



Original Article

The Comparison of Neurodevelopmental-Bobath Approach with Occupational Therapy Home Program on Gross Motor Function of Children with Cerebral Palsy

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ABSTRACT

Background: Traditional Bobath approach (TBA) is one of the several methods which is used for the treatment of children with cerebral palsy (CP) who are referred to occupational therapy settings. In this study the effect of TBA on the gross motor function (GMF) of children with CP was compared with that of the Home Program Bobath approach (HPBA).

Methods: Thirty children with CP participated in this study. They were randomly assigned in two groups. Control group received Bobath traditional services for 12 sessions. In the intervention group, along with these services, parents participated in training program and followed the exercises. Scale was used to assess GMF before and after intervention.

Results: Participants of this study consisted of 9 girls and 6 boys in traditional group and 10 girls and 5 boys in home-based group. The mean age of home-based group was 19.53 ± 3.35 months and traditional group was 17.20 ± 6.80 . GMF increased significantly in both groups. In addition, differences between the two groups were significant ($P=0.007$).

Conclusion: the results of this study showed that TBA with HPBA was more effective than the traditional ones.

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Introduction

Cerebral palsy (CP) is a group of non-progressive disorders [1,2] in which the primary damage to the nervous system [3] affects the posture and movement development [1]. This damage occurs in fetal or an infant brain [1,4] and results in postural control, muscle coordination, motor control, [3] sensory disturbance and cognitive and behavioral disorders [4].

The complex motor deficits in CP can be divided into the primary and secondary groups; muscle tone abnormality,

balance impairment and loss of motor control are primary deficits which can cause secondary ones like muscle contracture or bone deformity [1]. The ultimate problem owing to these deficits is lack of the necessary skills for independency in activity daily living (ADLs) [5,6].

So far there is no treatment for the brain defects in children with CP [1]. However, several management approaches may be used for the improvement of gross motor functions and ADLs [1,2,5,6].

The traditional and the most common treatment for children with CP is neurodevelopmental treatment (NDT)-Bobath [1-3,5,7-9] with the goal of improving motor efficiency and obtaining maximal functional independency [1,2].

In the Bobath concept, CNS dysfunction results in motor problems that interfere with normal motor development

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[10]. It is believed that the loss of inhibition of the postural reflexes and movement patterns are the main problems of children with CP [11]. Therefore the focus of NDT is to inhibit these reflexes [10], to correct postural tone and facilitate normal movement patterns [5].

The Bobath concept has been changed in the following aspects: 1. understanding of tone, 2. source of the patient's movement disorder and 3. Using of other modalities and adjuncts. Other aspects remain the same [12].

In a review article in 2010 the authors stated that; "of three studies that evaluated NDT, one high-level evidence study, found significant improvement on the gross motor function measure" [13]. Therefore, we believe that more studies on the effectiveness of NDT on gross motor function are necessary.

In this study, we evaluated this issue and in respect to Dr Bobath's statement "the Bobath concept is unfinished, we hope it will continue to grow and develop in years to come" [12], we used the modified version of this technique, the home-based intervention, that is the recent trend in pediatric occupational therapy. In this recent technique, parents and other family members are involved in the planning and evaluation of the intervention [14]. Unfortunately in Iran the parents are not motivated to participate in the treatment, thus the traditional technique is usually used. We compared the home-based technique with traditional one to assess how these techniques may affect the gross motor function of children under two years old with CP. In order to motivate the parents, we tried to instruct the techniques in form of play and simple tasks.

Methods

This clinical trial was performed in the clinic of Shiraz Rehabilitation School. Thirty children with cerebral palsy with age range of 0 to 2 years participated in the study. They were chosen by simple sampling procedure and were randomly assigned in either home-based Bobath technique or traditional Bobath technique group by use of simple randomization technique.

Inclusion criteria were motor dysfunction due to CP and age of 0-2 years.

Exclusion criterion was receiving other treatment procedures.

We used P-body scale to evaluate gross motor function of the participants. This scale is a valid and reliable evaluating instrument for motor skill assessment in fewer than 2 years children in our country [15].

Parents of CP children signed an informed consent and entered the study. Children were evaluated before treatment by the use of the P-body scale and their score was recorded by the first examiner.

Examiner 2 applied NDT-Bobath technique for treatment according to the child's growth level for each patient. This technique was applied in 12 one-hour sessions as following [16]:

- Using of inhibitory techniques to reduce spasticity and primary reflexes. This procedure consists of: 1. Inhibition of movement patterns in trunk and extremities and 2. Inhibition of primary reflexes.

- Using of facilitatory techniques to improve head control, weight bearing on the arms and balance reactions. In this procedure, balance and righting reactions was applied according to each patient's demands.

Participants of the two study groups underwent these techniques. Furthermore parents of home-based group received educational program in the last 20 minutes of each treatment session according to Novak clinical model [17,18]. In this model the five phases of education are [17,18]:

1. Establishing a collaborative relationship with the child, parent or caregiver
2. Collaborative goal setting
3. Constructing the home program
4. Supporting the program implementation
5. Evaluating the outcomes

They also received 6 pamphlets and one CD in order to learn the exercises for the home treatment. We tried to instruct the techniques in the form of play and simple tasks. At the end of the last treatment session children were evaluated again by using the P-body scale.

Statistical Analysis

The analysis of the data was done by SPSS software, version 18. The normality of the data was checked by Kolmogorov-Smirnov test. Results of pre & post intervention in each group were compared by paired T-test. The comparison of two study groups was done by independent T-test.

Results

Participants of this study consisted of 9 girls and 6 boys in traditional group and 10 girls and 5 boys in the home-based group. The mean age of the home-based group was 19.53 ± 3.35 months and traditional group was 17.20 ± 6.80 . In this study, 86.70% of cases were spastic CP, 6.70% were athetoid CP and 6.70% were hypotonic CP children. Gross motor function classification levels in the home program group were IV equal to 53.30% and V equal to 46.70%. In the traditional group were these were 66.70% and 33.30%, respectively. The distribution of data was normal in both groups. The comparisons of the P-body score, before and after the intervention in each group, are shown in Table 1. There was a significant

Table 1: Comparison of Gross Motor Function in traditional and home-based group

Variables		Mean±SD	P value
Traditional group	Before intervention	47.66±8.44	0.000
	After intervention	49.20±7.69	
Home-based group	Before intervention	45.60±6.45	0.001
	After intervention	48.33±6.95	

difference between the P-body score before & after each intervention.

The results of the comparison of two groups showed a significant difference between the home- based and the traditional technique. The mean difference of P-body score in home- based group was 2.93 ± 1.16 and in traditional group was 1.53 ± 1.45 . The P value was 0.007 (Table 2).

Table 2: Comparison of Gross Motor Function difference, in traditional and home-based groups

Variables	Mean±SD	P value
Traditional group	1.53±1.45	0.007
Home-based group	2.93±1.16	

Discussion

The results of the study showed a significant improvement of gross motor function after both the home-based NDT-Bobath and the traditional NDT-Bobath techniques. Furthermore, the results showed that the home-based technique was more effective than the traditional one.

According to the Bobath concept changes in the nervous system may be organized. Behavioral experiences have the potential to modulate cortical structure and function. Changes in the task, individual or environment result in the adaptation and re-organization of the nervous and muscular systems [12].

Therefore improvement of patients after treatment procedures was expected. The effect of NDT-Bobath technique on gross motor function improvement has also been shown previously by Knox et al. [7], Tzorlakis et al. [2] and Rui [6].

It can be suggested that the best outcome can be yielded by utilizing a combination of techniques derived from motor control and motor learning theories. Motor control is the regulation of the mechanisms which are essential for movement, while motor learning is the processes which result in changes in the skilled action capability. Active participation and setting meaningful goals are the principles of motor learning [12]. Therefore, it suggests that patients' involvement in treatment procedure may improve the development of motor performance.

The Bobath concept emphasizes the importance of parent education regarding skillful administering of exercises and supporting their child [19].

In the home-based interventions there are opportunities for more and repeated practice in the natural environment of the child [17] which facilitates the generalization of exercise activities into real world situation [20]. The child and his/her parents both participate in the treatment procedure, which results in mutual relationship between them [21,22]. This technique may cause confidence and trust in the parents which is critical for a successful improvement in children with CP [23]. Furthermore, by applying this technique some problems such as the brevity of treatment per week and/or being in treatment waiting lists are solved for these patients [20]. Furthermore, children with CP often have complex long-term needs. Thus home programs are the best solution for them and their parents [24].

Of course, there are many problems with home

program techniques. Changes in family activity are one of them [20]. Hinojosa found that mothers tended not to follow home programs as prescribed by therapists, so he suggested that home therapy programs must be simple to enable the parents to balance the care with other competing demands in their daily living [25].

The home program techniques were adjusted for each individual based on the level of competency of the parents. Therefore, any difference in the therapy program was due to this confounding factor and not due to differences in therapists' techniques.

Therefore, to develop effective collaborative partnerships with parents, occupational therapist must understand that parents differ from each other in many ways [7]. In the current study, after evaluating the parents individualized exercises in form of play and simple task were designed for them.

Conclusion

This study showed a significant improvement in gross motor function in the group of Bobath intervention within occupational therapy home programs and with the traditional Bobath therapy over the 12 weeks of treatment. If the larger randomized control trial confirmed the result of the current study, it can provide useful information to empower parents and therapists in choosing appropriate treatment. It is suggested that other outcomes such as quality of life and parental satisfaction be examined in subsequence studies.

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Conflict of Interest: None declared.

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