

A Comparative Study of Combined Vojta and Bobath Versus Pelvic Stabilization Exercises on Balance in Spastic Cerebral Palsy

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ABSTRACT

Background and Purpose: Cerebral Palsy (CP) is a non-progressive disorder of the brain that occurred during the fetal or developing infant. The movement and postural disorder that rise in the time of infancy or early life proceeding from brain injury. Brain injury is enduring moreover not able to revive however too early starting intervention, the more improvement can be made. The purpose of the study is combination of Vojta therapy and Bobath, is to facilitate the regulation or control of the body's position and to stimulate coordinated muscle activity which is done by Vojta and to inhibit the spasticity, to facilitate controlled motor activity which is done by Bobath.

Objective: The aim of the study is to compare a combination of Vojta therapy and Bobath approach versus Stabilization exercises to improve balance on Spastic cerebral palsy.

Design: experimental study.

Method: Sampling of 30 subjects of age group 7 to 14 years of both sexes are selected from the Nehru Memorial Sampooraniammal School for Differently Abled and nearby Trust schools for differently abled. Group A of 15 subjects receives Vojta and Bobath approach, Group B of 15 subjects receives Pelvic stabilization exercises. Pre and post intervention were assessed by Pediatric balance scale and Modified Ashworth scale.

Result: Group A cerebral palsy children included in the study completed the 15 sessions of the Vojta therapy and Bobath approach were re-evaluated at the three-month follow-up. The two-tailed P value is less than 0.0001, by conventional basis; this distinction gave thought to be exceedingly statistically significant.

Conclusion: we conclude that the combined application of a Vojta therapy and Bobath has improvement of the body's balance during movements ("postural coordination") and spasticity reduction.

Keywords: Vojta, Bobath, Pelvic stabilization exercise, Paediatric balance scale, Modified Ashworth scale.

INTRODUCTION:

Sir John Little an English orthopaedics, earliest to describe the term "Cerebral Palsy" in his famous work of 1862. A new entity was defined and entitled as "Little's Disease". Cerebral palsy is a cluster ahead of non-progressive, but often changing. It's

insult to brain ¹. Symptom together with signs stretch from children to children which comprise poor coordination, solid muscle and myasthenia, tremor along with problems in sensation, vision, hearing, and communication. Frequently little one accompanying cerebral palsy own delayed

developmental milestone, so they cease flip over, settle down, creep plus step out, so soon as kids following their age group. Certain sign involves epilepsy, cognizable as well as perceptual issues, one and all turn out especially a fraction of three based on subjects accompanying Cerebral disorder. Signs easily seen early years in life ^{2,3}.

CP is damage to parts on brain alike leads to motility disorder, balance, as well as posture disorder ⁴. Complications occurring over course on gestation, in turn during childbirth or else shortly after birth. Often, the root is congenital brain malformations, Intrauterine infections, Intrauterine stroke, Chromosomal abnormalities, Hypoxic-ischemic insults, Central nervous system (CNS) infections ⁵. The pathologic findings for preterm infants are diffuse injury in deep cerebral white matter, forming like focal necrosis and grey matter lesions, particularly basal ganglia in full term neonates ⁶. Risk component consist of premature birth, underweight, contamination in the course of gestation just when toxoplasma rather measles rubella, strenuous childbirth including head injury in the time of first few years of life ⁷. About 2% based on congenital source. Cerebral Palsy are classified as Quadriplegic, Hemiplegic, Diplegic. Diplegic is regular particularly among cerebral Palsy. To give an instance, stiffness possesses spasticity, faulty coordination in walking undergoes ataxic cerebral palsy, rolling and twisting move will run into dyskinetic cerebral palsy ⁸. Diagnosis to be assisted early, investigation like cranial ultrasound, MRI, Neural examination ⁹. Every incidence appropriate to little's disease is stable in worldwide epidemiological studies the most common movement disorder in children. It occurs in 2.1 every 1,000 live births ¹⁰.

Vojta-Therapy is a dynamic neuromuscular treatment method based on principles of maintenance of postures through isometric contraction of muscles during point stimulation. Reflex locomotion activation is related to

therapeutically applied external stimuli with predefined, identical, as well as "automatically" available movement responses¹¹. Vojta describes 10 different zones to stimulate the pattern regarding movements in reflex movement. A light pressure on exact stimulus zone (muscles or bones) along with resistance to current motion is applied towards convulsive movement along with performance following certain rhythmic movement sequence. The Vojta method has two step as Reflex crawling (reclining alongside body to the ground as well as other side above) Reflex rolling (reclining even as well body to skyward also other side to the floor). Vojta method is activated through three main positions of inclined, dorsal decubitus and lateral decubitus ¹². Vojta therapy is effective in improving balance and coordinated muscular performance in addition to reduced chance ahead of fall. By this therapy, directed towards cerebral palsy rehabilitation, Vojta method enhance balance in addition to stimulate coordinated muscular activity ¹³.

Bobath concept is a neurological approach used in assessment along with management attributed to individuals with locomotion and postural control stir due to lesion in the central nervous system^{14,15}. The element of NDT as follows, 1. Therapist controlled facilitation of movement to provide optimal sensory input for improving postural control, 2. Motor patterns are normalized by trained movement quality which was termed as regaining "typical movement behaviour" ¹⁶. The aim as regarding therapy, stands to improve muscle tone and postural alignment from specific approach and to work with practice of specific, relevant, functional skills ¹⁷. Stretching exercises are also essential for controlling spasticity in hips. Therapists reduce muscle tightness and reduce discomfort caused by spasticity using stretching and stabilization exercises. The indicated exercises focusing on muscle

groups in respect to the hip flexors, adductors along with hamstrings ¹⁸.

METHODS

The study was conducted at JKKMMRF trust hospital and rehabilitation school, Komarapalayam. A sample of 30 cerebral palsy children with in 7 to 14 age groups are selected and divided into Group A of 15 participant receiving Vojta and Bobath approach and Group B of 15 participant receiving Conventional therapy. The therapy session of 60 min should be performed 5 days/ week which is continued for 6 months. The therapists regularly review the treatment program and the

frequency of therapy sessions according to the child's progress. The parameters used for the study was Paediatric balance scale and Modified Ashworth scale, both male and female are encompassed in the study, exclusion basis undergone any surgery within 12months, mental retardation, seizure episodes, flaccid CP, learning disability, botulinum toxin injections in the past 6 months.

PROCEDURE

Group A - The Vojta therapy and Bobath approach combined protocol

VOJTA THERAPY - Reflex creeping (crawling)

| POSITION | STIMULUS | RESPONSE |
|-------------------|------------------------------------|---|
| Ventral decubitus | Resistance to rotation of head | Activate entire body's musculature |
| | Calcaneus area on occipital side | Occipital side flexion of fingers in UL |
| | Epicondyle on elbow in facial side | Facial side extension of fingers in UL |

Dosage: 3 repetitions with 15-50sec activation

Reflex rolling

| POSITION | STIMULUS | RESPONSE |
|----------------------------------|---|---|
| Phase - 1 Supine lying | Resistance to rotation of head. Intercostal space 7 th /8 th | Activate entire body's musculature. Extension of spine. Flexion of the hip, knee and followed ankle dorsiflexion. |
| Phase - 2 Side lying | Acromion Anterior superior iliac spine | Extension of spine throughout rolling. Contrary flexion and extension movements of the over- and underlying arms and legs as well as increase in support function on the underlying shoulder progressing to the hand, and on the underlying pelvis progressing to the leg. |

NDT BOBATH APPROACH

NDT Bobath therapy retained as its objective the re- education of balance, Coordination and balance within the 3 physical exercises proposed and applied.

1. Quadruped imbalances
2. Imbalances from kneeling posture
3. The cervant knight

Dosage

10 repetitions; Sets: 2, with 30 s rest between sets

Group B PELVIC STABILIZATION EXERCISES

Pelvic stabilization exercise like

1. Clam exercise
2. Leg lift table top exercise
3. Table top arm lift exercise
4. Leg lift exercise
5. Bridging exercise

RESULT

Descriptive statistics for paediatric balance scale- Group A and Group B

| Group | PBS | Mean | Standard deviation | Paired t- test |
|---------|------------|------|--------------------|----------------|
| Group A | Pre-test | 32.8 | | |
| | Post- test | 44.3 | 1.92 | 5.94 |
| Group B | Pre-test | 30.3 | | |
| | Post- test | 36.2 | 6.1 | 2.86 |

Descriptive statistic for Paediatric Balance Scale scale in Group A shows

that paired 't' test values of pre-Vs post-test values of Group A was 5.94 at 0.05%

level which was greater than tabulated 't' values (2.13). Group B shows that paired 't' test values of pre-Vs post-test values of Group B was 2.86 at 0.05% level which was greater than tabulated 't' values (2.13). This showed alike therein significant difference between pre-Vs post test results of Group A and Group B for

PBS. This exposed that there was significant improvement in post – test mean values in response to PBS in Group A and Group B.

RESULT- Paediatric Balance Scale (POST TEST ANALYSIS)

| Paediatric Balance Scale | Mean | Mean difference | Standard deviation | Unpaired t- test |
|--------------------------|------|-----------------|--------------------|------------------|
| Group A | 44.3 | 6.13 | 2.16 | 2.83 |
| Group B | 38.2 | | | |

The above table shows the post-test analysis result in PBS for Group A and B. The mean value of Group A is 44.3 which was greater than Group B value of and the unpaired 't' test value was 2.83 at 0.05% level, which was greater than

tabulated 't' value (2.15). It showed statistical significance difference between mean values of Group A and B.

Descriptive statistics for Modified Ashworth Scale- Group A and Group B

| Group | MAS | Mean | Standard deviation | Paired t- test |
|---------|------------|------|--------------------|----------------|
| Group A | Pre-test | 2.46 | 0.20 | 5.75 |
| | Post- test | | | |
| Group B | Pre-test | 1.77 | 0.21 | 3.69 |
| | Post- test | | | |

Descriptive statistic for Modified Ashworth scale in Group A shows that the paired 't' test values of pre-Vs post-test values of Group A was 5.75 at 0.05% level which was greater than tabulated 't' values (2.13). Group B shows that the paired 't' test values of pre-Vs post-test values of Group B was 3.69 at 0.05% level which was greater than tabulated 't'

values (2.13). This showed that there was significant difference between pre-Vs post test results in Group A and Group B. There was a significant improvement in post – test mean value in response to Modified Ashworth Scale.

RESULT- Modified Ashworth Scale (POST TEST ANALYSIS)

| Modified Ashworth Scale | Mean | Mean difference | Standard deviation | Unpaired t- test |
|-------------------------|------|-----------------|--------------------|------------------|
| Group A | 1.3 | 0.47 | 0.21 | 2.25 |
| Group B | 1.78 | | | |

The above table shows the post-test analysis result in PBS for Group A and B. The mean value of Group B is 1.78 which was greater than Group B value of 1.3 and the unpaired 't' test value was 2.25 at 0.05% level, which was greater than tabulated 't' value (2.15). It showed statistical significance difference between mean values of Group A and B.

therapy and Bobath on balance in Spastic cerebral palsy. The paediatric balance scale and Modified Ashworth scale were taken as the parameters to assess the balance and spasticity. The study sample comprised of 30 patients of age group 7 – 14 years grouped as A and B. In each group 15 subjects participated. Group A with Vojta therapy and Bobath approach whereas Group B with Pelvic stabilization exercises.

DISCUSSION

The purpose of the study was to determine the effectiveness of combined Vojta

Michael Wilhelm Jung conducted a randomised controlled trial with Vojta

therapy and neuro developmental treatment in children with infantile postural asymmetry. 19 participants receiving Vojta and 18 participants received Neurodevelopmental Treatment. The study concluded that both Neurodevelopmental treatment and Vojta are effective for spastic cerebral palsy ¹⁹. The result of statistical analysis brings out the following for consideration.

In the analysis and interpretation of PBS in Group A and Group B for 15 patients in each group

The unpaired t test value of PBS in Group A and B post- test analysis was 2.83 which was greater than the tabulated t value 2.13.

In the analysis and interpretation of Modified Ashworth scale in Group A and Group B for 15 patients in each group

The unpaired t test value of MAS in Group A and B post- test analysis was 2.25 which was greater than the tabulated t value 2.13.

The result showed that there was statistically significant difference between Group A and B. The Hemiplegic cerebral palsy children who were treated with combined Vojta and Bobath therapy had shown good improvement in balance, coordinated muscular activity and reduction of spasticity.

CONCLUSION

The study concluded that combination of Vojta and Bobath approach was effective treatment for balance in spastic cerebral palsy. Paediatric balance scale and Modified Ashworth scale could be used as assessment tool for cerebral palsy.

Declaration by Authors

Ethical Approval: Approved

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