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FUNCTIONAL REHABILITATION OF DELAYED DEVELOPMENTAL MILESTONES WITH INTEGRATED APPROACH – CASE REPORT

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ABSTRACT:

Delay in development of language, thinking, social or motor milestones is called developmental delay. Developmental delays are common in childhood, occurring in 10%–15% preschool children. Delay in development is caused by impairment in any of the following distinct domains, such as gross and fine motor, speech and language, cognitive and performance, social, psychological, sexual, and activities of daily living. It can be isolated (involving a single domain), multiple (involving two or more domains), or global (affecting most of the developmental areas). In order to avoid long term disability, early detection, and intervention is essential. Early and easy detection of mile stone delay are inability to hold head and neck at 3 months of age and sit without support by 9 months. This paper presents a case report of child aged16 months with delayed developmental milestones functionally rehabilitated with integrated approach. Child could not crawl or stand with support, could only sit without support at 16 months of age. Early diagnosis, multidisciplinary approach and appropriate early intervention are essential. With integrated treatments of Ayurveda and Physiotherapy the results were encouraging giving the child more physical freedom; the same is presented in detail.

Keywords: Delayed developmental milestones, developmental delay, functional rehabilitation, integrated treatments,

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INTRODUCTION:

Development is defined as maturation of functions. It denotes acquisition of a variety of competences for optimal functioning of the individual.[1]Developmental delay occurs when a child does not achieve developmental milestones in comparison to children of the same age.The degree of developmental delay can be further classified as mild (functional age < 33% below chronological age), moderate (functional age 34%–66% of chronological age) and severe (functional age < 66% of chronological age). The delay can be in a single domain (isolated developmental delay) or more than one domain. Delay can be in speech and language development, motor development, social-emotional development, and cognitive development. A significant delay in two or more developmental domains affecting children under the age of five years is termed global developmental delay. Parents play an active role in helping their child's recovery to maximum functionally. Early diagnosis and regular rehabilitation of delayed developmental milestones (DDM) is the key for optimal recovery.[2]

AETIOLOGY:

The aetiology for the vast majority of DDM is idiopathic and multi-factorial. Factors that may contribute can occur before/during or after child birth. These could include genetic or hereditary conditions like Down syndrome, metabolic disorders like phenylketonuria (PKU), trauma to the brain, such as shaken baby syndrome, severe psychosocial trauma such as post-traumatic stress disorder. Exposure to toxic substances like prenatal alcohol or lead poisoning or severe infections or deprivation of food may cause developmental delay.[3]

DOMAINS EFFECTED:

There are many different signs and symptoms of delay that can exist in children and often vary depending upon specific characteristics. Few present with early signs in infancy, but in other cases they may not be noticeable till child reaches school age. Some of the most common symptoms can include learning and developing more slowly than other children of same age. Rolling over, sitting up, crawling, or walking much later than their peers. They can also face difficulty in communicating or socializing with others, lower average IQ score, difficulty in talking or talking late, problem remembering things, inability to connect actions with consequences. They may also present with or difficulty with problem-solving or logical thinking, trouble learning in school, inability to do everyday tasks like getting dressed or using the restroom without help. Delays can affect a child's physical, cognitive, communication, social, emotional, speech and behavioral skills. Often, developmental delays affect more than one area of a child's development. When a child has delays in many or all of these areas, it is called global developmental delay. Some developmental delays have an identifiable

cause. But for most children, the cause of the delay, or multiple delays, is not clear.[4]

CASE DETAILS:

A 16-month-oldchild was brought to Jayalakshmi integrated rehabilitation unit, SGS Hospital by his parents with complaints of inability to stand and walk even with support along with neonatal brachial plexus injury of right hand.

On examination:

- Right arm was diagnosed as brachial plexus injury (erb's palsy). Resting arm position was internally rotated, adducted, elbow extended, forearm pronated and no tone from elbow joint to fingers.
- Passiverange of motion (PROM) of right shoulder was full except for final degrees being restricted and painful. Active range of motion was 90 degrees at shoulder and no active movements at elbow, wrist, metacarpo-phalangeal joints or inter-phalangeal joints.
- PROM of right upper limb - elbow, wrist, and fingers were full and free. There was no grasp reflex. Regular Physiotherapy was taken since 1 month of age.
- Physical developmental milestones were delayed. Respective expert evaluation revealed developmental delay in speech and low IQ score as well.
- Physical delay was observed in standing and walking. There was obvious weakness below low back as baby was not able to hold hip joint in neutral position, even while standing with support. Only neck control and sitting without support was achieved by 16 months of age.
- Muscle power was zero for all the muscle groups of right upper limb below elbow and both lower limbs.[5]

Past history:

According to patient's mother, forceps assisted vaginal delivery was performed. Both mother and baby were healthy following the delivery. On day 2 parents noticed that the baby was not using his right upper limb completely and it was later diagnosed as Erb's palsy by paediatrician and suggested for physiotherapy. With progressing baby's age, delayed motor mile stones were also observed by parents. When baby was first examined at SGS hospital child could sit without support and flex right shoulder up to 90 degrees; child could not crawl, stand or walk.

Procedures administered to the patient:

Delay developmental mile stones rehabilitation is explained in table-1. Erb's palsy/Neonatal brachial plexus injury was treated according to protocol followed at SGS Hospital.[6,7] Integrated treatments of Ayurveda and Physiotherapy were selected for the patient. *Abhyanga*, *Shastikashalipinda sweda* as Ayurveda treatments; stimulation and exercises as Physiotherapy treatments were selected for the patient.[8] Patient was treated in three divided sessions each session of 10 days duration.

- Quantity sufficient of indirectly heated *Balaswagandhadi Tailam* was applied in *Anuloma Gati* (downward) for 15 min
- 20 g of *Bala Mula* (roots of *Sida cordifolia* Linned.) was processed with 500 ml of *Ksheera* (milk) where in milk was

boiled to reduce the quantity to half and filtered. *Shastikashalipinda sweda* was done in gentle circular movements for 20 min in *Anuloma Gati*.

- Electric stimulation was given to both lower limbs and exercises were encouraged aiming at optimal physical freedom.

Table 1: Procedure of both the modalities

Treatment Modalities	Procedure followed
Ayurvedic treatment – *Bahyopakrama* *Abhyanga*	Application with *Balaswagandhadi Tailam* to low back and both lower limbs.
Shastikashalipinda sweda	*Shastikashalipinda sweda* was performed for 30 minutes using *Ksheera* processed with *Bala mula churna.*
Physiotherapy– Electrical stimulation Faradic stimulation	To the motor points of both lower limbs.
Exercises	To all the muscle groups of right upper limb for various movements' i.e. deltoid, biceps, triceps, flexor and extensor muscle group of wrist.

RESULTS:

After first session of integrated treatments, the muscle power improved from zero to two [Figure-1]. Child was encouraged to stand and walk few steps holding furniture. After second session child was able to stand without support and walk with minimal support. Electrical stimulation was discontinued after second session as the muscle power had improved to grade 3.After third session child was able to walk independently. With three sessions of *Bahyopakrama*, and two sessions electric stimulation muscle power was improved optimally i.e grade 4 from 0.Before treatment, patient was not able to stand or walk even with support. After treatment, patient could walk independently, run and climb stairs with minimal support [Table-2]. As the integrated treatments are aimed at gaining physical freedom, rehabilitation was designed to achieve optimal physical freedom to move around like other kids of the same age.

Table 2: Effect of therapy

Session	Result
Before treatment	Not able to stand or walk properly even with support. Patient was dropping down though made to stand with support.
After	Able to stand and walking with support of furniture. Able to stand from kneeling

1st session	position with support.
After 2nd session	Able to stand without support for 10-15 seconds and walk with minimal support.
After 3rd session	Able to stand and walk independently, without any support. Able to do stair case climbing with help of one hand(either right or left) with support of railing

Figure-1: Result, before treatment and after treatments

DISCUSSION:

Developmental delay is mainly of concern for parents when child is around 1-1.5 years of age when child is not able to stand or walk like their peers. This condition may be considered as *Apatarpana Vata Vyadhi* (diseases with deprived growth of body tissue caused due to *Vata Dosha* vitiation).[8,9]As delayed milestone aetiology is multifactorial and the symptoms affecting can be in multiple domains. Hence treatment choice is made on *Dosha* and *Dathu* involvement and symptomatic presentation. Therefore the choice of treatment is *Santarpanachikitsa* (nourishing treatment). There is weakness of back and both lower limb muscles i.e. *Ksheenata* and *dourbalyata* of *Mamsa dhatu* and *Vata Dosha* involvement. *Santarpana bahyopakramas* (nourishing external treatment modalities) such as *Balaswagandhadi tail* (Ayurvedic medicated oil) *Abhyanga* (oleation therapy) and *Shastikashalipinda sweda* [(SSPS) - strengthening sweating procedure] were opted. *Balaswagandhadi Taila* has *SantarpanaGunas* (with *Prithvi* and *Ap Bhutas*) which is indicated for *Balya* and *Vata* involvement.[8,9]*Abhyanga*[10,11]

mitigates *Vata Dosha* (*Vata Hara*), promotes strength (*Pushtikara*), sleep (*Swapna*), growth/ stouten (*Bhruhatwakrit*).

Ksheera has *Guru, SnigdhaGunas* and acts as *Balya, Jeevaniya,Rasayana, Vrishya* and *Medhya*.[12]*Shashtikashali* is best among *Shali, Balya, Varnya* and *Tridoshahara*.[13]*Bala Mula* (roots of *Sidacordifolia*Linn.) has *Guru, Snigdha* and *Pichchila Gunas*, with *Balya* and *Vata Hara* actions.[9]*Bala Mula*was processed with *Ksheera*. *Shastikashali* was cooked very soft and made *pottali* and dipped in *Ksheera Yukta Bala Mula*. *Pottali* was moved gently in *Anuloma Gati* (downwards/away from body). *Abhyanga* and SSPS were performed in *Anuloma Gati* because the *Dosha* involved is *Vata* as there is *Dhatu dourbalyata* (muscle weakness). Considering the *Dosha* and *Dhatu* involvement *Vataniyantrana* and *Balya* treatments are selected and movements were performed in *Vata Anuloma Gati*. All *Dravyas* are *Santarpana* in nature and *Vata Hara*, thus facilitated in improving the condition.

In Physiotherapy all treatment modalities are given externally to maintain physical health. Electrical stimulation (physiotherapy modality) and strengthening exercises were designed for two sessions.[14] Considering the age of the patient *Santarpana Bahyopakrama*[10,11] were selected as treatment for this case. The route of administration is external in both the systems to enhance the cumulative effects, where strengthening back and both lower limb muscles were obtained with Ayurveda treatments. Physiotherapy helps to rehabilitate and use the improved muscle nourishment and strength. Most developmental delays are time-limited. However, prevention of the delays and shortening their duration can avoid muscle tightness and deformities in severe cases. Few kids may also present with one or more deformities like genu recurvatum, scoliosis, meta tarsus varus or pes planus due to muscular weakness and weight bearing. When muscle power is not sufficient to support the joints then child can present with above mentioned deformities. To avoid permanent deformities that change joint alignment and threaten deformities for lifetime, early intervention is most essential to lead a near normal life.

CONCLUSION:

A 16-month-old child with delayed developmental milestones aiming at optimal physical freedom was rehabilitated integrating Ayurveda and Physiotherapy modalities. After treatment child is able to stand, walk, run and climb stairs independently.

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