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Case study

Physiotherapy rehabilitation of 3-year-old girl having spastic diplegic cerebral palsy

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ABSTRACT

Cerebral palsy is a concept that denotes a collection of long-term motion and posture disturbances that hinder daily tasks. The incidence has been estimated to be between 2 and 2.5 per 1000 live births. Non-progressive reforms with in brain's progress across foetal or child advancement are viewed as evidence of this disorders. Cerebral palsy can be segregated into certain sorts of motor impediments relying on their topography: Diplegia, hemiplegia, quadriplegia, monoplegia, and triplegia. Such patients seemed to have cognitive, sensory, or motor illness. It has an effect on motion, posture, and physical activity as well. Supplemental abnormalities such as spasticity, which have an effect on general health and makes studying fresh chores distressing, are also prevalent in children with CP. Spasticity is a pervasive feature of a CNS lesion. This leads to issues with functionality. Medical surgical and physiotherapeutic approaches such as stretching, positioning, manual therapies such as massage, MFR, MET and Cryotherapy are also used along with a few other physiotherapy approaches to alleviate spasticity. MFR and cryotherapy have been shown to help children with CP counteract spasticity. The objective of this project is to focus on the perks of physiotherapy restoration in cerebral palsy, along with the influences of MFR and cryotherapy on spasticity in the limbs in a 3-year-old girl with spastic diplegic cerebral palsy. The key concerns of the patient were hurdle in rolling and crawling, failure to stand and sit without aid, and spasticity. When the assessment was performed using GMFCS and spasticity by MAS and MTS, the diagnosis of spastic diplegic cerebral palsy was ascertained. It has been claimed that physiotherapy care is viable in fulfilling intended outcomes. The following are the outcomes: Cryotherapy and Myofascial Release technique were used to manage spasticity, as well as ROM exercises, gradual passive stretching, balance training, swiss ball exercises, weight bearing exercises, orthosis, and a decent home fitness regimen. The analysis revealed that physiotherapy measures like those of cryotherapy and myofascial release technique had a promising effect on improving spasticity and raising ability to stand, roll, partial neck control, crawl, balance posture, and stand with AFO help.

Keywords: Cerebral Palsy, Spastic diplegic, Physiotherapy Intervention, Modified Ashworth Scale.

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INTRODUCTION

CP is a category of chronic motor and posture dysfunction by nonprogressive disruptions in the growing brain. Frequently followed by sensory, learning, speech, vision, actions, or epileptic disturbances. The incidence has been estimated to be within 2 and 2.5 per 1000 living births. [1]. There had been reliable evidences of increases in the frequency of cerebral palsy and its magnitude throughout living births around the 1980s and 1990s, especially in premature babies. Refinements in success ratio constitute the majority of the increases in cerebral palsy incidences, as the occurrence of low birth weight and birth weight specific prevalence of cerebral palsy within babies weighing 2500g or over appear to be relatively steady. Spasticity is characterized as a stretch tolerance that varies with pace. Risk to that pyramidal areas of the brain causes spastic CP. [2,3]. Muscular spasticity and contracture cause joint and bone changes in cerebral palsy. The spinal and lower extremity joints are by far the most likely observed. Increased muscular tone causes absolute muscle maturity regression which can lead to performance issues. Ambulation, bed placement, seating, bench height, movements, transitions, and standing up are all affected by spastic disfigurements to the lower limbs. Although there are three possible goals for addressing spasticity: improving efficiency, reducing the threat of complications, and relieving agony Spasticity is a common symptom of a CNS lesion. This leads to issues with functionality. Medical, surgical, and physiotherapeutic interventions are all options for treating spasticity. Stretching, antagonistic muscle enhancing, alignment, restrictive casting and bracing, and body weight workouts are some of the most popular physiotherapy methods for reducing spasticity. Together with

all the several physiotherapy methods, certain manual procedures like massage, myofascial release (MFR), and acupressure are included. “The enablement of physical, neural, and neurophysiological adaptation and mitigation as configured by the myofascial system” is how myofascial therapy is described. [4]. Deep Myofascial Release is used to break down walls inside the fascia's deepest layers. This would be accomplished by stretching the fascia's elastic muscular frameworks and growing the viscosity of only the fascia's underlying tissues. Pressure, mobility impairment, spasm, spasticity, intellectual disabilities, such as cerebral palsy, head and birth disorder, cardiac complications, and scoliosis are all disorders or diagnoses that myofascial release techniques are used to treat. Cold therapy is a treatment option for a variety of immediate and severe ailments. Cold therapy facilitates a number of tissue-based benefits, involving post-injury inflammation and edema reduction, improved regional circulation diminished tissue-induced acute inflammation muscle spasm decline, and pain modulation. Another effect of cold therapy is a decrease in time-related spasticity after even a period of ice application. The body may well be offered ice in a variety of contexts including by immersing itself in cold water, using ice cubes or ice packs, or using cooling sprays including ethyl chloride.

MATERIAL AND METHOD

Patient information

The investigation portrays an observation of a 3-year-old minor girl who is greatly harmed by spastic diplegia, and the stage V spastic diplegic cerebral palsy is ascertained utilizing GMFCS measurement scale. The child was conceived full term with breech presentation, as per the mother. Well after birth, the baby didn't yell. The baby was therefore admitted to the NICU for three days after birth. The baby was released from the hospital on the fourth day after birth. At home, the baby was fine for two days. Parents identified the baby was passive on the sixth day in the evening, and after some time she began experiencing seizures, so she was rushed to a private clinic for seven days, where she recouped and was finally released. Her parents explored she was insufficient to hold her neck, roll, and do other tasks at the age of three months, so they took her to the specialist, where she was attributed to a Neuro-physiotherapist. At the age of three months, the baby was recognized with Cerebral Palsy, and physiotherapy care began in earnest.

The patient is a three-year-old girl with spastic diplegic Cerebral Palsy. On MAS, the patient has 3 grade muscle tone. She is a GMFCS level V. Gross motor abilities are however hampered. Her upper extremities are impaired as she undergoes fine motor skills. Plantar-flexors, hamstrings, hip adductors, and internal rotators have risen tone and spasticity. In addition, patient has truncal balance troubles. The patient is highly dependent on parents and siblings and may not prosper without them. Her social skills were disrupted by her age. The cardiorespiratory system was in good working order.

Physiotherapy intervention

The girl endured physiotherapy treatment in the Neuro-Physiotherapy OPD for a time frame of 4-5 months with the intention of reducing her spasticity and boosting her proficiency to sit and stand, roll, crawl, and manage her head and neck. To alleviate spasticity cryotherapy and myofascial release techniques have been used. For the calf muscle, the Myofascial Release technique will be performed in a prone position with a 120-second clock. To deliver the MFR, finger pads were meant to fall across the middle part of calves. This would sustain the tissue softening for 120 seconds, and then extend laterally myofascial structures until the first fascial barrier. MFR will be given 15 minutes. The client will be in a prone position whilst delivering cryotherapy to the muscle. The whole lower limb shall remain uncovered with caution and decency, and the child's skin sensitivity should be tested to confirm that neither of them has an affected skin sense. To avoid excessive specific chilling (ice burning), an ice pack (Compress Reusable Cold Gel Pack) is placed topically of the treatment region over a wet towel; dry toweling will hold the pack in place. The skin beneath the cooling medium is checked within a minute after administration to monitor for side effects and often unusual skin color variations. If the early study revealed no discomfort, it will be reiterated after 5 minutes. The cold pack will be introduced about 20 minutes, later removed and the skin should be dried. Learning on swiss ball to and fro activities is yet another physiotherapy recovery strategy. Stretching was also started slowly and passively. [5,6]. The patient did regular load training procedures in the type of fixed load handling the entire treatment plan was designed to improve truncal balance and movement transitions while maintaining adequate safety precautions. She was fitted with an Ankle Foot Orthosis (AFO) with limited reinforcement to help her preserve her balance whilst standing. The child's mother was taught how to follow correct procedure while conducting home workout regimen.

Figure 1: Swiss ball exercises a

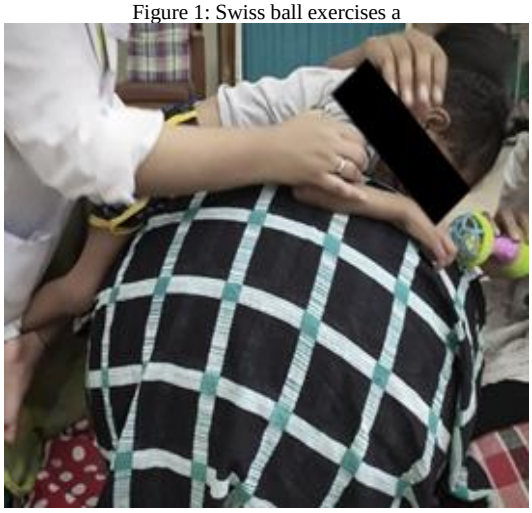
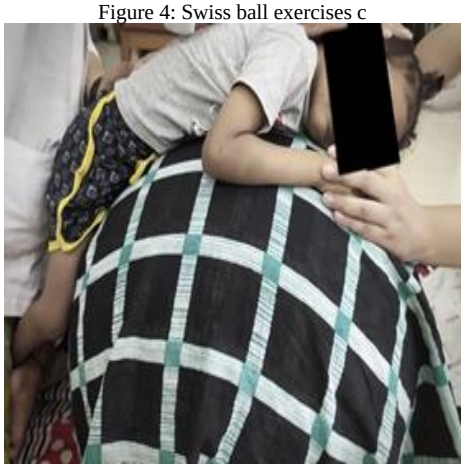


Figure 2: Standing exercises

Figure 3: Swiss ball exercises b

Figure 4: Swiss ball exercises c



RESULT

A substantial decrease in spasticity could be seen after a 5-month physiotherapeutic approach. Rolling, partial neck power, and creeping abilities have also been enhanced. With the assistance of an ankle foot orthosis (AFO) that provides minimized aid she can also stabilize her stance and stand.

DISCUSSION

Cerebral palsy (CP) is a term used to describe a group of severe movement and body position functional problems that cause performance dysfunction due to nonprogressive defects in the foetal or infant brain's growth. CP affects 2.5 percent among all live births worldwide, and the severity of this condition varies depending on the degree of inclusion, such as hemiplegia or diplegia, as well as age and surgery. Diplegia is by far the most popular form of CP, accounting for 30–40% of cases, led by hemiplegia (20–30%) and quadriplegia (10–15%) in several cases. Spastic diplegia is exacerbated by preterm birth and low birthweight. Cystic periventricular leukomalacia is shown by a brain imaging analysis (PVL). In preterm births, PVL is perhaps the most widely accepted ischemic brain injury. Ischemia emerges in the white matter close to the lateral ventricles. The cause of cerebral palsy in infants is unclear. [7]. Low birth weight, birth asphyxia, premature placental segregation, and irregular foetal position have all been linked to this disorder. Magnetic resonance imaging (MRI), the gold standard for exploring brain trauma in CP, has focused primarily upon the relationship between certain extent of periventric leukomalacia and visuo-spatial functions, demonstrating a strong link between the expansion of periventric white matter damage to the parietal and occipital regions and the magnitude of vision disability. Medical analysis is used to diagnose CP. [8,9].

In CP instances, the GMFCS is required to explain gross motor control. In clinical practice, CP is diagnosed primarily by interpretations of complaints such as sitting, walking, pulling to stand, posture assessment, deep tendon reflexes, and muscle tone. Neurological anomalies that appear in preterm births during the initial few months of life can disappear within the first year or two. The essence of the activity condition, such as spasticity, ataxia, dystonia, and athetosis, as well as the topographic arrangement of the motor disturbances, all contribute to the diagnosis of CP. Spasticity is perhaps the most famous disorder seen in preterm births that can be diagnosed clinically. Spasticity is portrayed as improved resistance to passive muscle stretch caused by velocity or abnormal voluntary muscle activity caused by upper motor neuron paralysis. Physiotherapy assists in the progression of skills that are important in everyday activities. Treatment through physiotherapy improves the physical and functional condition of children with cerebral palsy. Cryotherapy and wrapping procedures have been integrated to minimize lower extremity spasticity in hemiplegic CP, according to some studies. Spasticity reduction in upper motor neuron lesion and muscle retraining to facilitate muscle contraction have also been shown to be beneficial with cold therapy. Quite few studies have shown that stretches, in addition to MFR, is more effective in reducing spasticity in spastic CP children compared to stretching alone. MFR was found to have rewards in some children with cerebral palsy, including reduced spasticity and improved body symmetry and range of motion, according to Sandra L, et al (2010). In children with cerebral palsy, myofascial release can help to reduce spasticity and improve quality of life. According to a study, muscle tone measured with the Ashworth scale improves

in children with CP until they are 4 years old, then declines until they are 12 years old. A popular multidisciplinary intervention technique is physiotherapy reintegration. A progressive resistance training program will aid in the development of muscle strength over time. Range of motion exercises are performed to improve joint mobility. To avoid joint contractions, the patient's joint is stretched in a static and gentle manner. Stretches like these should be done in a functional capacity that is pain-free ROM. A team of healthcare professionals, including physical therapists, orthopedic surgeons, and orthotists, collaborates on the creation and implementation of exercises that strengthen posture, balance, gait, and mobility. [10].

CONCLUSION

According to the findings of this research, physiotherapy techniques such as cryotherapy and Myofascial Release technique aid in the management of spasticity, while ROM exercises, gradual passive stretching, balance training, Swiss ball exercises, and weight bearing exercises, orthotics, and a proper home exercise regimen improved gross motor functions and social skills.

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