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sensory modulation and motor ability performance in those patients using GMFM scale. The results showed that sensory processing affects functional abilities in self- care and social function (r2= 0.30 and r2= 0.39, respectively) and caregiver assistance (r2= 0.36 and r2= 0.37, respectively), ($p<0.05$).[23] It also recommended a new intervention to deal with these sensory disorders in CP children to improve their functional mobility. This agreed with our study that SIT improves gross motor functions and thus improves performance and functional ability.

Additionally, Shams Aldine et.al. (2010) performed a study to compare the effect of neuro- developmental treatment and sensory integration therapy on gross motor function in CP children. Twenty- two spastic CP children were randomly divided into two groups, one group received SIT and the other group received neurodevelopmental therapy. R esults showed significant improvement in SIT group specifically in lying (P= 0.003), sitting (0.009), crawling and kneeling (0.02) and standing ability (P= 0.04).[24]

Our results showed significant improvement in rolling ($p<0.001$) and walking ($p<0.001$). However, this comes in contrast with Shams Aldine et.al., 2010 where there was no statistical significance in rolling (P= 0.65) and walking (P= 0.69) in the group received SIT. This could be justified in our study as we included larger number of CP children and the sessions were on a longer period of time.

Literature has also stated that sensory integration problems in those CP children leads to functional immobility, abnormal tone and posture, lack of muscle coordination and imbalance which may lead to unstable mobility.[25]

The current study also yielded a high significant improvement ($p< 0.001$) in sensory processing assessed by CSP- 2 in all scale aspects (Auditory, Visual, Touch, Movement, Body Possession and Oral) after SIT sessions. We believe that this improvement is correlated to the fact that CP children have sensory processing problems and thus affecting their gross motor functions.

This goes in concordance with a previous study that analyzed the sensory profile in children with CP classified by GMFCS using CSP- 2. Their results showed that all twenty (n= 20) participants with age (6- 9) years suffer from defect in at least one sensory domain.[26]

In conclusion, within this study sample, CP children showed significant improvement gross motor performance after a 6 months therapy duration with total 72 sessions of sensory integration therapy. Improvements were mainly achieved in the targeted areas and domains on which plan of SIT therapy was tailored for. These results indicate the importance of SIT in managing CP patients as an adjunctive treatment modality with occupational and medical treatment.

Future Recommendation:

1. The size sample was small, further studies may get generalized results with larger sample size.
2. Studies may include other CP varieties.
3. Scarcity of CP patients who do not receive medical treatment that may affect muscle spasticity such as muscle relaxants (baclofen) or botilinum toxin injections.

Conclusion:

The present study aimed to assess the impact of sensory integration therapy on gross motor functions in CP children which would affect their functional mobility. The study also assessed the effect of sensory integration therapy on muscle spasticity in those patients. Results showed that there is a significant improvement on muscle spasticity and gross motor function after sensory integration therapy thus, improvement of functional mobility in daily life activity.

Thus management of sensory processing deficits in the CP is a corner-stone hand in hand with other neuro- rehabilitation and occupational therapy to enhance functional mobility.

- Conflict of Interest: None.
- Funding: None.

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in table (6).

Additionally, the study assessed the spasticity of muscles in the included CP patients using MAS scale and it showed highly significant improvement with p value (<0.0001) after sensory integration therapy as shown in table (7).

Table (7) Modified Ashworth spasticity scale before and after SIT

Modified Ash Worth Spasticity Scale		Before No. = 65	After No. = 65	Test Value	P- Value	Sig.
Hip Flexors	Mean± SD	3.42±0.53	2.57±0.59	−7.030	<0.001	HS
	Range	2- 4	1- 4			
Hip Extendors	Mean± SD	3.25±0.56	2.03±0.77	−7.126	<0.001	HS
	Range	2- 4	1- 3			
Hip Internal Rotators	Mean± SD	3.40±0.55	1.92±0.69	−7.234	<0.001	HS
	Range	2- 4	1- 3			
Hamstrings	Mean± SD	3.18±0.46	1.74±0.71	−7.180	<0.001	HS
	Range	2- 4	1- 3			
Gastroconemius	Mean± SD	3.17±0.57	1.43±0.64	−7.399	<0.001	HS
	Range	2- 4	0- 3			

SD: Standard Deviation.

There was a positive relationship between sensory integration function assessed by CSP 2 and gross motor function assessed by GFMF88 in which, higher scores of CSF 2 (improved sensory integration performance) indicates improved functional ability (high GFMF 88 scores) which is demonstated in a scatter plot in diagram (1).

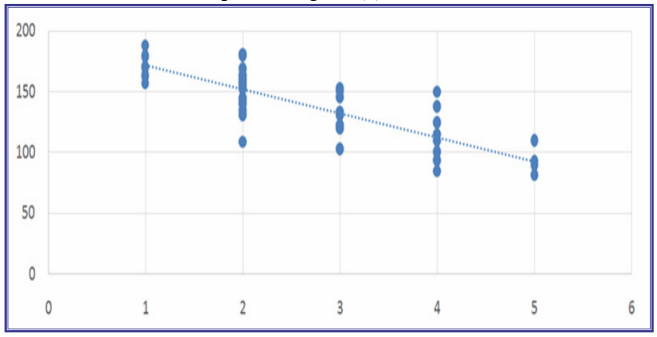

Diagram (1) scatter plot between GFMF and CSP.

Discussion:

CP children suffer from difficulty in functioning during daily activities. Studies showed that these difficulties are due to the nervous system insult that affects the gross motor muscles affecting gross motor mobility and tonicity that affects control of posture. On the other hand, altered sensory processing modulation has an additive effect which impairs motor functions, mobility and limits adaptation of those children in their daily life.

Fine motor skills in CP are connecting with adequate gross motor functions. It has been shown in recent literature that somatosensory interaction and visual motor pathways are crucial in sensory modulation in CP. Patients with low sensory profile have low scores in adequate perception and accordingly poor copying, positioning and impaired tactile and proprioception.[20] These impairments negatively impairs the fine and gross motor functions in CP.

Neuro- rehabilitation, occupational and medical approaches are different conventional modalities used in management of CP children. Occupational medicine treatment modalities mainly focused on attaining the optimum motor function for each case to guard against abnormal postures and to improve the defects in gross motor abilities aiming to reach the maximum functional capacity and participation.

Various types of CP have its own type of neuro rehabilitation designed by clinicians to meet the deficiencies and strengths for each type. Fortunately, therapies based on sensory integration modulation are beneficial to all clinical variants of CP. However it is not widely spread as an option in the management plan of CP children. Thus our study aimed to find out the impact of SIT in the gross motor functional mobility and muscle spasticity in those children.

This study has proved that motor functions could be facilitated by sensory integration therapy. Changes in motor abilities and performance are expected to improve after different type of SIT or exercise. The main goal of SIT is to improve posturing and movement stability by group of exercises and actions in the session that are targeted towards specific area in gross motor ability of each CP child.

Additionally, sensory integration therapy also showed it can improve muscle spasticity which is a major problem in CP patients and in turn imposes the functional mobility of the muscles.

To our recent knowledge, there were no studies on Egyptian population assessing the impact of SIT on gross motor function in a number of CP children. Moreover, assessment of muscle spasticity by MAS scale to justify that SIT improved the spasticity thus, the functional mobility assessed by GMFM.

Results in this study revealed high significant improvement (p< 0.001) in gross motor function of the included participants in all five scales of GMFM:

1. Lying and rolling.
2. Sitting.
3. Crawling and Kneeling.
4. Standing.
5. Walking, Running, and Jumping after sensory integration therapy sessions.

Similarly, in previous study which included 30 CP patients divided into two groups, group A (15 patients) received SIT and conventional therapy. While group B (15 patients) received only conventional treatment.

Results indicated highly significant difference (P<0.00) in a group A in gross motor function assessed by GMFM 88, which highlights the impact of SIT on gross motor function.[21]

Moreover, in a randomized controlled trial by Palmer et.al, who performed SIT on spastic diplegic patients to improve sitting and crawling abilities. Results was assessed by Bayley motor scale and it showed that there was significant improvement in the patients who were subjected to sensory integration therapy than the patients who were subjected to home based therapies.[22]

Silvia et.al., (2021) investigated 28 CP children with age range 5 to 15 years (mean± SD; 9.9± 3.2 years) to assess if there is a relation between

Table (2) Mean Age and gender of CP children in our study group

		No. = 65
Age	Mean±SD	5.68± 1.57
	Range	3- 9
Gender	Female	21 (32.3%)
	Male	44 (67.7%)

SD: Standard Deviation

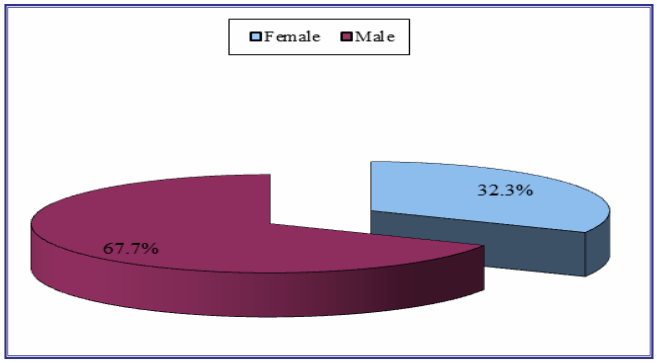

Figure (1): Pie chart showing males and females percentage in the study group.

Table (3): mean, standard deviation, minimum and maximum score of GMFM 88 in study group before treatment

GFMF Score Before		No. = 65
Lying And Rolling	Mean± SD	27.08± 18.44
	Range	1.9- 66.66
Sitting	Mean± SD	34.64± 15.50
	Range	8.3- 66.66
Crawling And Kneeling	Mean± SD	31.57± 13.47
	Range	11.7- 66.66
Standing	Mean± SD	27.47± 14.43
	Range	7.6- 58.9
Walking, Running, Jumping	Mean± SD	25.48± 9.21
	Range	4.1- 56.9

SD: Standard Deviation

We investigated the gross motor functions in CP children by measuring the five scales of GMFM- 88 score before SIT, as demonstrated in table (3) the results showed the mean of lying and rolling, sitting, crawling and kneeling, standing, and walking, running, jumping was (27.08± 18.44 SD), (34.64± 15.50 SD), (31.57± 13.47 SD), (27.47± 14.43 SD), and (25.48± 9.21 SD) respectively.

Table (4) Wilcoxon Rank test in GFMF 88 scale before and after therapy

GFMF Score		Before No. = 65	After No. = 65	Test Value	P- Value	Sig.
Lying And Rolling	Mean± SD	27.08± 18.44	37.99± 22.60	-7.010	<0.001	HS
	Range	1.9- 66.66	9.8- 86.27			
Sitting	Mean± SD	34.64± 15.50	50.02± 16.11	-7.011	<0.001	HS
	Range	8.3- 66.66	20- 90			
Crawling And Kneeling	Mean± SD	31.57± 13.47	50.87± 18.33	-7.010	<0.001	HS
	Range	11.7- 66.66	30.95- 85.7			
Standing	Mean± SD	27.47± 14.43	50.35± 19.26	-7.011	<0.001	HS
	Range	7.6- 58.9	25.64- 87.1			
Walking, Running, Jumping	Mean± SD	25.48± 9.21	44.57± 13.93	-7.010	<0.001	HS
	Range	4.1- 56.9	18- 72.22			

P- value >0.05: Non significant (NS); P- value <0.05: Significant (S); P- value<0.01: highly significant (HS): Wilcoxon Rank test

Results in our study group showed highly significant improvement of gross motor function assessed by GMFM 88 scale after sensory integration therapy with p- value< 0.001 in the five aspects of GMFM88 scale; (Lying and Rolling), (Sitting), (Crawling and kneeling), (Standing), (Walking, running and jumping) table (4).

As shown in figure (2), the five aspects of gross motor functions measured by GMFM88 scale are demonstrated in a bar chart showing an improvement after sensory integration therapy in our study group.

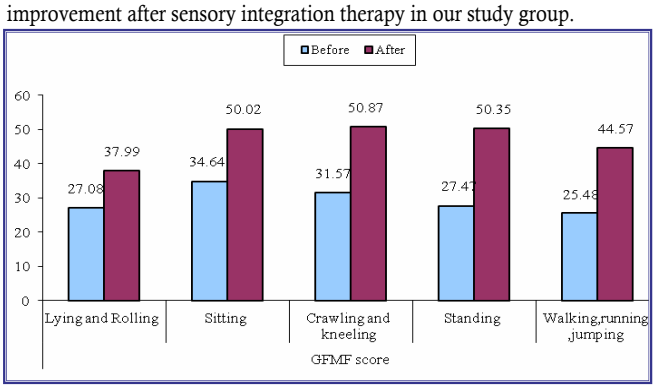

Figure (2): Bar chart for GFMF- 88 scale before and after SIT therapy.

Table (5) the mean, standard deviation, minimum and maximum score of CSF 2 in study group before treatment.

Child Sensory Profile 2 Scale Raw Score before		No. = 65
Auditory	Mean± SD	8.92± 1.72
	Range	3- 11
Visual	Mean± SD	8.00± 1.53
	Range	2- 10
Touch	Mean± SD	6.45±0.94
	Range	4- 8
Movement	Mean± SD	5.29± 1.04
	Range	2- 7
Body Position	Mean± SD	3.92±0.83
	Range	2- 7
Oral	Mean± SD	7.66±0.78
	Range	6- 10

SD: Standard Deviation

As regards the mean, standard deviation, minimum and maximum score of CSF 2 profile in CP children who participated in the study, results showed in table (5) the mean of auditory scale was (8.92) with (±1.72 SD), the mean of visual scale was (8) with (±1.53 SD), the mean of touch scale was (6.45) with (±0.94 SD), the mean of movement scale was (5.29) with (±1.04 SD), the mean of body position scale was (3.92) (±0.83 SD) and the mean of oral scale was (7.66) with (±0.78 SD).

Table (6) Wilcoxon rank test in sensory aspects of CSF- 2 profile in CP children

Child Sensory Profile 2 Scale Raw Score		Before No. = 65	After No. = 65	Test Value	P- Value	Sig.
Auditory	Mean± SD	8.92± 1.72	10.11± 1.55	-5.903	<0.001	HS
	Range	3- 11	4- 13			
Visual	Mean± SD	8.00± 1.53	10.12± 1.77	-6.471	<0.001	HS
	Range	2- 10	5- 15			
Touch	Mean± SD	6.45±0.94	10.17± 2.13	-7.031	<0.001	HS
	Range	4- 8	8- 17			
Movement	Mean± SD	5.29± 1.04	9.62± 2.45	-7.026	<0.001	HS
	Range	2- 7	4- 15			
Body Position	Mean± SD	3.92±0.83	7.03± 1.90	-6.991	<0.001	HS
	Range	2- 7	4- 13			
Oral	Mean± SD	7.66±0.78	8.37±0.82	-5.613	<0.001	HS
	Range	6- 10	6- 10			

P- value> 0.05: Non significant (NS); P- value <0.05: Significant (S); P- value<0.01: highly significant (HS): Wilcoxon Rank test

Results also showed highly significant improvement in sensory aspects (auditory, visual, touch, movement, body possession and oral) assessed by CSF- 2 after sensory integration therapy with p- value (<0.001) as shown

3. Gross motor function assessment using Gross motor function measurement (GMFM- 88) scale. Clinical neurologists usually use this test to analyze the gross motor functions of CP children and to detect any changes in it. It consists of 88 items that are divided to five areas of gross motor function:
   a. Lying and rolling.
   b. Sitting.
   c. Crawling and kneeling.
   d. Standing
   e. Walking, running, and jumping.

   The GMFM 88 scale has been used widely in assessment of motor function in CP children which also allows the study of quantitative changes after any intervention in gross motor functions.
4. Sensory integration was assessed by Child sensory profile 2 (CSP- 2) which consists of 86 items that measures the sensory characteristics of the child and is reported by the parent.[17]

   CSP- 2 is divided into 4 sensory patterns areas: seeking, avoiding, sensitivity and registration. CSP- 2 also measures the 6 sensory areas (auditory, visual, touch, movement, body position and oral), and three behaviors related to sensory processing (behavioral, socio- emotional and attention).

   Responses for the profile are described on a five likert point scale for each single item as the following: (0= not applicable), (1= almost never or never) and (5= almost always or always). As much as the scores are high, this means high incidence of such behavior and indicates the presence of high sensory defect.[18]
5. Muscle spasticity scale assessment by Modified Ashworth Spasticity scale: Quantitative assessment of muscle tone and spasticity in CP children is commonly studied by clinicians using the Ashworth Scales (AS) and the Modified Ashworth Scales (MAS). These are tests that are done manually to examine muscle resistance and tonicity against stretching the muscle passively Table (1).[19]

Table (1) Grades of spasticity according to the modifiedAshworth scale (Ashworth, 1987)

Grade	Description
0	No increase in muscle tone
1	Slight increase in muscle tone, manifested by a catch and release or by minimal resistance at the end of the ROM when the affected part (s) is moved in flexion or in extension
1+	Slight increase in muscle tone, manifested by a catch, followed by minimal resistance throughout the reminder (less than half) of the ROM
2	More marked increase in muscle tone throughout most of the ROM, but affected part (s) easily moved
3	Considerable increase in muscle tone, passive movement is difficult
4	Affected part (s) rigid in flexion or extension

6. Sensory integration therapy was held in the sensory motor integration therapy room in the care of special needs center- faculty of postgraduate studies- Ain Shams University. Each participant had 60 minutes session 3 times per week for 6 months with total 72 sessions.

SIT focused on visual perception, body awareness, tactile perception, visual motor coordination training, vestibular and proprioceptive exercises that aimed to enhance ability of those children to receive, process and integrate the sensory inputs.

Therapies included visual awareness and perception using bars of lights in a dark room with patterns of lights synchronized to turn on and off in time intervals. Touch and pressure were aroused using cardboard with different textures from soft to harsh, pressure was stimulated using therapist hands and different weighs applied on pressure muscles and joints of each child, different weighted cuff lings applied to the extremities to create stimulating points of pressure and touch on body parts.

Proprioception and body awareness was enhanced by using CP ball, tilt bars, hanging swings, and special massage chairs.

Oral movements were also trained first by massaging the mastication muscles and applying different textures to the child.

In every SIT session, the therapist achieved reduction in muscle tone of every CP patient by applying sustaining stretching position exercises in all limbs and extremities while the child is put in sitting, standing, and crawling positions. Cerebral Palsy ball and tilt board were used to achieve balance and corrective responses. An age appropriate developmental milestone was studied and proper age appropriate ambulation training was applied.

GMFM 88, CSP- 2 and MAS was assessed again post treatment to sensory integration therapy to assess the improvement.

Ethical Approval And Consent:

Written consent after oral approval and consent was fulfilled prior the study according to the Faculty of Post- graduate Childhood Studies national ethical consideration code (RHDIRB2020110401) registered in 4th of November 2020.

Statistical Analysis:

The study data was collected, revised, coded and entered to the Statistical Package for Social Science (IBM SPSS) version 23. The quantitative data were presented as mean, standard deviations and ranges when parametric.

Also qualitative variables were presented as number and percentage Wilcoxon test was used to compare between 2 paired groups with quantitative data and non- parametric distribution.

Correlations between 2 quantitative parameters in the same group were done by Spearman correlation and a scatter plot was used to display the relationship.

The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p- value was considered significant as the following (P> 0.05: Non significant, P< 0.05: Significant, P < 0.01: Highly significant).

Results:

Descriptive analysis in our study group showed that a total number of sixty five CP patients (n= 65) of which 21 females (32.2%) and 44 males (67.7%) were included in the study with mean age 5.68± 1.57 SD and range (3- 9) as demonstrated in table (2) and figure (1) respectively.

Introduction:

Cerebral palsy (CP) is a common neurological disorder that affects movement, muscle tone, and motor skills. It is characterized by persistent and non- progressive signs that appear later clinically and during child's developmental period, usually resulting from a lesion in the prenatal, perinatal or post natal period that insults the brain during embryogenesis and developing period in either early fetal or post natal life.[1][2] The most common type of CP is spastic cerebral palsy (SCP), either unilateral or bilateral and may represent 75% to 85% of cases.[3]

The insulting lesion usually affects the motor abilities and it is usually accompanied by other complications that may be manifested by cognitive impairments, sensory disturbances, communication disorders, as well as perceptual and behavioral problems in sensory. Additional comorbidities could be seen such as problems in the musculoskeletal system and epilepsy.[4]

Multidisciplinary approach and integrative therapy is the key role in management of cerebral palsy, its goal is to apply a holistic and coordinated plan of early intervention in order to reach the optimum level of child's engagement and independence in the surrounding community.[5]

Sensory integration is a term that identifies the process of which the body receive and analyze of all sensory stimuli that is received from the surroundings and the way the brain process these stimuli. After brain processing, these stimuli are organized and integrated properly then the brain gives the reaction that is proper to the stimulus given. The human body then responds in an organized and efficient way.[6]

Sensory Processing Disorder (SPD) is defined as a disorder in an individual's response to the normal sensory stimuli in which the response is not compatible with the stimulus. It could be presented by either hyposensitive sensory processing disorder or hypersensitive processing disorder. Both types could definitely affects patients life especially CP children as it can impair their daily life activity, mobility and participation.[7]

Sensory integration therapy is a type of treatment modality that is introduced to many disorders. It is mainly based on understanding the defect in sensory inputs signaling and how they are integrated and processed in the brain, then in acts on organizing and modifying the way of receiving those sensory inputs to the right tract in order to give the proper efficient response.[8]

Usually CP children are managed by medications and rehabilitation. However these modalities are mainly targeted to the motor deficits in those patients neglecting the sensory deficits which eventually lead to developmental disability.[9][10] According recent literature in the field of CP and sensory deficits, it has been found that those patients do have not only motor deficits but also disorders in sensory integration and processing.[11][12]

Children with cerebral palsy usually are presented with deficits in executive functions which appear symptomatically in the form of poor arousal response, low attention span, as well as problems in motivation and behavior that results in defect in action and organization plan.[13][14]

Majority of CP children suffer centrally from sensory discrimination and integration deficits mainly in the proprioception and tactile function. These impairments lead to sensory disorders that act as additive effect on abnormal spastic tone in the muscles manifested as abnormal posture and mobility.[11]

The central nervous system in cerebral palsy is injured by an insult that affects both sensory and motor functions.[12][13] Accordingly, altered sensory stimuli processed by CP brain leads to abnormal response that is shown as abnormal body movement, altered posture and loss of control. These impairments give a false proprioception stimulus and in return a false response that eventually results in an improper movement. These deficits in CP children usually lead to limitations of mobility actions and planning.[14]

Therefore, both motor and sensory abilities are equally of crucial importance for the optimum functional ability and oriented mobility in CP children daily life activities and participation.[15]

According to a scoping review study, results revealed that sensory integration therapy has improved motor rehabilitation results in CP children. However, it recommended other researches to assess SIT effectiveness in those children.[16]

The present study aims to identify the impact of sensory integration therapy on gross motor function in CP children and also its effect on muscle spasticity that indeed will suggest anew multidisciplinary modalities of treatment in CP children rather than conventional ones to help them in proper participation.

Methods:

An interventional study was conducted on sixty five children with CP.

Participants And Procedures

Subjects:

The present study included sixty five children who matched the inclusion criteria attending neurology outpatient clinic of special needs care center, faculty of postgraduate childhood studies, Ain Shams University, Cairo, Egypt. The authors examined 200 patients from July 2020 till October 2021 to meet the inclusion criteria of the study.

- Inclusion Criteria: We included CP children diagnosed by pediatric neurologist with age range (3- 9) years of both sexes.
- Exclusion Criteria: We excluded CP children who received surgical procedures to improve motor functions such as tendon lengthening, botilinum toxins or baclofen pumps for treating spasticity and children with any chronic medical health condition that may affect sensory and motor ability.

Procedure:

All sixty five CP children participated in the study where subjected to:

1. Detailed medical history and clinical examination mainly to exclude chronic medical health conditions.
2. Clinical neurological assessment by pediatric neurologist to diagnose CP.

The Effect Of Sensory Motor Integration Therapy On Gross Motor Function In Cerebral Palsy Children

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قسم الدراسات الطبية للأطفال كلية الدراسات العليا للطفولة جامعة عين شمس

Summary

Background: Cerebral palsy is a neurological disorder that affects the functional mobility of children in their daily life. Sensory integration intervention represents an emergent aspect of study and is as important as the role of motor affection in children suffering spastic cerebral palsy. Therefore, early intervention with all management modalities may improve children's mobility, activity, and participation.

Objectives: to study the impact of sensory integration therapy on gross motor function and muscle spasticity in an Egyptian sample of children with cerebral palsy.

Methods: Two hundred children attending neurological outpatient clinic were examined by pediatric neurologist to meet the inclusion criteria of the study in which total number of sixty- five (n= 65) children diagnosed with cerebral palsy with age range three to nine years old were recruited from center of special needs children Ain Shams University, Cairo, Egypt. All subjects received pre and post intervention assessment of gross motor function using Gross motor function measurement- 88 scale by a pediatric neurologist, child sensory profile- 2 and modified Ashworth spasticity scale. Sensory integration therapy sessions were done 3 times per week each for 60 minutes for 6 months duration with total 72 sessions. Duration of the study was from July 2020 to October 2021.

Results: Sixty five CP patients (n= 65) where 21 females 32.2% and 44 males 67.7% with spastic cerebral palsy participated in the study. Results showed improvement with high significance (P<0.0001) in the 5 domains of gross motor functions within the study group after intervention with sensory integration sessions. Decrease in muscle spasticity (P<0.0001) in those children. Sensory profile assessment also showed significant improvement in its aspects with (P<0.0001).

Conclusion: Sensory integration therapy is a promising modality of rehabilitation and could be very beneficial in the early intervention management plan of cerebral palsy.

Keywords: Cerebral palsy, sensory integration, gross motor, spasticity.

تأثير العلاج الحسي الحركي التكاملي
علي المهارات الحركيه الكبري لدي الاطفال المصابين بالشلل الدماغي

مقدمه: الشلل الدماغي هو اضطراب عصبي يؤثر على الحركة الوظيفية للأطفال في حياتهم اليومية. تعد دراسة دور التكامل الحسي جنبا إلى جنب مع الدور الحركي للأطفال المصابين بالشلل الدماغي التشنجي مجالا ناشئا للدراسة، لذلك فإن التدخل المبكر بجميع طرق العلاج قد يحسن حركة الأطفال.

الاهداف: لتحديد تأثير علاج التكامل الحسي على الوظيفة الحركية الكلية والتشنج العضلي في عينة مصرية من الأطفال المصابين بالشلل الدماغي.

نوع الدراسه والتصميم: دراسه اكلينيكيه اجريت علي خمسة وستين (ن= ٦٥) طفل مصاب بالشلل الدماغي تتراوح أعمارهم من ثلاث إلى تسع سنوات في مركز أطفال ذوي الاحتياجات الخاصة بجامعات (عين شمس، القاهرة، مصر). تم تقييم الوظيفة الحركية الإجمالية باستخدام مقياس قياس الوظيفة الحركية الإجمالية GFMF-88 قبل وبعد العلاج بالتكامل الحسي الحركي. تم أيضا اختبار الملف الشخصي الحسي للطفل Child Sensory Profile 2 ومقياس Modified Ashworth Spasticity Test قبل وبعد التدخل على جميع المرضي. تم إجراء جلسات علاج التكامل الحسي ٣ مرات في الأسبوع حيث استمرت كل جلسه لمدة ٦٠ دقيقة لمدة ٦ أشهر بإجمالي ٧٢ جلسة.

العينة: تضمنت الدراسه عدد الإجمالي خمسة وستون مريضا بالشلل الدماغي (ن= ٦٥) واظهرت نسبه ٢١ أنثى ٣٢,٢% و ٤٤ ذكرا ٦٧,٧%.

النتائج: أظهرت النتائج تحسنا كبيرا في الوظائف الحركية الكبرى لدى الأطفال المصابين بالشلل الدماغي بعد جلسات العلاج التكامل الحسي بدلاله احصائيه P<0.0001، إلى جانب التحسن السريري في التشنج العضلي لدى هؤلاء الأطفال.

الكلمات الافتتاحيه: شلل دماغي، تكامل حسي حركي، مهارات حركيه كبري، تشنج عضلي.

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