

Australian Bobath Training Association (ABTA) Response to Recent Systematic Reviews and Guideline Updates



At the present time, there is a strong drive against the Bobath concept, including recommendations in the UK Stroke Guidelines based on recent systematic reviews. The StrokeEd Collaboration in Sydney have called for de-implementation of the Bobath concept. We strongly refute these developments the main reason being that the studies included in the systematic reviews do not represent the Bobath concept as it is taught around the world by tutors accredited by the International Bobath Instructor Training Association (IBITA). Testing the efficacy of the Bobath concept must involve clinicians with skills in the clinical reasoning and interventions of the Bobath concept, who have completed accredited training.

The Bobath concept has unavoidably a dual nature. In the 1950, Berta Bobath was one of the first clinicians to demonstrate recovery of neural function after brain injury, a precursor to the scientific knowledge of neuroplasticity underlying neural recovery. Her book 'Adult Hemiplegia: evaluation and treatment' was first published in 1970 and was used widely around the world. Therefore, many clinicians worldwide have some knowledge of the Bobath concept. Berta Bobath established the International Bobath Instructor Training Association (IBITA) in 1984 to ensure high standards in accredited trainers and to further develop and evolve the Bobath concept as the scientific knowledge base expanded. The Bobath concept is taught worldwide by accredited instructors in a post graduate short course (Basic Bobath Course) with 110 hours of formal teaching, usually over a three-month period. The greater proportion of the course is practical skills training, including supervised patient treatment sessions, with theoretical neuroscience-based lecture components underpinning the movement analysis and intervention skills. Many thousands of clinicians have completed these IBITA courses around the world and use their skills in daily practice. Therefore, there is a huge difference between clinicians with minimal exposure to the Bobath concept and those who have had formal training in IBITA courses and have gone on to further develop their skills.

Treatment fidelity is a key concept in clinical trials that do not involve pharmaceuticals. Defining the content of the intervention and how it is tailored for individuals is crucial (Boutron 2017, Consort statement for nonpharmaceutical trials). The curriculum for the Basic Bobath Course is highly detailed regarding both theoretical and practical components. *The training process for IBITA tutors is extensive, involving face to face completion of international training modules, and a rigorous process that assesses both the theoretical knowledge and practical skills of candidates through multiple evaluation methods including a two day live evaluation of skills by members of an international panel.* This level of standardisation of training around the world enables high confidence in the ability to adhere to treatment fidelity of therapists who have successfully completed the Basic Bobath Course.

Unfortunately, the articles included in recent systematic reviews are overwhelmingly representative of clinical practice without specific and structured training in the Bobath concept. There is a vast difference between therapists who perhaps have received a few hours of undergraduate training and some supervised clinical experience and a therapist who has completed the IBITA formal training process. We do not disagree that use of the Bobath concept by therapists with minimal training may be less effective than other treatments. However, as very few clinical trials in the Bobath concept include therapists with accredited training, the efficacy of the Bobath concept with appropriately trained therapists is unknown.

Around the world, there are thousands of therapists who have given their time and their financial resources to learn the skills of the Bobath concept. If therapists are asked why they choose to attend, the most common response is that they have observed colleagues who are highly successful in their treatment with patients, and they want to achieve the same outcomes with their patients.

To enable therapist to assess the strength of the evidence for themselves, we have summarised information about the interventions in clinical trials included in systematic reviews. We have chosen the 4 systematic reviews that are cited in the UK Clinical Guidelines and referenced in the Stroke Education group call for de-implementation of the Bobath concept (Dorsch 2023, Scrivenor 2020, Wattchow 2018, Veerbeek 2014). We focus on analyses with significant findings against the Bobath Concept. Reviewing these trials shows clearly that the Bobath concept interventions were, in nearly all cases, a "usual care" comparator with no indication

of the level of training in the Bobath concept or how the Bobath concept interventions were carried out. The efficacy of the Bobath concept when utilised by therapists with accredited training is yet to be determined. As stated above, there are other concerns about the validity of the systematic reviews under discussion. To explore these further, please access the links provided below.

Dorsch et al 2023

Dorsch S, Carling C, Cao Z, Fanayan E, Graham PL, McCluskey A, Schurr K, Scrivener K, Tyson S. Bobath therapy is inferior to task-specific training and not superior to other interventions in improving arm activity and arm strength outcomes after stroke: a systematic review. *J Physiother.* 2023 Jan;69(1):15-22. doi: 10.1016/j.jphys.2022.11.008. Epub 2022 Dec 16. PMID: 36529640.

Significant results statement from abstract

Pooled data from five trials indicated that Bobath therapy was less effective than task-specific training for improving arm activities (SMD -1.07 , 95% CI -1.59 to -0.55).

| | Bobath | Comparator |
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| Arya (2012) N = 103 India | Training: Not specified The control group was given an intervention of the same duration based on the Brunnstrom movement therapy and Bobath neurodevelopmental technique. Brunnstrom movement therapy uses reflexes to develop movement behavior through sensory stimulation to inhibit spasticity and movement retraining to enhance the recovery. The specific techniques are used to develop synergistic and voluntary control of movement as per the Brunnstrom recovery stages. The Bobath neurodevelopmental technique is a concept of treatment based on the inhibition of abnormal reflex activity and the relearning of normal movement, through the facilitation and handling. | Training: Not specified Meaningful Task Specific Training (MTST) mainly comprises the specific number of meaningful tasks, which are common to all the patients. The tasks have to be practiced repetitively either with unilateral (U/L) (the most affected extremity) or bilateral (B/L) upper limb/s, depending on the task requirement. It also has a component of individualized meaningful tasks, which have to be selected from a task bank for repetitive practice. Similar to CIMT, MTST is based on task specificity. (Details provided in appendix) |
| El Bahrawy (2012) N = 40 Egypt | Training: Not specified A qualified physiotherapist with three years of experience with neurological patients conducted the conventional physiotherapy programme. The therapist responsible for the conventional therapy program was trained in the standardized procedure for conducting the control program. Retraining normal movement pattern was based on Bobath treatment principles. These patterns were facilitated through appropriate sensory and proprioceptive input; direct manual facilitation; key point | Training: Not specified Motor Relearning Programme Participants then performed drinking task through grasping a cup, moving the cup toward the mouth, reaching down toward the table then releasing the cup on the table. The intervention technique followed four sequential steps: identification of the missing performance components (step 1); training using remedial exercises (step 2); training using functional task components (step 3), and transfer of skills to functional task performance (step 4) |

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| | control and visual and verbal feedback. Recruitment of arm activity in functional situations with various positions (i.e., lying, sitting, standing and walking). | |
| Moon (2018) N = 18 South Korea | Training: Not specified The control group underwent NDT to improve the functions of the trunk and upper extremities. NDT aims not only to improve muscle tone and reflexive and abnormal movement patterns and postures, but also to normalize sensorimotor elements such as sense, perception, and memory. In this study, the NDT group performed its training without using tools under the guidance of therapists. The intervention consisted of a preliminary exercise for 10 minutes and an NDT based manual exercise for 20 minutes | Training: Not specified Task oriented circuit training There were 6 rehabilitation tools (putty, skate, incline board, stacking cone, range of motion arc, ring) selected which are used widely in occupational therapy [24]. TOCT included 6 different tasks in which subjects performed for 5 minutes in each task in a circular manner. Each task was based on 4 levels of difficulty and the therapist provided a task fit for the subject's ability level. The guidelines required that tasks should be easily performable in a clinical environment, and that training should aim for active movements, induce the suppression of compensatory movements, gradually increase in speed and frequency, encourage the subject to make further efforts, and increase the difficulty level when a subject's function improves. |
| Supititada (2004) N = 69 Thailand | Training: Not specified In the control group, patients were treated according to the NDT method. All activities were performed bimanually and, if necessary, the affected arm was supported with the unaffected hand. Symmetry of posture and inhibition of inappropriate "synergistic" movements were emphasized. | Training: Not specified. Constraint Induced Movement Therapy: All patients in the experimental groups had their healthy hands covered by glove for avoidance of using them. Patients were encouraged to use the affected arm at home during the 12 days of treatment, too. |
| Tariah (2010) N = 18 Jordan | Training: Not specified In the NDT group, the training consisted of weight bearing and facilitation of arm movement based on conventional NDT procedures, which is the common treatment for stroke survivors in Jordan. | Training: Not specified Constraint Induced Movement Therapy. Restricting the movement of the unaffected hand using a resting hand splint for two hours per day Intensive training of the affected arm two hours per day while restraining the unaffected hand, seven days a week, for two months. |

El-Bahrawy, M.N. and EL-WISHY, A.A.B., 2012. Efficacy of motor relearning approach on hand function in chronic stroke patients. A controlled randomized study. *ITALIAN JOURNAL OF*, 121.

Arya KN, Verma R, Garg RK, Sharma VP, Agarwal M, Aggarwal GG. Meaningful task-specific training (MTST) for stroke rehabilitation: a randomized controlled trial. *Top Stroke Rehabil*. 2012 May-Jun;19(3):193-211. doi: 10.1310/tsr1903-193. PMID: 22668675.

Moon JH, Park KY, Kim HJ, Na CH. The Effects of Task-Oriented Circuit Training Using Rehabilitation Tools on the Upper-Extremity Functions and Daily Activities of Patients with Acute Stroke: A Randomized Controlled Pilot Trial. *Osong Public Health Res Perspect*. 2018 Oct;9(5):225-230. doi: 10.24171/j.phrp.2018.9.5.03. PMID: 30402377; PMCID: PMC6202022.

Suputtitada A, Suwanwela NC, Tumvitee S. Effectiveness of constraint-induced movement therapy in chronic stroke patients. *J Med Assoc Thai*. 2004 Dec;87(12):1482-90. PMID: 15822545.

Tariah HA, Almalty AM, Sbeih Z, Al-Oraibi S. Constraint induced movement therapy for stroke survivors in Jordan: a home-based model. *Int J Ther Rehabil*, 17 (2010), pp. 638-646

Scrivener et al (2020)

Scrivener K, Dorsch S, McCluskey A, Schurr K, Graham PL, Cao Z, Shepherd R, Tyson S. Bobath therapy is inferior to task-specific training and not superior to other interventions in improving lower limb activities after stroke: a systematic review. *J Physiother*. 2020 Oct;66(4):225-235. doi: 10.1016/j.jphys.2020.09.008. Epub 2020 Oct 14. PMID: 33069609

Significant results statement from abstract

The pooled data indicated that task-specific training has a moderately greater benefit on lower limb activities than Bobath therapy (SMD 0.48), although the true magnitude of the benefit may be substantially larger or smaller than this estimate (95% CI 0.01 to 0.95).

| | Bobath | Comparator |
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| *Brock (2011) N = 26 Australia & Germany | Training: Completion of Basic Bobath Course and 2 Advanced courses In this intervention, participants received individual treatment prescription based on the Bobath concept towards the goal of improving walking ability in different environmental contexts. This intervention included detailed assessment of the individual's movement strategies and the neurological and neuromuscular deficits underlying motor dysfunction. Treatment strategies were individualized and aimed at both reducing the severity of impairments where they impacted on function, and optimizing postural and movement strategies to improve efficiency and maximize function... The session incorporated structured task practice for 1/6 of the treatment time allocated. | Training: Not specified Participants receiving Intervention B undertook physiotherapy based on structured task practice. The supervised exercise programme aimed to provide repeated task specific practice of environmental contexts frequently encountered in walking outdoors. The tasks practised focused on increasing endurance, walking on slopes, going up and down a single step and walking over rough ground. Based on principles of motor learning, the therapist provided instruction in how to perform the task, including demonstration, verbal cueing to correct ineffective adaptive motor patterns and feedback on the performance of the task as specified by the study protocol, as well as supervision for safety. The therapist did not provide hands-on assistance or guidance during tasks |
| Langhammer (2000) N = 61 Norway | Training: The two physiotherapy programmes were standardized as follows; a manual describing the main philosophy behind the two physiotherapy methods was produced according to background literature. Workshops were | Training: The two physiotherapy programmes were standardized as follows; a manual describing the main philosophy behind the two physiotherapy methods was produced according to background literature. Workshops were |

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| | <p>organized with stroke patients not included in the study, and physiotherapists, in order to coordinate treatment according to the Bobath and MRP manuals. These treatments were discussed among the physiotherapists and the project leader in order to coordinate and as far as possible identify treatment variables in a 'Bobath respectively MRP manner' and as described in the manuals true to the background literature</p> | <p>organized with stroke patients not included in the study, and physiotherapists, in order to coordinate treatment according to the Bobath and MRP manuals. These treatments were discussed among the physiotherapists and the project leader in order to coordinate and as far as possible identify treatment variables in a 'Bobath respectively MRP manner' and as described in the manuals true to the background literature</p> |
| <p>**Mudie (2002) N = 40 Australia</p> | <p>Training: Bobath trained staff therapists (training not specified) *A treatment protocol based on Bobath practices (see Davies "Steps to follow" pp. 99–118) was devised by the Bobath-trained staff physiotherapists who trained the third group. This protocol focused on increasing trunk and pelvic range of movement, normalizing trunk muscle tone, maintaining appropriate balance responses during reaching and improving the subject's ability to move in and out of an asymmetric postural set. A series of postures and postural manoeuvres involving lateral weight shift, lateral, anterior and posterior pelvic tilting and isolated trunk movements were verbally and manually facilitated by the therapist during seated reaching or in lying. These manoeuvres were repeated throughout the session to encourage subjects' awareness of normal posture and weight distribution.</p> | <p>Training: Not specified For the first group, a portable computer-linked Balance Performance Monitor (BPM) feedback console was used to provide awareness of weight distribution during training in sitting. Visual information on weight distribution was provided by horizontal and vertical sets of coloured lights grading from green when weight is distributed evenly, through orange to red when weight was borne asymmetrically in the outer limits of the base of support... The subject was required to displace weight to either side whilst reaching to touch a target with the nonparetic hand at various heights and distances. Task related training For task-related reach training, the subject was seated on an adjustable plinth, with feet flat on the floor. Fifteen grocery items were placed either behind or to the side of the subject or on the floor at approximately 140% of arm's length to encourage a range of weight shift to either side. These items were retrieved singly with the nonparetic upper limb and placed on the cupboard shelves at various heights and distances</p> |
| <p>Simsek (2016) N = 42 Turkey</p> | <p>Training: Not specified Conventional treatment (Bobath NDT) A therapy program was applied to the patients depending of the functional level in NDT group. Bobath NDT procedures were applied as upper extremity activities, trunk exercises, sitting, standing and walking exercises, balance exercises and lower extremity exercises</p> | <p>Training: Not specified Nintendo-Wii group used five games selected from the Wii sports and Wii Fit packages for upper limbs (tennis and punch out) and balance training (tightrope tension, tilt table and heading), respectively. Each game was performed as three sets with five-minute intervals between each.</p> |

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| | <p>depending on the functional needs of the patient. NDT exercises were done in the bed, in sitting and standing positions. Scapular mobilization, exercises, M. latissimus dorsi stretching, weight shifting to the affected upper extremity, selective strengthening of shoulder stabilizers were done for upper extremity and also strengthening exercises of the abdominal muscles (rectus abdominus and oblique abdominal muscles), bilateral arm activities, grip activities when the elbow is in flexion and extension, pronation, supination exercises, grip and unhand activities were done focusing on the facilitation of movements on the paretic side. Balance, weight shifting to lower extremities and walking exercises were also done. First, pelvic elevation in the bed, balance training in sitting and standing position, standing without sitting, weight shifting to lower extremities, squatting down activities, walking exercises (right–left, stepping forward–backward and walking), going up and down stairs activities were also done. The exercises were gradually made more difficult considering the functional status of the patient.</p> | <p>In tennis play, the patient was asked to hit the ball using the remote control of Wii by moving the body forward and backward while keeping the support surface. In tilt table play, the patient was asked to hole the balls while weight shifting in forward and backward, to right and left. In tightrope tension game, the patient was asked to stay stable on balance board through transferring balance to right and left. In punch out game, the patient was asked to kick the competitor forward–backward or upward–downward using his/her upper extremity and Wii remote control and nunchuck equipment. The arm movements involved in the use of the Wii included shoulder flexion and extension (tennis), shoulder rotation (tennis), shoulder flexion–extension, elbow extension and flexion (punch out), wrist supination and pronation (tennis) and different degrees of wrist flexion and extension as well as thumb flexion involved in all activities. Trunk stabilization of lower extremities, weight transfer and weight shifting (forward–backward and right–left) activities were supported by the other games (heading, tightrope tension and tilt table). All five sports required full body motion and balance.</p> |
| <p>Tang (2005) N = 47 China</p> | <p>Training: Not specified Based on the principles of normalization of motor performance and quality of movement.</p> | <p>Training: Not specified Problem oriented willed movement therapy. Detailed protocol with tailoring of interventions according to impairments of cognition and perception provided.</p> |
| <p>Thaut (2007) N= 78 Germany & USA</p> | <p>Training: Not specified Usual Care</p> | <p>Training: Not specified Rhythmic auditory stimulation while walking according to protocols with a metronome and specified musical tapes (summary provided)</p> |
| <p>Van Vliet (2005) N = 120 UK</p> | <p>Training: Not specified Routine treatment. The Bobath Based treatment was delivered by physiotherapists working on the ward who used it routinely before the study began. Prepared written guidelines, consisting of theoretical concepts for practice and main clinical objectives, based on their</p> | <p>Training: Movement Science Based treatment was provided by two physiotherapists who received training because they had insufficient experience of the treatment. The first author (PvV) provided the training. Prepared written guidelines, consisting of theoretical concepts for practice and main clinical objectives,</p> |

| | own knowledge and experience and their interpretation of the literature | based on their own knowledge and experience and their interpretation of the literature |
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| Verma (2011) N = 30 India | Training: Not specified Subjects in the control group (n = 15) participated in the conventional poststroke lower extremity rehabilitation program based on the Bobath's neurodevelopmental technique. The control group program was matched for duration, number, and frequency of the sessions with the experimental group program. | Training: Not specified The experimental group (n = 15) received 15 minutes of Motor Imagery (MI) followed by 25 minutes of Task Oriented Circuit Class Training (TOCCT) for a total of 40 minutes, 7 days per week for 2 weeks (14 sessions). MI comprised imagining walking abilities and tasks related to a real-life situation (Table 1). The participants were familiarized with the MI during a preintervention session and educated about the basic imagery principles. A therapist with previous clinical experience with such techniques with poststroke patients administered the MI. The MI program of 15 to 25 minutes was given on an individual basis. The participants were also asked to keep a diary of their MI practice to measure the rehearsal frequency after each treatment session. TOCCT was provided to groups comprising up to 4 patients at any one time with a physiotherapist or occupational therapist for supervision |
| Yelnik (2008) N = 68 France | Training: Not specified. Description: Physical rehabilitation based on the manipulation of the sensory information required to maintain balance, attention being paid to the amount of exercise, that is, duration and intensity, rather than the quality of the movement. Most of the exercises were conducted in visual deprivation, thus challenging the selection and synthesis by the brain of vestibular and somatosensory information | Training: Not specified Description: Conventional approach (NDT-based treatment). Global sensorimotor rehabilitation, based on the NDT approach described by Bobath, targeting more on the control of weight bearing and shifting in erect stance and the quality of gait with less emphasis on the response to destabilization situations |

Note: Two trials stated that therapists were trained in the Bobath concept. Both trials yielded positive outcomes for Bobath interventions

*Brock This pilot study indicates short-term benefit for using interventions based on the Bobath concept for improving walking velocity in people with stroke ($p = .01$)

**Mudie In the short term, the Bobath approach was the most effective treatment for retraining sitting symmetry after stroke ($p = 0.004$)

Brock K, Haase G, Rothacher G, Cotton S. Does physiotherapy based on the Bobath concept, in conjunction with a task practice, achieve greater improvement in walking ability in people with stroke compared to physiotherapy focused on structured task practice alone?: a pilot randomized controlled trial. *Clin Rehabil.* 2011 Oct;25(10):903-12. doi: 10.1177/0269215511406557. Epub 2011 Jul 25. PMID: 21788266.

Langhammer B, Stanghelle JK. Can physiotherapy after stroke based on the Bobath concept result in improved quality of movement compared to the motor relearning programme. *Physiother Res Int.* 2011 Jun;16(2):69-80. doi: 10.1002/pri.474. Epub 2010 May 18. PMID: 21110413.

Mudie MH, Winzeler-Mercay U, Radwan S, Lee L. Training symmetry of weight distribution after stroke: a randomized controlled pilot study comparing task-related reach, Bobath and feedback training approaches. *Clin Rehabil.* 2002 Sep;16(6):582-92. doi: 10.1191/0269215502cr527oa. PMID: 12392332.

Şimşek TT, Çekok K. The effects of Nintendo Wii(TM)-based balance and upper extremity training on activities of daily living and quality of life in patients with sub-acute stroke: a randomized controlled study. *Int J Neurosci.* 2016 Dec;126(12):1061-70. doi: 10.3109/00207454.2015.1115993. Epub 2015 Dec 1. PMID: 26626539.

Tang QP, Yang QD, Wu YH, Wang GQ, Huang ZL, Liu ZJ, Huang XS, Zhou L, Yang PM, Fan ZY. Effects of problem-oriented willed-movement therapy on motor abilities for people with poststroke cognitive deficits. *Phys Ther.* 2005 Oct;85(10):1020-33. PMID: 16180951.

Thaut MH, Leins AK, Rice RR, Argstatter H, Kenyon GP, McIntosh GC, Bolay HV, Fetter M. Rhythmic auditory stimulation improves gait more than NDT/Bobath training in near-ambulatory patients early poststroke: a single-blind, randomized trial. *Neurorehabil Neural Repair.* 2007 Sep-Oct;21(5):455-9. doi: 10.1177/1545968307300523. Epub 2007 Apr 10. PMID: 17426347.

van Vliet PM, Lincoln NB, Foxall A. Comparison of Bobath based and movement science based treatment for stroke: a randomised controlled trial. *J Neurol Neurosurg Psychiatry.* 2005 Apr;76(4):503-8. doi: 10.1136/jnnp.2004.040436. PMID: 15774435; PMCID: PMC1739598.

Verma R, Arya KN, Garg RK, Singh T. Task-oriented circuit class training program with motor imagery for gait rehabilitation in poststroke patients: a randomized controlled trial. *Top Stroke Rehabil.* 2011 Oct;18 Suppl 1:620-32. doi: 10.1310/tsr18s01-620. PMID: 22120031.

Yelnik AP, Le Breton F, Colle FM, Bonan IV, Hugeron C, Egal V, Lebomin E, Regnaud JP, Pérennou D, Vicaut E. Rehabilitation of balance after stroke with multisensorial training: a single-blind randomized controlled study. *Neurorehabil Neural Repair.* 2008 Sep-Oct;22(5):468-76. doi: 10.1177/1545968308315996. PMID: 18780882.

Wattchow 2018

Wattchow KA, McDonnell MN, Hillier SL. Rehabilitation Interventions for Upper Limb Function in the First Four Weeks Following Stroke: A Systematic Review and Meta-Analysis of the Evidence. *Arch Phys Med Rehabil.* 2018 Feb;99(2):367-382. doi: 10.1016/j.apmr.2017.06.014. Epub 2017 Jul 20. PMID: 28734936.

Significant results statement from abstract

Use of Bobath therapy was not supported.

| | Bobath | Comparator |
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| Gelber (1995) N = 27 USA | Training: Provided not specified Description: Inhibition of abnormal muscle tone and initiation of normal (good quality) motor movements with progression through developmental sequences prior to advancing to functional activities. Strict guidelines provided | Training: Provided not specified Functional retraining. Practicing functional tasks as early as possible even in the presence of spasticity or abnormal postures. Strict guidelines provided |
| Langhammer (2000 & 2011) N = 60 Sweden | Training: The two physiotherapy programmes were standardized as follows; a manual describing the main philosophy behind the two physiotherapy methods was produced according to background literature. ^{7,8} Workshops were organized with stroke patients not included in the study, and physiotherapists, in order to coordinate treatment according to the Bobath and MRP manuals. These treatments were discussed among the physiotherapists and the project leader in order to coordinate and | Training: The two physiotherapy programmes were standardized as follows; a manual describing the main philosophy behind the two physiotherapy methods was produced according to background literature. ^{7,8} Workshops were organized with stroke patients not included in the study, and physiotherapists, in order to coordinate treatment according to the Bobath and MRP manuals. These treatments were discussed among the physiotherapists and the project leader in order to coordinate and as far as possible identify treatment variables in a 'Bobath respectively |

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| | as far as possible identify treatment variables in a 'Bobath respectively MRP manner' and as described in the manuals true to the background literature | MRP manner' and as described in the manuals true to the background literature |
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David A. Gelber, B. Josefczyk, Denyse Herrman, David C. Good, and Steven J. Verhulst. [Comparison of Two Therapy Approaches in the Rehabilitation of the Pure Motor Hemiparetic Stroke Patient](#). Journal of Neurologic Rehabilitation 1995 9:4, 191-196

Langhammer B, Stanghelle JK. Bobath or Motor Relearning Programme? A comparison of two different approaches of physiotherapy in stroke rehabilitation: a randomized controlled study. Clinical Rehabilitation. 2000;14(4):361-369. doi:10.1191/0269215500cr338oa

Langhammer B, Stanghelle JK. Can physiotherapy after stroke based on the Bobath concept result in improved quality of movement compared to the motor relearning programme. Physiother Res Int. 2011 Jun;16(2):69-80. doi: 10.1002/pri.474. Epub 2010 May 18. PMID: 21110413.

Veerbeek (2014)

Veerbeek JM, van Wegen E, van Peppen R, van der Wees PJ, Hendriks E, Rietberg M, Kwakkel G. What is the evidence for physical therapy poststroke? A systematic review and meta-analysis. PLoS One. 2014 Feb 4;9(2):e87987. doi: 10.1371/journal.pone.0087987. PMID: 24505342; PMCID: PMC3913786.

Significant results statement from abstract

Neurological treatment approaches to training of body functions and activities showed equal or unfavorable effects when compared to other training interventions. (*Bobath/NDT was the only approach investigated*).

Thirty three studies were included in the analyses for Bobath/NDT. In 80% of the studies, Bobath/NDT was the conventional care comparison for new technologies, (eg. robotics, gait trainers) or specific targeted interventions (eg. CIMT, bilateral arm interventions, and rhythmic auditory stimulation). The term Bobath or NDT was included in the title in 18% of the studies, these studies have been discussed above.

Links to other resources:

Letter to the Editors

[Dorsch et al](#)

[Scrivener et al](#)

Responses from other international Bobath groups

[British Bobath Tutors Association \(BBTA\)](#)