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ORIGINAL ARTICLE

EFFECTIVENESS OF MYOFASCIAL RELEASE IN REDUCTION OF HAMSTRINGS SPASTICITY AMONG DIPLEGIC CEREBRAL PALSY CHILDREN	Search engine: **www.ijmaes.org**

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Abstract

***Background and Objective**: In spastic diplegic cerebral palsy, spasticity of limbs will result in reduced range of motion of joints and that may limit the functional recovery of the patient. Main objective of the study is to find the effect of myofascial release technique in reduction of spasticity in spastic diplegic cerebral palsy children. **Methods:** A random sampling method is used to select 15 patients with diplegic cerebral palsy. The subjects have underwent myofascial Release for reducing spasticity of hamstrings and to thereby improve knee range of motion. The outcomes are measured by the MAS and goniometry for hamstrings spasticity and knee passive range of motion respectively, on both side limbs. **Results:** Wilcoxon signed rank test has been used to find the significance of MAS score and PROM between pre and post in the group . Intra group analysis, showed reduction in spasticity and improvement in range of motion (p<0.005). **Conclusion:** This study concluded that myofascial Release is effective to reduce spsticity in spastic diplegic cerebral palsy children.*

***Keywords:** Spastic Diplegic Cerebral palsy, Myofascial Release, Modified Ashworth Scale (MAS)*

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INTRODUCTION

Cerebral Palsy is defined as a "non-progressive but not unchanging disorder of movement and/or posture, due to an insult or anomaly of the developing brain[23]. Cerebral palsy is the commonly used name for a group of conditions characterized by motor dysfunction due to non-progressive brain damage early in life. There are many causes of the brain damage, including abnormal development of the brain, anoxia, intracranial bleeding, excessive neonatal asphyxia (hypoxic ischaemic neonatal encephalopathy), trauma, hypoglycaemia and virus and other infections. The causes of Cerebral Palsy take place in prenatal, perinatal, and postnatal periods. In all cases, it is an immature nervous system which suffers the insult and the nervous system afterwards continues to develop in the presence of the damage[1].

Topographically cerebral palsy is classified as Tetraplegia, Diplegia and Hemiplegia. In Diplegia, involvement of all limbs with lesser involvement of upper limbs can be seen. There are spastic types, athetoid (Dyskinetic) types and a rare ataxic type. There is a hypotonic type which either becomes a spastic, athetoid or ataxic type[2].

Spastic muscles may have specific structural changes due to adaptability to abnormal use or disuse.Initially spastic muscles are however structurally normal though not normally extensible.

When a muscle is stretched and elongates, the stretch force is transmitted to the muscle fibers via the connective tissues (endomysium and perimysium) in and around the fibers. It is hypothesized that molecular interactions link these noncontractile elements to the contractile unit of muscle, the sarcomere. During passive stretch both longitudinal and lateral force transduction occurs. When initial lengthening occurs in the series elastic (connective tissue) component, tension rises sharply. After a point there is a mechanical disruption (influenced by neural and biochemical changes) of the cross-bridges as the filaments slide apart, leading to an abrupt lengthening of the sarcomeres known as sarcomere give. When the stretch force is released, the individual sarcomeres return to their resting length. The tendency of muscle to return to its resting length after short-term stretch is called elasticity. If more permanent (plastic) length increases are to occur, the stretch force must be maintained over an extended period of time.[3, 4]

When a muscle is stretched very quickly, the primary afferent fibers stimulate alpha motoneurones in the spinal cord and facilitate contraction of extrafusal fibers, increasing tension in a muscle. This is called the monosynaptic stretch reflex. Stretching procedures that are performed at too high velocity may actually increase the lesion in a muscle that is to be lengthened. If a slow stretch force is applied to muscle, the GTO fires and inhibits the tension in the muscle, allowing the parallel elastic component (the sarcomere) of the muscle to remain and lengthened.[5, 6]

Aim of this study was to find out the effectiveness of myofascial release in reducing spasticity of hamstring muscles and to increase ROM of knee extension in spastic diplegic cerebral palsy.

METHODOLOGY

Population: The universal population of this study included both male and female subjects between the age group of 4 and 10 years, diagnosed as spastic diplegic cerebral palsy.

The subjects in both the groups received treatment for 6 weeks daily. In both the groups, the data was collected using Modified Ashworth Scale for spasticity of hamstrings and Goniometry for range of motion of knee. Both pre-treatment score and post-treatment score was taken using both the tools.

Setting of the Study: The study was conducted in the department of physiotherapy, Florence Rehabilitation Center, Kalyan Nagar, Bangalore with written informed consent and the rights of the subjects' parent/ guardian being protected.

Sample and Sampling Techniques: Subjects who were reporting to Florence College of Physiotherapy and Rehabilitation Center and diagnosed as spastic diplegic cerebral palsy and satisfying inclusion criteria were included in the study and randomly divided into two groups.

Here, 30 subjects were selected for the study. 15 subjects were allocated with Myofascial release to reduce hamstring spasticity. Simple random sampling was selected so that each and every unit in the population had an equal probability of being selected in the sample.

Inclusion Criteria: Subjects diagnosed as spastic diplegic cerebral palsy of both male and female subjects with age group between 4 to 10 years and spasticity grade 2 as per Modified Ashworth Scale on hamstrings were selected for the study.

Exclusion Criteria: Subjects who receiving pharmacologic drugs for reducing spasticity; Subjects with frequent epilepsy; Subjects with mental retardation; Subjects with hypersensitivity of skin were excluded from the study.

Method of Data Collection: Subjects with spastic diplegic cerebral palsy were selected from Florence Rehabilitation Center, Bangalor, who were referred from nearby hospitals. Those subjects satisfying inclusion criteria were included for the study. Fifteen subjects were randomly assigned with myofascial release to reduce hamstring tigtness.

Measrurement tools: Modified Ashworth Scale is a subjective 5-point scale which remains as a "gold standard" and has shown to have good intrarater reliability (0.84) and good interrater reliability (0.83). Modified Ashworth Scale is used as a qualitative scale in this study.[7, 8]

Goniometry is used as a quantitative measurement tool in this study. Studies have proved the intratester and intertester reliability of goniometric measurement of knee joint flexion is 0.90 & 0.86 respectively according to ICC (Interclass Correlation Coefficient) .

Materials used: Goniometer Treatment couch, Percussion hammer, Pillows, Inch tape, Weighing machine.

Figure 1. Measuring ROM of knee

Procedure: Informed consent was taken from the parents of the subjects who were children and they were clearly explained about the procedure of the study. Here the 15 subjects were randomly allotted for Group A. The subjects were assessed for spasticity of hamstrings on both the legs. The data was collected by using Modified Ashworth Scale and Goniometry for spasticity of hamstrings and range of motion of knee joints before starting the treatment session and after the treatment. The subjects in Group A were treated with Myofascial Release technique for 6 weeks.

Intervention:

The subjects who received Myofascial Release were positioned in prone with the back of thighs exposed. The subjects were given enough privacy and their parents were allowed to be with them throughout the treatment. The subjects were instructed to inform if any discomfort was felt during the treatment procedure.

Subjects received Myofascial release technique were evaluated for areas of restriction of fascia in back of thighs. The treatment area was cleaned with water using cotton and the area was dried before applying the technique. Later, powder was applied on to the treatment area in order to reduce friction thereby, preventing blister formation.

The treatment was applied by the therapist standing at the side of the patient. Then technique was applied with different levels according to subject's tolerance for duration of 3 to 5 minutes in each sitting.

Here the technique was applied in four levels. Level one was performed by longitudinal movements without causing any tension to the tissues. The level two was performed by applying light resistance to the tensed muscle.

The level three was performed by compressing the treatment area, while the tissues were being compressed; they were taken passively through their fullest possible range of motion. In level four, the patient actively moved the tissue through the fullest possible range of motion, while offering resistance.

Figure 2. Myofascial Release for hamstring

The taut band was palpated along the length to relieve tension and then firm pressure was maintained on that spot to elicit more tension. Flat palpation was used as the muscle could be pressed against the underlying bone.

RESULT

Wilcoxon signed rank test has been used to find the significance of MAS score and PROM between pre and post in intra group. Chi-square/Student test has been used to find the significance of homogeneity of gender and age.

Modified Ashworth Scale	Pre test	Post test	Z value	P value
Right	2.0	1.43±0.42	Z=3.017	P=0.003
Left	2.0	1.50±0.32	Z=3.217	P=0.001

Table 1: Comparison of pre and post effect on Modified Ashworth Scale

PROM	Pre test	Post test	% change	P value
Right	118.00±6.54	121.33±5.81	1.83%	P=0.047
Left	116.33±5.81	122.33±6.98	4.3%	P=0.004

Table 2: Comparison of pre post effect on Passive Range of Motion

DISCUSSION

In intragroup analysis comparisons were made on pre and post treatment with MAS scores and goniometric measurement scores for hamstrings spasticity and passive range of motion of knee for both right and left sides. It was found that there was significant difference in spasticity and range of motion in subjects with hamstring tightness. Myofascial Release is found effective in reducing spasticity and thereby improving knee passive range of motion.[9, 10]

MFR can be used in children with cerebral palsy. Fascial releases produce tonal and sensory changes. In spasticity, when the muscle is used lesser or less active, the ground substance, which maintain the distance between connective tissue structures change to harder state from healthy fluid state. Muscles must stay active to ensure that the fluids in the body keep moving.[11,12]

Anything that interferes with muscle activity interferes with muscle and fascia. By Myofascial Release it is possible to make the muscle and fascia active by ridding yourself of these chemical toxins and wastes. When using MFR techniques, the therapist monitors tissue tightness by developing a kinesthetic link with the point through touch. Through this link the therapist feels the patient's inherent tissue movement and underlying neurophysiologic tissue tone as well as the more overt muscle tone. Myofascial release is a new approach which produces consistent result in children suffering from Hamstring spasticity. MFR treats the patient's current problem as well as all malalignment that may that may predispose the point to future injury.[13, 14]

CONCLUSION

In spastic diplegic cerebral palsy, spastic muscles limit the child to achieve functional goals. It also leads to reduced range of motion in joints and if untreated might gradually lead to contractures and fixed deformities.

Myofascial Release can reduce spasticity on hamstring muscles and the outcome measurement of passive range of motion of knee joint showed good improvement among cerebral palsy children.

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