

# EFFECT OF THE BOBATH TECHNIQUE, CONDUCTIVE EDUCATION AND EDUCATION TO PARENTS IN ACTIVITIES OF DAILY LIVING IN CHILDREN WITH CEREBRAL PALSY IN IRAN

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**Objective:** In children with cerebral palsy, one of the most important roles of occupational therapists is to promote the children's independence in functional performance. The goal of this study was to compare the effect of the Bobath technique, conductive education (CE), and education to parents in activities of daily living (ADLs) in children with cerebral palsy aged 4–8 years in Iran.

**Methods:** This study was a quasi-experimental clinical trial with pre/post design. Forty-five children with cerebral palsy were selected by convenience sampling in a rehabilitation centre and allocated to three groups by matching closely their sex, age, and IQ; 15 children were in the Bobath group, 15 were in the CE group, and 15 were in the education-to-parents group. Outcome measures were the Goodenough test and the Client Development Evaluation Report.

**Results:** There were no significant differences in mean age ( $p = .261$ ) and IQ ( $p = .449$ ) at baseline among the three groups. There were significant differences in ADLs after treatment within each group ( $p = .001$ ). Significant differences were also found in the average total ADLs scores between the three groups after treatment ( $p < .0001$ ). We found that the most effective approach was CE, followed by education to parents and the Bobath technique. There were significant differences between 12 sub-skills out of 16 in ADLs in the three groups, and children in the CE group achieved higher scores in comparison with other groups.

**Conclusion:** The Bobath technique, CE, and education to parents improved ADL skills in children with cerebral palsy. In the CE approach, group education promoted better social communication and more mobility in familiar environments. On the other hand, practical education and treatment programmes improved ADLs skills.

**KEY WORDS:** Activities of daily living • Bobath approach • Cerebral palsy •  
Conductive education

## Introduction

Activities of daily living (ADLs) consist of activities such as putting on makeup, personal hygiene, getting dressed, eating,

mobility, communication, relationships, and sexual issues (Pedretti, 1996). The normal development of these skills occurs in a predictable way across the human life span. Children with cerebral palsy (CP) cannot follow this normal developmental

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pattern as a result of brain injury and developmental disorders. One of the most important goals of rehabilitation in treating children with CP is to improve their functional abilities and to maximise their independence so that they can acquire the necessary skills for carrying out ADLs.

Currently, there are several approaches for the treatment of children with CP, which show promising effects in improvement of ADLs and functional activities. Among these approaches, the Bobath technique and conductive education (CE) are the pioneers for serving children with CP in the field of rehabilitation. The Bobath technique was designed 60 years ago by Dr. Karl Bobath and Mrs. Bobath. This approach is not purely a treatment technique, but it provides a means for observing, analysing a child's performance, and finding his/her potential abilities, as well as obtaining background information for fulfilling these abilities by use of different techniques. The main purpose of this approach is to correct abnormal postural tone and to facilitate more normal movement patterns for performing performance skills (Case-Smith, 2005). On the other hand, the CE approach is one of the rehabilitative approaches with the aim of educating people with physical disabilities to acquire new experiences in ADLs. In this approach, the child is educated on how to use his/her abilities for performing active movements and generalising this learning to different life situations. A specific type of this technique is to present activities in the form of a group, using music and rhythmic speech during activities, and paying attention to all aspect of child development, that is, the physical, intellectual, cognitive and social approach (Hari, 1996).

In a survey conducted in 1974, it appeared that children with CP participating in the Bobath approach obtained better scores in terms of physical and cognitive spans, and children with CP participating in CE achieved better scores in the fields of self-care and academic performance (Heal, 1974). In another study, 15 children with CP (2–12 years old) participated in Bobath programmes for 6 weeks. These children showed significant improvement in motor movement and self-care skills (Knox & Evans, 2002). A study comparing the effects of intensive therapy, CE, and special education on function in 19 children with CP led to greatest improvements in the group receiving intensive therapy, with children in all groups showing some improvement in function (Stiller, Marcoux, & Olson, 2003). In 2005, Ahl and colleagues conducted an assessment survey on functional education of children with CP with the aim of assessing gross motor performance, ADLs, the degree of assistance from the therapist, and understanding of parents about their roles. In this study, 14 diplegic and hemiplegic children (1.5–6 years old) were studied for 5 months. The results showed that the social development of children improved significantly and the caregiver's assistance was noticeably reduced

afterwards. The family gained a full understanding from its central role in all aspects of ADLs, and movement and cognition of children with CP (Ahl et al., 2005).

Education of parents is one of the methods for promoting ADL skills in children with CP. Parents are the first to communicate with the child, and they spend a great deal of time with him/her. A previous study showed that agreement for some domains (e.g. health-related quality of life) is better between parents and chronically sick children compared with parents and their healthy children (Eiser & Morse, 2001). Parents are mostly concerned with their children with CP in ADLs such as hand function, eating/drinking, functional mobility, sitting, standing/walking, transfers, joint stiffness, communication, opportunities of therapy, visual perception, and social behaviour (Knox, 2008). In a previous study conducted in 2007 on 39 children with CP, as well as their sisters, brothers and parents, parenting approaches, such as rejection, acceptance, control and independence, were considered as important factors in quality of life of children with CP, as well as the only known factors affecting their psycho-cognitive span (Aran, Shalev, Biran, & Gross-Tsu, 2007).

With regard to the importance of performing ADLs independently and the effectiveness of treatment in children with CP at an early age, the choice of suitable treatment approaches is critical in order to achieve the best results during an important time of plasticity in nervous system development. However, many therapists use the Bobath technique and are not familiar with CE or the education-to-parents approach in treatment of children with CP. Therefore, this study was conducted to evaluate and compare the effect of the Bobath technique, CE and education to parents on ADLs in children with CP in Iran.

## Methods

### *Participants*

This study was a quasi-experimental clinical trial with a pre/post study design. Forty-five children with CP aged 4–8 years were selected by convenience sampling from the Valiasr Rehabilitation Foundation and allocated into three experimental groups by matching closely their sex, age and IQ. Their characteristics are listed in Table 1. They were referred for rehabilitation in the rehabilitation centre of the Foundation in Iran in the summer of 2008. The inclusion characteristics included: (a) condition that was diagnosed by a child neurologist, and (b) normal IQ as measured by the Goodenough test (Goodenough, 1926).

### *Instrumentation*

The Client Development Evaluation Report (CDER; Department of Developmental Services, 1986) was used to evaluate

**Table 1.** Baseline characteristics of the three experimental groups

	Groups <sup>a</sup>			<i>P</i>
	Bobath	CE	Education to parents	
Age, mean $\pm$ SD (month)	69.20 $\pm$ 17.08	70.5 $\pm$ 16.9	72.85 $\pm$ 17.03	0.261
IQ, mean $\pm$ SD	79.3 $\pm$ 4.9	79.3 $\pm$ 3.7	78 $\pm$ 4.5	0.449
Sex, <i>n</i>				
Male	7	7	8	
Female	8	8	7	
Type, <i>n</i>				
Hemiplegia	5	6	5	
Diplegia	7	5	5	
Quadriplegia	2	2	2	
Dystonia	1	2	3	

<sup>a</sup>*n* = 15 for each group. CE = conductive education.

ADLs for the participants. The CDER contains both diagnostic and evaluation information and is available only to persons of age three and above. The evaluation element of the CDER covers areas relating to motor, independent living, social, emotional, cognitive and communication skills. Each of the item scores were calculated independently. There are 19 items in the section of independent living skills, including food preparation, bed making, washing of dishes, household chores, basic medical self-care, self-medication, eating, toileting, level of bladder control, level of bowel control, personal hygiene, bathing, dressing, movement in familiar settings, movement in an unfamiliar setting, transportation about the community, money handling, making of purchases, and ordering of food in public. Scoring of each item was carried out according to the instruction manual (Department of Developmental Services, 1986).

### Procedures

After parents' written consent for participating in the study, children were then evaluated primarily by the CDER. In this study, all items except basic medical self-care, self-medication and making of purchases were evaluated, because parents in Iran do not permit their children younger than 8 years to do these activities. Participants were then divided into three experimental groups. There were 15 children in each group, and they were matched closely with each group in terms of sex, gender and IQ, with no other treatment performed on them apart from the experimental intervention. Children took part in the Bobath technique, CE, and education to parents for 3 months, four sessions per week and 3 hours daily, and were then re-evaluated by the CDER again after the interventions. In the Bobath group, the therapists were trained in specific courses in England, and

in the CE group, the training was conducted by therapists who had passed the professional course in Hungary (these were sent by the Valiasr Rehabilitative Foundation). In the education-to-parents group, a therapist qualified with a Master of Science degree in occupational therapy carried out the ADL education for parents and corrected their mistakes about the concept of ADLs.

The data were evaluated by SPSS software (version 11.5). Results of each group before and after intervention were compared by Wilcoxon signed rank statistical test, and results of the three groups after intervention were compared by performing overall ADLs by the Kruskal-Wallis statistical test.

### Results

The average scores of age and IQ and their standard deviation for children with CP in the three groups are shown in Table 1. There were no significant differences in age ( $p = .261$ ) and IQ ( $p = .449$ ).

The Wilcoxon signed rank test was used to evaluate the effectiveness of each of these approaches in the improvement of ADLs as assessed by the CDER before and after treatment intervention. There was a significant difference between the average total ADL score before and after intervention in the Bobath group ( $p = .001$ ), the CE group ( $p = .001$ ), and the education-to-parents group ( $p = .001$ ; Table 2).

The Kruskal-Wallis test was used to compare the change between the average total scores of ADLs as assessed by the CDER before and after intervention. We found a significant difference among the three groups in ADL performance ( $p < .0001$ ; Table 3).

The Kruskal-Wallis test was used to compare the three groups according to different performances of sub-skills. There was a significant difference between the performance of ADL sub-skills in the three groups in household chores ( $p=.031$ ), eating ( $p=.001$ ), toileting ( $p=.004$ ), level of bowel control ( $p=.006$ ), personal hygiene ( $p=.002$ ), bathing ( $p=.029$ ), dressing ( $p=.021$ ), movement in a familiar setting ( $p=.029$ ), transportation about the community ( $p=.029$ ), money handling ( $p=.030$ ) and ordering food in public ( $p=.017$ ; Table 4).

**Table 2.** Evaluation of activity of daily living (ADL) performance in the three groups before and after intervention

Group	Average ADL score of CDER		<i>p</i>
	Before	After	
Bobath	29.40	34.60	.001
CE	26.47	42.80	.001
Education to parents	30.33	36.80	.001

CDER=Client Development Evaluation Report (Department of Developmental Services, 1986); CE = conductive education.

The descriptive data show that the participants in the CE group gained higher scores in sub-skills of independent living skills (Table 4).

## Discussion

Performing ADLs is one of the most important aims of treatment of children with CP. The main aim of the Bobath technique, CE, and education to parents is to promote independency in ADLs in children with CP. The present study showed that these three approaches resulted in significant improvement in ADL performance after the interventions. There was a significant difference in the average total ADL scores among the three groups before and after the interventions. The differences in the three groups were even more obvious in average scores of ADL sub-skills before and after the interventions in household chores, eating, toileting, level of bowel control, personal hygiene, bathing, dressing, movement in a familiar setting, transportation about the community, money handling, and ordering food in public. The CE group performed the sub-skills better than the other groups.

**Table 3.** Comparison of the average total activity of daily living (ADL) scores before and after intervention among the three groups

Approach	Bobath	CE	Education to parents	<i>p</i>
Change in average total ADL scores of CDER	5.20	16.33	6.47	<.0001

CE=conductive education; CDER=Client Development Evaluation Report (Department of Developmental Services, 1986).

**Table 4.** Comparison of the average sub-skills of activity of daily living (ADL) score before and after intervention among the three groups

ADL sub-skills	Bobath		CE		Education to parents		<i>p</i>
	Before	After	Before	After	Before	After	
Food preparation	1.07	1.20	1.00	1.53	1.13	1.07	.234
Bed making	1.67	2.00	1.67	2.40	1.67	2.07	.394
Washing dishes	1.40	1.73	1.47	2.33	1.27	1.87	.068
Household chores	1.73	2.00	1.60	2.33	1.80	2.07	.031
Eating	2.93	3.40	1.33	2.93	2.73	3.40	.001
Toileting	1.67	2.33	1.20	2.67	2.00	2.40	.004
Level of bladder control	2.27	2.60	2.07	3.20	2.87	3.40	.340
Level of bowel control	2.33	2.53	2.27	3.20	2.93	3.47	.006
Personal hygiene	2.27	1.87	1.40	2.73	1.67	3.40	.002
Bathing	1.73	2.20	1.40	2.53	1.40	2.00	.029
Dressing	2.00	2.40	1.73	2.80	2.27	2.53	.021
Movement in a familiar setting	2.93	3.20	2.47	3.47	2.73	3.13	.029
Mobility in a unfamiliar setting	2.53	3.00	2.60	3.73	2.67	3.07	.104
Transportation about the community	0.87	0.87	1.53	2.33	1.00	1.00	.029
Money handling	0.93	1.13	0.87	1.80	0.93	1.20	.030
Ordering food in public	0.47	0.47	0.80	1.55	0.53	0.80	.017

CE=conductive education.

In an American Academy for Cerebral Palsy and Developmental Medicine evidence report (Darrah, Watkins, Chen, & Bonin, 2004), the results from studies that compared the CE group with the control group showed significant differences in dressing, self-care and toileting between the groups in favor of CE. These results were consistent with the present study, in that 11 out of 16 ADL sub-skills showed higher scores in the CE group than in the Bobath and education-to-parents groups. In another study, children who participated in the CE group gained better scores in self-care and academic skills than in the Bobath group (Heal, 1974). The effectiveness of CE has also been shown in other studies. A positive effect of the CE approach was observed in physiotherapy with therapeutic exercises in movement, cognitive and social spans (Calderón-González, Tijerina-Cantú, & Maldonado-Rodríguez, 1989). CE also improved ADLs in children with CP after a period of 4½ months (Blank, von Kries, Hesse, & von Voss, 2008), and also resulted in improvement in gait (Catanese, Coleman, King, & Reddihough, 1995; Liang et al., 2002; Zhao, Zhang, & Liao, 2002).

An interesting finding in the present study was that there was improvement in the sub-skills of movement in a familiar setting and also in transportation about the community. The reason for this finding may be because of improvement of gait. CE was more effective than the other approaches in this study, because CE is provided in a group and the children work collectively to monitor and to encourage one another. In groups, children learn not only from their conductors but also from their peers and other group members, and they are encouraged to achieve more within the group. Children can experience socialisation in groups and learn how to solve their problems, which can be similar to others, and the encouragement of one person can be generalised to the encouragement of all group members. Children in groups also have the opportunity to take responsibility for themselves, and the group interaction paves the way for their future social interactions. There are many studies in the literature about the effectiveness of group therapy. Group therapy improves the attention of children in activities as well as increases social interaction in children with CP (Schofield & Wong, 1975). In another study by Righetti-Veltma (1994) on children with CP aged 10–15 years, it was shown that group activity causes a positive interaction in most of the children with CP. The children expressed their feelings better verbally and became more responsible to others, which could lead to a better feeling of self-identity (Righetti-Veltma, 1994). On the other hand, the assessment of participation and enjoyment in children with CP demonstrated that mastery motivation and involvement in rehabilitation services enhances intensity and diversity in particular leisure activities (Majnemer et al., 2008).

## Conclusion

In this study, we demonstrated that the Bobath, CE and parental education approaches improve ADLs for children with CP in Iran. The CE approach was more effective in improving social interaction and relationships than the other approaches. The focus on CE intervention in education, function and ADLs may fit with the needs of many families. Educational programmes for parents can also improve the quality of life of children with CP in respect to activities such as eating, bowel and urine control, and household chores.

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