

Effect of Functional Therapy Intervention on Motor Functions in Children with Spastic Cerebral Palsy

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ABSTRACT

Background and purpose: Cerebral palsy, is an umbrella-like term, used to describe a group of chronic non progressive defect impairing control of movement and posture, is the most common condition seen by pediatric physical therapists, and it poses a challenge to practitioners due to the large variation in prognosis for motor function of children with this diagnosis. The purpose of this study was to evaluate the effect of functional physical therapy program on motor function in children with spastic cerebral palsy. **Subjects:** Twenty eight spastic cerebral palsied children, age ranging from 1-5 years, were involved in the study, met the following criteria; spastic cerebral palsy, have at least good head control, respond to visual and auditory stimuli, had no history of uncontrolled convulsions, had not undergone an orthopedic procedure in the last year, had not receive any medications to reduce spasticity for the previous 6 months, and had no current cardiac problem. Children were randomly distributed into two groups; functional physical therapy group and traditional physical therapy group. **Measurements:** Both basic gross motor abilities and motor abilities in daily situations of all children were assessed before and after application of the intervention by using gross motor function (GMFM) and Pediatric Evaluation of Disability Inventory (PEDI). **Intervention:** Intervention was applied daily for six weeks daily, one group received functional physical therapy followed by traditional physical therapy, while second group received only traditional physical therapy. **Results:** The results of the study revealed a significant improvement in motor abilities of all children in functional physical therapy group as measured by GMFM & PEDI, where P value was < 0.05 in both measures. While traditional physical therapy group did not show a significant improvement. **Discussion and Conclusion:** The result of this study supported the hypothesis that using functional physical therapy program in addition to traditional physical therapy for the treatment of spastic CP children is more effective than using traditional physical therapy alone.

INTRODUCTION

The incidence of Cerebral Palsy (CP) in industrial countries is in the same order of magnitude as adult onset of diabetes and stroke¹¹. There have been an increases in the incidence and prevalence of CP that may be related to improved documentation of cases by national registries, advances in neonatal care, or other factors²⁰.

Different authorities have proposed numerous classification and sub-

classifications. One classification is according to topography of CP; Quadriplegia, Hemiplegia, Diplegia, monoplegia. Another classification is according to type of involvement; Spastic, rigid, athetoid, ataxic, hypotonic, mixed²⁷. The spastic type is the most common abnormality of motion and posture seen in CP¹⁷.

Some individuals who have CP have no associated medical disorders. However, many of the others have medical disorders associated with CP including: mental Impairment, seizures or epilepsy, growth Problems, impaired vision or hearing, abnormal sensation

and perception, incontinence, swallowing and eating difficulties¹³.

The art of spasticity management involves the use of continuum of modalities throughout childhood to match the right treatment modality to the individual child needs. The science of spasticity management occurs when the benefits outweigh the risks^{15,17}. A variety of therapeutic methods is available for managing spastic CP children, among these methods are: surgical management, medical management, orthotic and inhibitory casting, occupational therapy, speech therapy and physical therapy which include; neurodevelopmental treatment, sensory integrations, conductive education, play therapy, electrical stimulation, hippotherapy, hydrotherapy, functional physical therapy, and other interventions^{9,29}.

According to the International Classification of Functioning, Disability and Health (ICF), impairments were defined as problems in body function or body structures, such as significant deviations or losses, and activity limitations were defined as difficulties in activities and participation restrictions as problems in the manner or extent of involvement in life situations³. The focus on impairments should be replaced by a focus on function, as by itself does not lead to an improved function¹⁶. Activity-focused interventions involve structured practice and repetition of functional actions or tasks to promote learning³³. In this intervention, motor activity or task is broken down into steps, with each step taught independently and then organized to accomplish the entire task. Children managed with this approach have demonstrated gains in motor skills. In this approach, the therapist acts as a guide by helping the child figure out how to improve his or her motor performance on various motor skills. Another classification of interventions

or approaches used by physical therapists and occupational therapists is: The Bottom-up and the Top-down approaches. Bottom-up approaches such as sensory integration, emphasize sensory experience, with less emphasis on cognitive processing and cortically driven motor programming. Undergoing sensory integration therapy may show some gains in motor development, but these gains often do not generalize to functional skills¹. While the "Top down" approaches develop activity-related goals which is the first step in order to develop intervention plans that will increase independence and participation for children with neurological movement conditions. According to current "top down" approaches, goals related to functional outcomes are determined first. Then, components that limit these outcomes are assessed³³. Top-down approaches typically use a problem-solving approach to motor skill development and have been greatly influenced by the dynamic systems approach to motor learning and control. This approach suggests that motor skills develop from an interaction of many systems, both internal and external to the child. It also emphasizes the context in which motor behavior occurs. Task-specific intervention approach or strategies is commonly used¹.

Over the last 15 years, reviews focusing on the effectiveness of rehabilitation programs and the best training method or treatment regime for promoting motor development for CP children have been inconclusive³².

The purpose of this study was to assess the effect of functional physical therapy program in addition to traditional physical therapy on gross motor activities and amount of assistance provided during activities of daily living in children with spastic CP along six weeks program, and compare it to the

effect of applying traditional physical therapy alone in a control group. Our null hypothesis was that CP children in both groups would improve similarly.

Study design

The study was designed as prospective randomized controlled clinical trial. It was initially approved by the Research committee of the Department of Rehabilitation Sciences at the college of Applied Medical Sciences, King Saud University.

SUBJECTS AND METHODS

Functional physical therapy (FPT) group data were; 13 spastic CP children 5 male and 8 female, participated in this study. Their mean age 40.15 ± 10.2 months, height 86.6 ± 17.4 cm, weight 13 ± 2.2 kg. The majority of cases were spastic diplegic represented 69.2%, quadriplegic represented 30.8%, no hemiplegic case participated. The majority of cases were level IV according to GMFCS represented 53.8%, level I represented 23.1%, level III represented 15.4%, level II represented 7.7%, level V represented 0%.

While Traditional Physical therapy (TPT) group data were; 8 male (53.3%) and 7 female (46.7%), participated in this study. Their mean age 41.05 ± 9 months, height 99 ± 6 cm, weight 12.4 ± 3 kg. The majority of cases were spastic diplegic represented 53.3%, quadriplegic represented 33.3%, hemiplegic represented 13.3%. The majority of cases were level IV according to GMFCS represented 46.7%, level I represented 13.3%, level III represented 20%, level II represented 13.3%, level V represented 6.7%.

The 30 CP children involved in the study met the following inclusion criteria; spastic CP, age range from 1-5 years at the onset of the study, classified into levels I to V

according to Gross Motor Function Classification System (GMFCS), but have at least good head control, respond to visual and auditory stimuli, had no history of uncontrolled convulsions, had not undergone an orthopedic procedure in the last year, had not receive any medications to reduce spasticity for the previous 6 months, had no current cardiac problem. Exclusion criteria included; children with other types of CP, children above the age of 5 years or less than 1 year, children who does not have good head control, children who does not respond to visual or auditory stimuli (either due to blindness or deafness or severe mental retardation), children with uncontrolled convulsions or VP shunt, children with severe medical or orthopedic problems, children who live out of Riyadh city, children who have difficulties in transportation and can not join the program daily, and children who is not accompanied by their initial career.

Location of the study was conducted at pediatric physical therapy department in King AbdulAziz University hospital in Riyadh.

Clinical measurement

Both basic gross motor abilities in a standardized environment and motor abilities in daily situations were studied using: Gross Motor Function Measure (GMFM-66) and Pediatric Evaluation of Disability Inventory (PEDI).

Gross Motor Function Measure (GMFM)

GMFM is a standardized observational instrument designed and validated to measure change in gross motor function over time in children with cerebral palsy. The GMFM measures basic gross motor functions by an independent rater in a standardized environment. The GMFM takes approximately 45 minutes to administer. All items generally can be completed by age 5 years in children

without motor delays²⁵. The GMFM is scored by observation of a child's performance on each item. Items are scored on a 4-point ordinal scale: 0=does not initiate, 1=initiates <10% of activity, 2=partially completes 10% to <100% of activity, 3=completes activity). Scores for each dimension are expressed as a percentage of the maximum score for that dimension. A total score is obtained by adding the scores for all dimensions and dividing by 5 (ie, the total number of dimensions). Each dimension, therefore, contributes equally to the total score. The GMFM total scores can range from 0-100²⁸.

Pediatric Evaluation Disability Inventory (PEDI)

It is a standardized test designed to identify and describe functional impairment in children, monitor progress and can be used as an outcome measure to evaluate different therapeutic programmes. It is a judgment – based parent-structured interview used by professional in rehabilitation medicine, is a clinical instrument for the assessment of functional status in children up to 7.5 years of age¹⁸. The PEDI measures performance in the daily environment as assessed by parents or caregivers. The PEDI is able to measure both capability (what the child can do) and performance (what the child actually does do) of routine daily child hood activities in 3 domains: 1) self-care, 2) mobility, 3) social function domain¹⁰. Each domain consist of 3 parts: (1) functional skills (current capability of selected tasks in 197 items), (2) caregiver assistance (the extent of help the caregiver provides in 20 items), and (3) modifications (environmental or technical modifications needed to enhance the children's function in 20 items)^{4,21,30}.

Because the focus of the study was on the children's motor abilities and functions,

only the first two domains were used. The social function domain was not used.

Tests were applied for each child within three days Pre start and post end of treatment program. Assessments took place at the usual treatment room.

The initial assessment reflected the pre-treatment results, while the second assessment 6 weeks later, reflected the post-treatment results.

The data and time of all assessments were recorded and every effort was made to schedule the first assessment and treatment sessions and second assessment on the same time of the day.

The GMFCS & GMFM & PEDI measurements were conducted by A trained and masked independent physical therapist working in Pediatric physical therapy department in King Abdul-Aziz University hospital for almost 10 years. She was not involved in the study, but was trained to administer the GMFM & PEDI. She was familiar with interviewing and assessing CP patients, using a standardized measurement scale.

Interventions

The intervention phase consisted of 6 weeks of rehabilitation program. All children were treated in the same gym. Mothers attended with their children. The treatment area consisted of a large room containing physiotherapy equipment and supplies that serve children with developmental disabilities. Once the child arrives to the Gym with his/her mother, treatment session starts on scheduled time and continue for one hour. First half hour for the intervention program and the second half hour for traditional physical therapy. Each child received his/her treatment at the same time daily during the six-week program. The assistant physical therapist were familiarized

with intervention used by the researcher and had been following researcher instructions through the whole program for each child.

Functional physical therapy (FPT)

FPT has flexible sequence, Involves exploration and creativity, child centered but it is adult guided. It emphasizes dynamic interaction and Improves organizational skills. Therapy was individualized on the basis of specific assessed needs, therefore variations occurred within the given intervention on the basis of the therapy goals for each child. Mother participation was important and critical in this intervention. A delay in completing the FPT part should not exceed 35-40 min of the whole session. In FPT program; the child was not passive recipient but an active, working participant.

During the first intervention visit, the physical therapist and the mother discussed the child's strengths and needs, the concerns and priorities of the mother. At start of each week, mothers were given a list of problems written in Arabic of usual problems that child may face. Mothers were asked to identify 3 problems either selected from the given list or out of the list. Mother's choices were not limited to what was written in the list, but the listed problems were given as a general guideline. The mother was asked to identify one-three functional problems concerning the child. Specific individual and measurable treatment goals were negotiated, accurately assessed and documented for each child. Each problem was discussed with the mother to find if achieving these selected goals would be possible considering patient age and limitations. When finalized, the researcher will break each problem into steps, set short term treatment goals, design an individualized intervention plans that are dependent on each patient needs and on the characteristics of

physiotherapy department, then start child training to achieve each goal. Next week, if the child achieved all goals, the mother will be asked again to repeat the same procedure. If one or more goals were not achieved, case will be discussed with the mother and she will be given the choice to repeat the same goals or to chose new goal/goals. Physical therapist intervention was individualized for each child. Evaluations were ongoing from moment to moment. The mother was present for the sessions and was invited and encouraged to participate in the activities. The mother's level of involvement in the session was left up to the mother. Physical therapy intervention was incorporated into play activities. Therapeutic techniques included active ROM, weight bearing, strengthening and endurance activities, and guiding movement. Other activities to enhance motor function included practice of functional motor skills and environmental adaptations. Instruction in positioning and handling techniques.

Throughout each session, the therapist demonstrated and provided the mother with opportunities to participate in positive interactive behaviors. The mother and child were provided with positive reinforcement and ongoing feedback regarding the child's motor function and the mother's and child's interactive behaviors. These strategies reflect the principles and guidelines proposed by several leaders in early intervention.

Normal movement quality is not the goal of practice. The focus of practice should be on the action, not the patterns of movement.

The environment was organized to make toys and materials available that promoted development in a safe area to practice the task. Weekly observation were completed by the researcher. All parents were encouraged to continue daily home exercises.

Instructions should be brief and simple, and direct focus should focus onto the relevant cues of the task. They should focus attention onto the external aspects of performance, not the movement it self.

Traditional physical therapy (TPT)

TPT was provided for each child in the second 30 min of the session. TPT was based

on the assessment of the treating therapist and on her observations of child response in physical therapy Gym, regardless of child specific problems or response at home. Some of the exercises applied in traditional treatment included; Passive ROM and stretch exercises, active ROM exercises, mat exercises, balance exercises, stairs training, gait training, neurodevelopmental techniques.

RESULTS

Table (1): Comparison of mean values of GMFM, pre & post treatment in FPT group.

Pre GMFM		Post GMFM		Paired differences		P value
Mean	SD	mean	SD	mean	SD	
53.5	±26.3	59	±26.7	5.5	±2.6	.001

Total GMFM:

The mean value of GMFM for FPT group was 53.5% ±26.3 pre treatment, while it

became 59% ±26.7 post treatment. There is a significant difference (P = .001) (Table 1, Fig. 1).

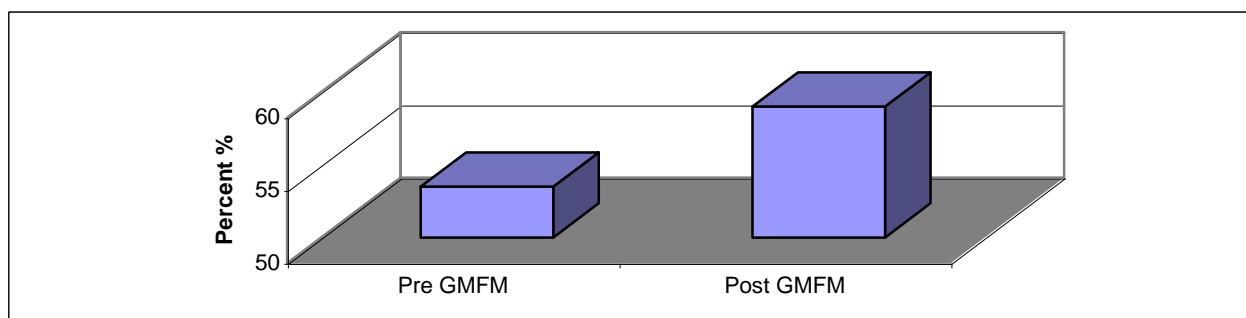


Fig. (1): Comparison between mean values of GMFM, pre and post treatment in FPT group.

Table (2): Comparison of mean values of PEDI, pre and post treatment in FPT group.

	Pre PEDI		Post PEDI		Paired differences		p-value
	mean	SD	mean	SD	mean	SD	
Total PEDI	42.2	±25.2	51	±26.8	8.87	±6.87	.003
self-care domain	42.5	±25	52.5	±26.7	10	±5.5	.001
Mobility domain	41.6	±27.4	49	±30	7.3	±8.5	.014
Self Care Assistance domain	43.8	±27	50	±27.4	6	±6.8	.011
Mobility Assistance domain	46.4	±31	52.2	±30	5.7	±6.4	.005
Total care-Assistance domain Total	46	±27.8	51.1	±28	5.2	±6.4	.009

Total PEDI:

The mean value of PEDI total for FT group was 42.2±25.2 pre treatment, while it increased to 51 ±26.8 post treatment. There is a significant difference (P = .003) (Table 2, Fig. 2).

SELF CARE domain in PEDI (SC):

The mean value of self-care domain scoring in PEDI for 42.5 ±25 pre treatment, while it became 52.5 ±26.7 post treatment. There is a significant difference (P = .001) (Table 2, Fig. 2).

Mobility domain in PEDI (M):

The mean value of mobility domain in PEDI 41.6±27.4 pre treatment, while it became 49±30 post treatment. There is a significant difference (P = .014) (Table 2, Figure 2).

Scores of self-care assistance domain in PEDI SC assist):

The mean value of self-care assistance domain in PEDI was 43.8% ±27 pre treatment, while it became 50% ±27.4 post treatment. There is a significant difference (P = .011) (Table 2, Fig. 2).

Scores of mobility assistance domain in PEDI (M assist):

The mean value of mobility assistance domain in PEDI 46.4 ±31 pre treatment, while it became 52.2 ±30 post treatment. There is a significant difference (P = .005) (Table 2, Fig. 2).

Total scores of care-assistance domain in PEDI:

The mean value of total scores of care-assistance domain in PEDI domain in PEDI was 46±27.8 pre treatment, while it became 51.1 ±28 post treatment. There is a significant difference (P = .009) (Table 2, Fig. 2).

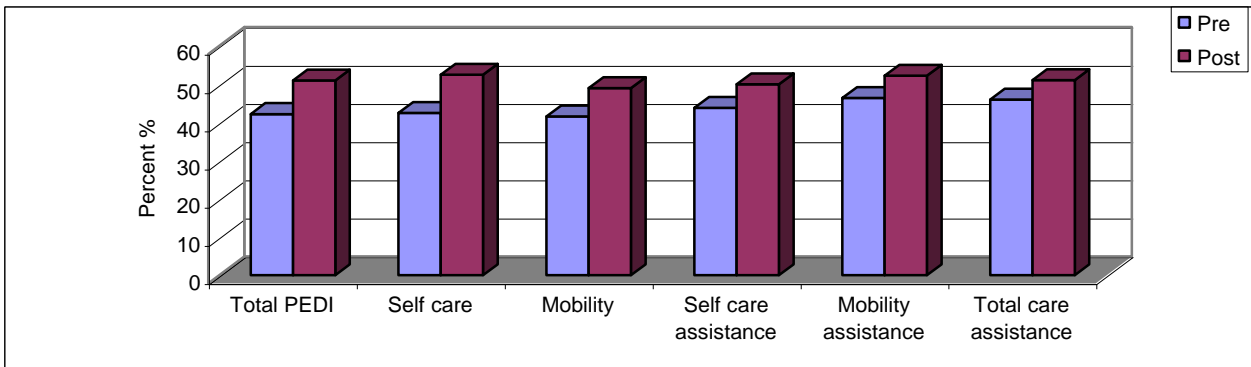


Fig. (2): Comparison between mean values of PEDI, pre and post treatment in FPT group.

Table (3): Comparison of mean values of GMFM, pre and post treatment in TPT group.

Pre	GMFM	Post	GMFM	Paired differences		P value
Mean	SD	mean	SD	mean	SD	.0063
56.7	±20.1	58.4	±23.6	1.7	±4.2	

Total GMFM:

The mean value of GMFM for TPT group was 56.7% \pm 20.1 pre treatment, while it

became 58.4% \pm 23.6 post treatment. There is no significant improvement ($P = .0063$) (Table 2, Fig. 2).

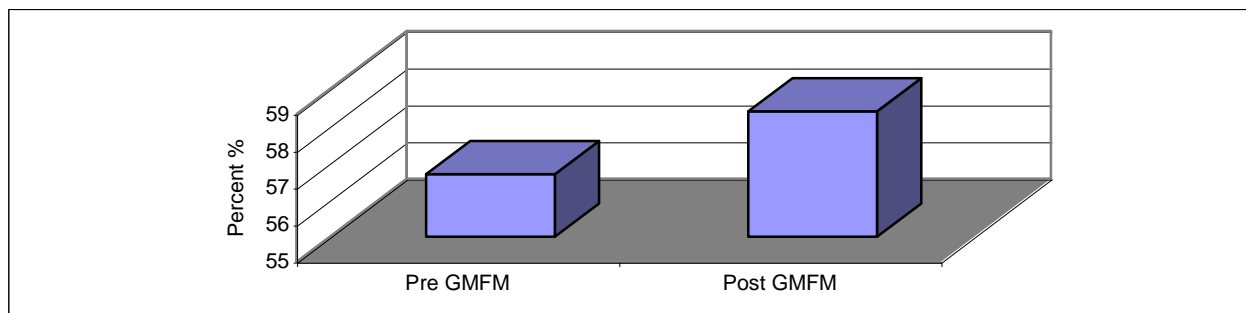


Fig. (3): Comparison of mean values of GMFM, pre and post treatment.

Table 4: Comparison of mean values of PEDI, pre & post treatment in TPT group.

	Pre PEDI		Post PEDI		Paired differences		P value
	mean	SD	mean	SD	mean	SD	
Total PEDI	43.4	\pm 20	45.3	\pm 23	1.9	\pm 8.4	0.273
self-care domain	45.2	\pm 22	46.2	\pm 20	1	\pm 5.6	0.812
Mobility domain	41	\pm 20	43.1	\pm 21	2.1	\pm 7.2	0.213
Self Care Assistance domain	44.2	\pm 24.3	46.5	\pm 23	2.3	\pm 8.3	0.604
mobility Assistance domain	45.4	\pm 23	46.9	\pm 22	1.5	\pm 6.1	0.165
Total care-Assistance domain Total	43.6	\pm 22	44.5	\pm 20	.8	\pm 7.6	0.415

Total PEDI:

The mean value of PEDI total for VS group was 43.4 \pm 20 pre treatment, it increased to 45.3 \pm 23 post treatment. There is no significant improvement ($P = .273$).

SELF CARE domain in PEDI (SC):

The mean value of self-care domain scoring in PEDI for 45.2 \pm 22 pre treatment, while it became 46.2 \pm 20 post treatment. There is no significant improvement ($P = .812$).

Mobility domain in PEDI (M):

The mean value of mobility domain in PEDI 41 \pm 20 pre treatment, while it became 43.1 \pm 21 post treatment. There is no significant improvement ($P = .213$).

Scores of self-care assistance domain in PEDI SC assist:

The mean value of self-care assistance domain in PEDI was 44.2 \pm 24.3 pre treatment, while it became 46.5 \pm 23 post treatment. There is no significant improvement ($P = .604$).

Scores of mobility assistance domain in PEDI (M assist):

The mean value of mobility assistance domain in PEDI 45.4 \pm 23 pre treatment, while it became 46.9 \pm 22 post treatment. There is no significant improvement ($P = .165$).

Total scores of care-assistance domain in PEDI:

The mean value of total scores of care-assistance domain in PEDI domain in PEDI was 43.6 \pm 22 pre treatment, while it became 44.5 \pm 20 post treatment. There is no significant improvement ($P = .415$).

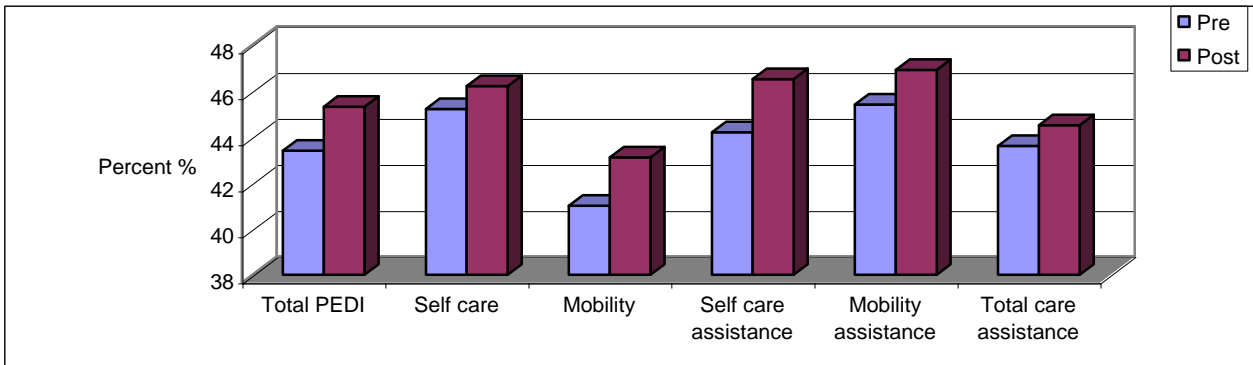


Fig. (4): Comparison of mean values of PEDI, pre and post treatment in TPT group.

DISCUSSION

In the present study, the effect of applying functional physical therapy program in addition to traditional treatment showed significant improvement in comparison to application of traditional physical therapy alone. The program, which was applied for 6 weeks, revealed a significant improvement in motor function of spastic CP children as measured by GMFM & PEDI. The aim of FT is to enable the children to master important tasks and participate in day-to-day activities in their environment²⁴.

Within the frame work of the International classification of functioning, disability and health, WHO, 2001, the environment was defined as “the physical, social, and attitudinal conditions that are present in an individual’s life. For example, family support and assistance, and peer acceptance are social and attitudinal environmental factors that may influence the mobility methods used by CP children mobility during daily life requires adaptation to physical and social features and time constraints associated with home, school, and community settings²⁶. A complication in the goal setting and management in such patients

is the fact that they are children, still proceeding through normal developmental stages. Goals, therefore, cannot be static, but must be constantly changing to facilitate continuing progression through the developmental process throughout their daily environments²². The developed skills interventions focus on learning, practicing and mastering the task of sequenced motor milestones²³. During practice it is important to provide feedback on these essential components of the task. When determine the content of feedback, it is important to analyze the movement task and determine which components of movement are essential for successful performance of the task³¹. Studies of functional outcomes of children receiving rehabilitation treatments have generally found that children make improvements in functional status while receiving therapy services (i.e., performance in activities of daily living)⁸. A study was carried on 2001 by Ketelaar to compare two physical therapy approaches on 55 children with mild or moderate spastic CP aged 2-7 years. Purpose of this study was to determine whether the motor abilities of children with spastic CP who were receiving functional physical therapy (physical therapy with an emphasis on practicing functional activities) improved more than the motor

abilities of children in a reference group whose physical therapy was based on the principle of normalization of the quality of movement.

There were 3 follow-up assessments: 6, 12, and 18 months after the pretest. Both basic gross motor abilities and motor abilities in daily situations were studied, using the GMFM and PEDI scales. Results showed improvements in basic gross motor abilities, as measured by the GMFM in a standardized environment in both groups without difference. When examining functional skills in daily situations, as measured by the PEDI, children in the functional physical therapy group improved more than children in the reference group¹⁸.

FCC is a model of patient care delivery that encourages the inclusion of the family in the planning and provision of care. The three major concepts of FCC philosophy identified were respect, collaboration, and support. (1) "Respect" includes those that acknowledge cultural and individual differences and those that recognized the value of family to the patient. For example, one of the survey items in the "respect" group asked if the staff new about special practices in the family's culture. (2) "Collaboration" items recognize the role of patients and their families as partners with health care professionals in planning patient care. A survey item in the "collaboration" group asked whether the staff included the family and/or patient in decisions about care. (3) "Support" includes items demonstrating ways in which health care professionals and the hospital infrastructure could support the families' needs while a family member receiving therapy¹⁴.

According to motor theories and motor learning guidelines related to the task and environment; the motor development and coordination are assumed to emerge from a dynamical interaction of many subsystems in a

task specific context. For this reason, useful motor behaviour is more likely to result from emphasizing active processes that encode information into long-term memory for future retrieval and by working on functional tasks than from working on movement patterns just for the movement's sake alone^{16,33}.

According to current "top down" approaches, goals related to functional outcomes are determined first. Then, components that limit these outcomes are assessed³³. Repetition does Influence daily practice by giving guidance on what to do, how to do, and most important, why to do which will improve clinical decision-making among the child and therapist². Yet it is apparent from motor learning research that practice alone does not guarantee leaning. These authors suggest that movement repetition actually provides practice at constructing an appropriate action plan for the task¹².

Normal movement quality is not the goal of practice. However, if a child chooses a coordination mode that brings about unsuccessful or unsafe outcome, the therapist will direct the child to a more appropriate pattern. Likewise, if the preferred pattern can cause secondary complications over time, the therapist may direct the child to a different pattern³³. Therapeutic approaches should not be directed towards restoring the motor patterns to as close as normal as possible, but rather towards resolving the functional problem. Treatment strategies should therefore focus primarily at restoring or, if indicated and possible, improving functional ability, respecting the typical characteristics of the disease and the disease related natural course¹⁶. Therefore, goals need to be formulated with the understanding that physiotherapy cannot change a child from 'can't do' to 'does do', but that a physiotherapist

may be able to help a child change from 'could do' to 'does do' when the child demonstrate the appropriate behaviour³⁰.

There is, in our view, a trend among physical therapists to a move from a neurodevelopmental treatment (NDT) approach to family-centered functional therapy incorporating motor learning and cognitive strategies when working with children with cerebral palsy². NDT approach is widely used, and may be the most widely used among pediatric physical therapists treating CP's,⁶ It was developed as early as 1940s, focused at that time on impairment following the concept of "reflex-inhibiting' postures". Promoting 'key points of control' in which the therapist inhibited abnormal patterns of movement and facilitated more normal movements while the child was moving. Handling techniques were used to inhibit spasticity, abnormal reflexes, and abnormal movement patterns. The child was a relatively passive recipient of NDT treatment. The normal development sequences were advocated as a framework for treatment¹². Some studies have shown that therapy with NDT is effective in improving some measure of motor performance in CP children. In contrast, some researchers have found little or no change in motor performance to indicate that therapy with NDT is effective^{6,12}. This controversially about the effectiveness of the NDT programme may have been influenced by a lack of focus on function. By the 1980s, Bobath treatment 'incorporated systematic preparation for specific functions' and the children were treated in 'functional situations'. Working for meaningful functional goals and giving opportunities for the practice of such skills became central to the Bobath concept¹⁹. In a systematic review for the Bobath approach applied by AACPD on 2001, The Bobaths discussed their realization that their treatment

had not automatically carried over into activities of daily life, as they had expected it would. Consequently, systematic preparation for specific functional tasks was instituted with an aim of treating the children in actual settings where they live, play, and learn. The analysis applied in this same systematic review comparing studies about NDT published before 1990 with those published between 1990 and 2000 showed that the later studies, presumably using contemporary NDT, had a greater percentage of results that favored NDT than did the earlier studies. And when only motor impairment or motor activity measures were considered, NDT still showed more positive results for later studies compared with earlier studies⁷.

Study limitations included; Small sample size, absence of a detailed assessment of children IQ, detailed assessment of the children and parents psychological responses could not be provided with no psychologist participating in this study, the continuation of the effects of interventions after at least 6 weeks of the program could not be measured because of difficulty of controlling parents during such period (some families may continue to apply physio at home and hospitals while others may not), which may not reflect the actual effects of the interventions after such period. So studies over longer periods are recommended to check that progress does not slow down or even give way to regression if treatment of this intensity is continued for longer periods of time.

In conclusion; the primary objective must always be focused on maximizing the quality of life of children that we serve by optimizing function and social participation and by providing adequate family and community supports. It is the time to give up trying to "cure" the neurological deficits by remedial methods and get on with the task of

helping children and their families. Results of this study showed improvement in gross motor activities and functional skills following six weeks Functional Therapy program in addition to traditional physical therapy. Not all children will show improvement in the same way. Treatments should consider relationships among the primary and secondary impairments, personality characteristics of the child-family-therapist, level of the therapist communication skills, environmental supports and barriers.

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الملخص العربي**تأثير برنامج العلاج الطبيعي الوظيفي على الوظائف الحركية في الأطفال المصابين بالشلل الدماغي**

تهدف هذه الدراسة إلى بيان اثر برنامج العلاج الطبيعي الوظيفي على الوظائف الحركية في الأطفال المصابين بالشلل الدماغي . وبرنامج العلاج الطبيعي الوظيفي يهدف إلى التركيز على تحسين الأداء الوظيفي . وقد اشتملت عينة الدراسة على خمسة عشرة طفلاً مصابين بالشلل الدماغي تتراوح أعمارهم بين 1-5 سنة لديهم القدرة على التجاوب السمعي والبصري ولديهم القدرة على التحكم في وضعية الرأس ولو جزئياً ولم يجر أي منهم أية عملية جراحية في السنة الأخيرة ولا يتعاطون أية أدوية بغرض تقليل التقلصات طوال الستة أشهر الأخيرة . ولقد تم قياس الوظائف الحركية للأطفال عينة الدراسة قبل وبعد البرنامج العلاجي عن طريق طريقتين ثبتت فعاليتهما في هذا المجال . وقد تضمنت الدراسة برنامج علاج طبيعي وظيفي يركز على أداء الوظيفة بالإضافة إلى العلاج الطبيعي التقليدي لمدة ستة أسابيع . ولقد أظهرت النتائج تحسناً ملموساً في الوظائف الحركية في الأطفال عينة البحث مما يثبت فعالية لبرنامج العلاج الوظيفي إلى جانب العلاج التقليدي .