examples of individually tailored exercises for each of the eight exercise task categories identified in Phase 1, according to the Exercise components at the BCSF "Technique level".*

Activities	Environment arrangement	Assignment of task	Communication	Facilitation
Turning and moving in lying positions	Lying supine, left leg is standing, arms 45°, rabbit in right hand	Push yourself from the left leg into your right shoulder	Keep the rabbit in your hand	Help to open the hand and place the rabbit in the hand
	Lying supine, both legs standing, pillow under your head	Move both legs to the right, stay for one minute and go back	Feel all parts of your body elongating	
	Lying supine, both legs standing, arms crossed over body	Turn your head to the right and left and your eyes in the opposite direction	Make sure you are in the midline	Provide a light hand contact on the head
Sitting, including leg and arm activities	Sitting on a roller, hands on box on table	Tilt the box	Don't initiate with speeding up from the right	Help to "facilitate" the box
	Sit on a 48 cm high stool	Stabilize your right leg with your left hand and reach forward	If you feel uncomfortable in the ankle joint or tendon, reduce the range	Help with your own hand
	Sit on a sofa	Take both hands to your feet and turn your head and eyes from right to left and stop in the midline		Ensure the person will not fall. Teach the position of the left foot!
Standing, including leg and arm activities	Safe area for standing	Turn the body, use both arms and watch the line as if you are playing golf	Have fun	
	Standing between two chairs with armrests, both hands on the armrests	Imagine a raw egg under your right heel	Feel stability in the left hip and left hand and use right hand contact only when necessary	Stand on the left side
	Standing backwards to the kitchen bench, both hands on the bench	Find your weight on both feet and close your eyes	How many weight is on the right and left leg?	Stabilise the trunk and left hand
Lying position, leg and arm activities	Lying supine, legs bent, feet standing	Grasp your left knee with both hands and bend the knee in the direction of your right shoulder	Don't extend your neck, don`t push into the pillow	Help to place the hand
	Lying supine, both legs to right side	Mobilize your ribs on the left side with your right hand	Feel the tension	Little help with pressure on ribs
	Lying prone, arms above	Lengthen and shorten the arm, let the elbows move	Don't extend your elbows with your back muscles. If you are using your power to pull down, it means you are using the wrong movement	
Transfer from lying position to sitting, side sitting or kneeling	Lying prone on floor	Place your arms under your shoulders and shift your weight to the knees, come up to all fours and lift your head	Stabilize your left elbow	A little help to come into the position
	On all fours, pillows right and left of the body	Come to side-sitting, once to the left, once to the right	Find the diagonals, elongate your back	Place the pillows
	Side-lying on right side, both legs bent, right arm 45°, left arm in front of the body, hand near face	Roll over both arms and come to sitting. Both legs are then sinking over the edge of the bench.	The head is the last	A little help on the pelvis
Sit to stand	Sitting on a higher chair (49cm)	Slide your arms forward and feel the weight coming onto your feet. In the moment of time when the weight is enough on the feet, lift the pelvis and come up to standing	Concentrate on every part of the movement, don't hold breath	
	Sidesitting on the floor	Place your left hand as forward as possible, place your right hand and come on to all fours (Part task training for sidesit to standing)	Find the connection of legs and shoulders	In the beginning, help with placing the left hand
	Sitting on a chair, bench or sofa	Place both arms into a "waltz" position and come up to standing	Don`t pull on your husband, listen to the music and find the rhythm	Your hands in the position for waltzing
Steps and walking	Stands between two chairs	Take a step forward and turn your body in the opposite direction, then step again	Make sure you are well balanced	
	Standing in a corner	Stay standing on your more affected leg	Don't push backwards	Help on left side
	Walking outside	Walk straight forward and turn your head 45° right – to the middle – to the left	Keep upright	Walk hand in hand

Activities	Environment arrangement	Assignment of task	Communication	Facilitation
Grasping and hand manipulation	Standing in the laundry, next to the washing machine	Grasp the basket with both hands and lift the basket	Feel the weight on both feet, how are you standing?	Ensure the person will not fall
	Sitting in the wheelchair, feet on the floor	Place the left hand on the armrest, with the right hand serve a glass of water to your relative	Take your time	Stand on the left side to receive the glass of water
	Sitting on a bench, with a box on the left side	Put your socks on with two hands	Relax both shoulders	Remind to use both hands

Table 7. *Examples of shaping elements identified according to the BCSF "Techniques" of the Bobath concept.*

Assignment of task	Communication	Environment arrangement	Facilitation (provided by a relative)
more range, quicker/ slower, alternating, changing rhythm, without visual contact, with additional task (singing, swinging arms, carrying full glass of water….)	imagine…. (eg. surfboard), linking attention to a body part or external reference, don't push /pull…. less encouragement from relative, without a reminder	with or without box/ wall/ pillow/ towel/ belt lower chair, bare feet/ shoes	less help, only light touch without help, without supervision

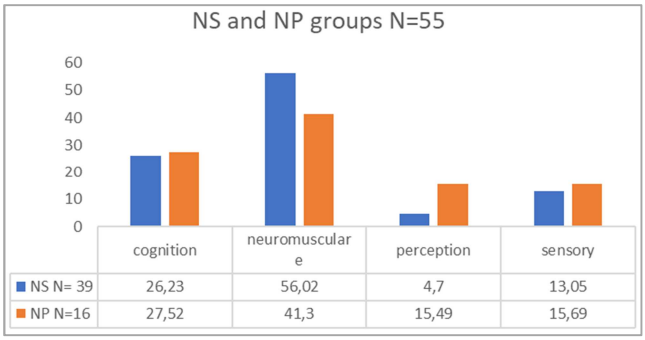

Figure 4. *CNS and NMS function targeted therapy according to motor disorder group, NS vs NP.*

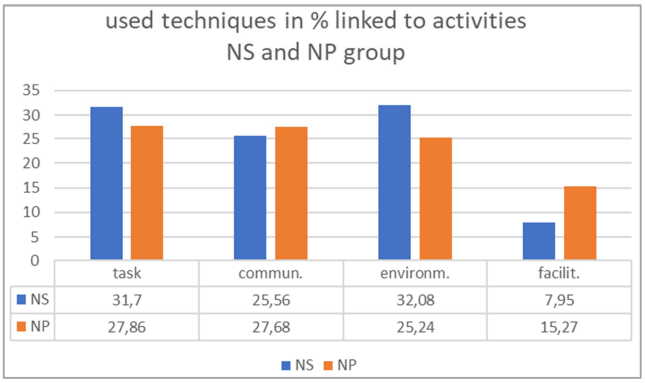

Figure 5. *Use of techniques for NS and NP.*

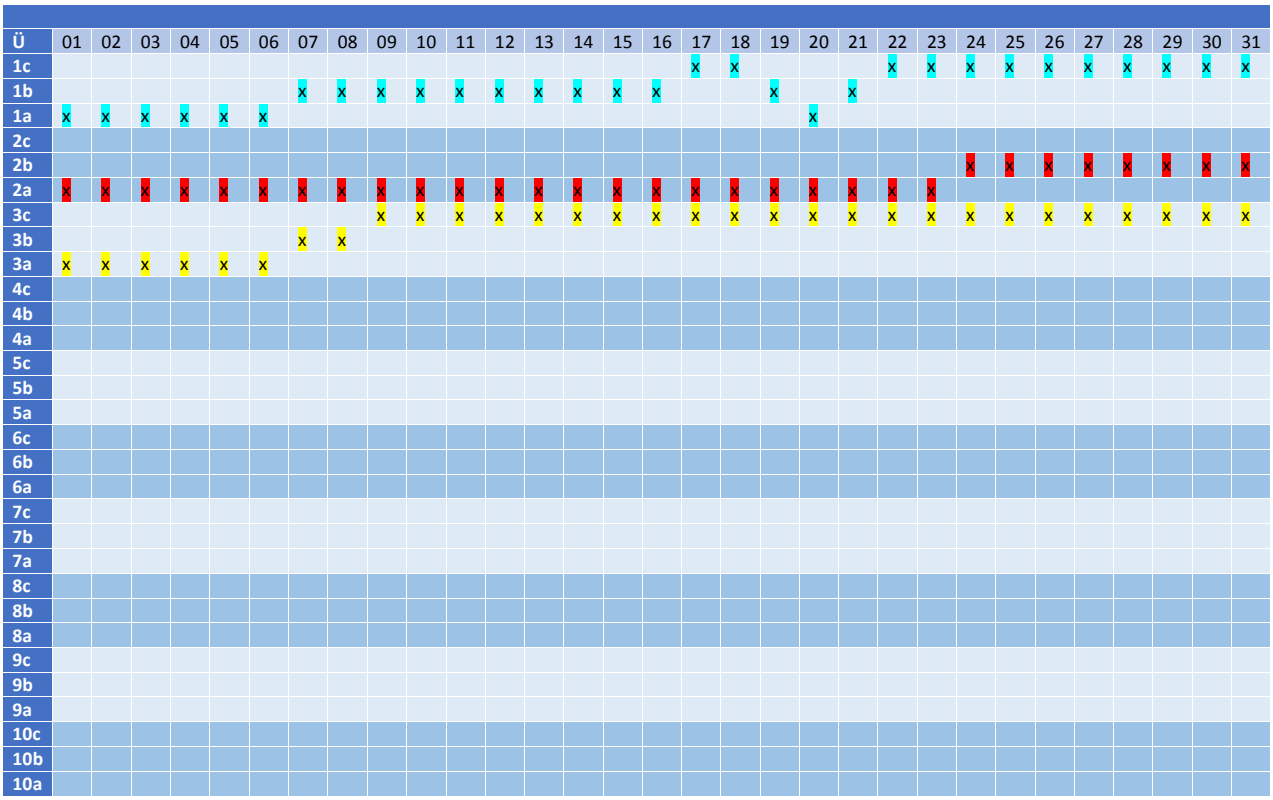

Figure 6. *Documentation of self-training (example).*

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