

The cognitive approach of occupational therapy and functional approach of Physiotherapy for motor developmental delay –Single case study

Prof Dr. CK Senthil Kumar 1*, Prof. Ranjeeta Behera 2

1 Director, North East Christian University, Centre for Medical Education and Research, Nagaland. INDIA.

2 Centre for Medical Education and Research, North East Christian University, Dimapur Nagaland, INDIA.

*Corresponding author - Director, North East Christian University, Centre for Medical Education and Research, Dimapur, Nagaland

Introduction

Motor developmental delay is considered to be a good prognosis condition out of all other developmental delay and the intervention focus predominantly on movement. When a child fails to meet one or more developmental milestones related to motor, speech and language, social functioning, or daily living skills [1-4]. Treatment for Motor developmental delay is a continuous process and needs tailor-made strategies and flexibility in treatment protocol to counter problems that keep changing as the child grows. The earlier the child gets medical attention better the prognosis of the ailment (5). Incidence reports that a diagnosis of developmental delay occurs in up to 15% of children under age five, with the incidence increasing from 12.84% to 15.04% over the past 12 years [6] Motor developmental delay is diagnosed as early as the age of 6th month when the child fails to attain neck control and subsequent motor developments. In certain cases where there are significant deficits of the motor system governing the lower limb, the ailments are manifested quite late in the child's life compared to gross motor deficits. There are various reasons for the ailment but the most common reason is improper development of the motor cortex or the subcortical motor structures. This may be a developmental disorder or congenital anomaly. But the gross symptoms of both types remain almost the same. There may be slight variations as far as the prognosis is concerned.

Parents used to identify at the time of 14 months to 18 months that the child is not able to walk or stand and is unable to keep pace with the peer group. In allopathic management for motor delay, there is no intervention promoting or enhancing the function of the motor system. Symptomatic management and physiotherapy are the predominant management. Botox is also a widely practiced medicine to relieve spasticity but the latency period of benefit with Botox is 6 to 9 months, making it a temporary solution to such problems.

In this case study one Child who was admitted to a private clinic with pure motor developmental delay was taken up to throw more light on the effectiveness of integrated therapy of occupational therapy and physiotherapy. In the current scenario where both physiotherapy and occupational therapy are flourishing as two different successful professionals, the integrated approach is becoming thin and hence we felt the need for emphasizing such an integrated approach through a case study.

Methodology –

The subject aged 12-year-old female was taken up for rehabilitation in a private clinic in Chennai on 10 April 2022 with the following complaints

1. Inability to sit without support for more than 5 minutes
2. Inability to assume an upright posture and stand
3. Inability to straighten both knees
4. Inability to use both hands for functional activity
5. Inability to move freely in bed (lack of unaided log rolling)

Apart from the above complaints the subject was diagnosed with a high BMI which was 28(overweight) (limitations were there in finding the height of the subject due to the inability to assume an upright posture and bilateral knee flexion deformity).

Motor problem list assessed by a physiotherapist (PT)

1. Bilateral Extension lag (knee was fixed at 60⁰ flexions on supine lying)
2. Adductor tightness and spasm
3. Patella was fixed and there was only grade I mobility of the patella
4. Calf muscle tightness
5. Foot hypersensitive (may be due to lack of axial loading)
6. Foot deformity in pes-planus, equines, and varus deformity
7. Elbow in flexion deformity (due to tight biceps and weak triceps)
8. Lack of prehension and precision activities of bilateral hand

Cognitive Problem list assigned by an occupational therapist (OT)

1. Lack of motivation
2. Lack of peer group participation
3. Reduced attention span
4. Reduced explorative attitude
5. Presence of proprioceptive sensory seeking was identified by OT which was a significant finding which was missed out in the PT assessment

Procedure –

The subject consulted a pediatric physician and was referred for rehabilitation. Then there was a case presentation held with an OT, PT, social worker, and parents. Various concepts were discussed and elaborated. An integrated approach evolved and the patient's parent also took part in the later stages of the discussion to make sure the feasibility of the subject to execute the thus-evolved treatment plan. After considering the valuable opinion and suggestions of the experts and the constraints of the patient's parents the following treatment plan was devised.

Physiotherapy treatment provided**First week**

1. Passive stretching to the hip flexors (iliopsoas), knee flexors (hamstrings), calf muscles, elbow flexors (biceps brachii, brachialis, and brachioradialis), and intrinsic and extrinsic hand muscles.
2. Passive range of motion of all the joints following stretching.
3. Active assisted movements were provided once the kid's passive range was free, this was done for every ten degrees.
4. Trunk movements were trained in high sitting (sitting without placing feet on the ground on a high couch) with backrests. The patient had an apprehension to sit without support in high sitting due to fear of falling.

2nd week

1. Same lines of treatment as prior but limited to knee, hip, and elbow
2. Active free range of motion training was done using a re-education board and suspension slings where the muscles were trained in the outer, middle and inner ranges gradually.
3. Splints were used to make the patient assume long sitting (sitting with both legs straight.)
4. Night splints were used to reduce knee fixed flexion posture.
5. Postural modification was trained in sitting in front of a postural mirror to encourage symmetrical sitting.

3rd week

1. Continuation of the above-mentioned exercises where ever needed
2. Functional training and community participation was emphasized
3. Patient was made to assume an upright posture as satisfactory weight reduction was achieved with ayurvedic treatments, exercises, and diet
4. A hip-knee-ankle foot orthosis was used initially by the patient as instructed by the previous PT, which was replaced by knee-ankle foot orthosis as a fair amount of hip control was attained.
5. Abdominal muscle strengthening and back muscle strengthening provided
6. Gait training in parallel bars was provided
7. Reciprocating gaiter was used to do assistive walking using the orthosis.
8. Breathing training to improve cardiorespiratory endurance during walking.
9. Deep relaxation techniques were taught and practiced daily

Cognitive rehabilitation by the OT

1. Promote peer participation
2. Setting up exquisite and exploratory rooms to motivate the cognitive pursuit of new activity and exploration.
3. Usage of hand and improving perceptual capabilities of the hand
4. Cognitive counseling to both patients and parents
5. Functional training and community participation was emphasized

Outcome measures

1. **Functional independence measure scale**
2. **Barthel index**

The outcome measures were used before the first set intervention on 20 January 2013 and the post-test was done after the third set intervention on 13th September 2013

Results

The results shown at the end of the third set of intervention was very encouraging as the patient was able to walk on supervision.

The scores on the outcome measure showed a significant difference

Functional independence measure scale (Total score 126)	Barthel Index (Total score 100)
<ul style="list-style-type: none"> • Eating • Grooming • Bathing • Upper body dressing • Lower body dressing • Toileting • Bladder management • Bowel management • Bed to chair transfer • Toilet transfer • Shower transfer • Locomotion (ambulatory or wheelchair level) • Stairs • Cognitive comprehension • Expression • Social interaction • Problem solving • Memory 	<ul style="list-style-type: none"> • Feeding • Bathing • Grooming • Dressing • Bowels • Bladder • Toilet use • Transfers (bed to chair and back) • Mobility (on level surfaces) • Stairs

Scale	Pre test score	Post test scores
1. FIMS	62	78
Barthel Index	50	65

Conclusion –

This study concludes that motor developmental delay can be treated successfully when an integrated approach is adopted. Occupational therapy and Physiotherapy when combined and administered the patient showed a good prognosis. Further research is required to come out

with the difference in treatment effect using an integrated approach as compared to an individual treatment approach. The same can be applied in other conditions also.

Patient perspective – “At the start of the program the orientation was very useful to both me and my parents as it clarified many myths. The rigorous but enjoyable OT and PT sessions made my day happy and helped me to reach out to many friends and school activities became so easy.”

References

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