



EFFECTIVENESS OF ROLFING TECHNIQUE (MFR) AND STRETCHING IN CEREBRAL PALSY SPASTIC HEMIPLEGIC'S CALF MUSCLE SPASTICITY

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ABSTRACT

Background: Cerebral palsy is a congenital disorder affecting movement, muscle tone and posture, and this is due to damage or abnormal brain development in the parts of the brain that controls movement. Therefore, this study includes Rolfing technique of myofascial release and stretching which is used for diagnostic and treatment purpose for patient with cerebral palsy Spastic hemiplegic. Thus, the present study compared the effect of Rolfing technique and stretching in Spastic hemiplegic in cerebral palsy. **Methodology:** The experimental study in role 20 children of Shriram Murti Smarak hospital and private clinics of Bareilly and equally divided into two group (Group One: Rolfing technique, (MFR) Group 2 stretching group). Spasticity was the main outcome measure assessed at baseline and 3rd month **Result:** The paired t test use to compare the result for MAS from baseline and 3rd month the data analysis showed a significant difference between Group A and b **Conclusion:** Both the technique are equally effective in Spastic hemiplegic of cerebral palsy and in releasing the calf muscle but for the reduction of spasticity Group A is slightly better than Group B.

KEYWORDS : Myofascial Release, Stretching, Cerebral Palsy And Rolfing Technique.

INTRODUCTION

Cerebral palsy (CP) is a collection of neurological illnesses that manifest in infancy or early childhood and permanently impair body mobility and muscle coordination. The defects or injuries to the developing brain that impair the brain's capacity to regulate movement, maintain posture, and maintain balance are the root cause of cerebral palsy. The loss or impairment of motor function is referred to as palsy, whereas cerebral refers to the brain¹.

According to geographic location and high-income versus low- to middle-income countries, the prevalence of cerebral palsy for all live births varies from 1.5 to 3 per 1000 live births Frequency, spasticity, dyskinesia, hypotonia, and ataxia are characteristics of the neurologic impairment of the motor system in children with cerebral palsy. Spastic, dyskinetic, hypotonic, or mixed CP is the overall classification based on clinical data²

Based on their systematic review of research from 1988 to 2016, Novak et al. [2017] assert that cerebral palsy can be correctly diagnosed in the first few months of life. They also reported that cerebral palsy can be accurately diagnosed in this way using a combination of information from the patient's medical history, neuroimaging, and standardized, individually administered neurological and motor assessment tools.³ The arm and hand on one side of the body are usually affected by spastic hemiplegia/hemiparesis, but the leg can also be affected. A deformity of the spine called scoliosis can occur in some children. While IQ is typically normal, speech is delayed and may be competent at best⁴

Spasticity is characterized as an increased resistance to passive muscle stretch that is velocity dependent, or alternatively, as inappropriate involuntary muscle activity linked to paralysis of higher motor neurons. Spasticity can cause functional issues with daily activities such as walking, feeding, washing, and clothing⁵ A velocity-dependent increases in resistance to passive muscular stretch is known as spasticity, or alternatively as in the child's level of arousal at the moment and the amount of time that has passed since the trigger event that caused the spasticity determine the degree or severity of spasticity in cerebral palsy². The Ashworth scale is a critical assessment tool in the physical examination of spasticity during rehabilitation³

In order to restore appropriate length, reduce discomfort, and enhance function, myofascial release is a commonly used manual therapy technique that uses precisely guided low load, long duration mechanical pressures to alter the myofascial complex (Barnes, 1990).⁶ Deep myofascial release is used to alleviate constraints that are located in the deeper fascia layers. This is achieved by altering the viscosity of the fascia's ground substance and extending the muscle-elastic components of the fascia as well as the cross connections⁷

Rolfing is a MFR technique which involves the use of pressure on areas of the body in which muscle tendons adhere to each other than sliding over one another in the normal way.¹²

Stretching primarily aims to lengthen a musculotendinous unit, or, to put it another way, to increase the distance between the origin and insertion of a muscle. When it comes to stretching, muscle tension and length are typically negatively correlated: lower muscle tension is associated with longer muscles, whereas higher muscle tension is associated with shorter muscles⁵. Active and passive stretching are the two different forms. A therapist performs passive stretching exercises on a patient who is not using their own muscles.

When the therapist manually moves the patient's joint to its end-range position, the muscle that needs to be stretched gets longer⁴

OBJECTIVE

To ascertain the efficacy of stretching and the Rolfing Technique (MFR) in treating cerebral palsy spastic hemiplegic's calf muscle spasticity

METHODOLOGY

Type of study: Experimental study
Study setting: Shri Ram Murti Smarak Institute of Paramedical Sciences, Bareilly and other Physiotherapy clinics of Bareilly
Study design: Interventional study.
Duration of study: 6 months
Duration of Intervention: 3 months
Study population Patient with Cerebral palsy spastic hemiplegia
Sample size: 20 subjects
Type of sampling: Convenience sampling

Group A- 10 subjects MFR (Rolfing Technique) on Calf muscle in Cerebral palsy spastic hemiplegia

Group B- 10 subjects Passive Stretching of Calf muscle in Cerebral palsy spastic hemiplegia

Inclusion criteria

Subjects with cerebral palsy who are spastic hemiplegic and the age taken 2-10 years. Both male and female subjects were included in the study and Grade 3 was assigned to the calf muscle spasticity on the Modified Ashworth scale. Subjects able to move around with or without assistance.

Exclusion criteria

Subject had any past orthopedic procedures. The subject had an injection of botulinum toxin during the last six months. Subject with contractures Cognitive and perceptual impairment in the subject

Parameters

Modified Ashworth Scale is a six-point rating system also known as MAS is used to measure muscular resistance to passive motions (spasticity)⁵In this study by shifting the ankle from maximal plantar flexion to maximal dorsiflexion, and then the plantar flexors of the ankle were assessed while the knee was stretched. Additionally, the modified Ashworth scale was used to measure children with spastic hemiplegic cerebral palsy.

Procedure

Step 1: Data were retrieved from a designated source, and participants who met the study's inclusion requirements were enrolled.

Step 2: All 20 individuals were divided into two groups at random: Group A received the Roling technique (MFR), while Group B received stretching, with each group consisting of 10 subjects.

Step 3: After explaining the entire process to the parents of each child, the parents' informed consent was obtained.

Step 4: All participants with spastic hemiplegia of cerebral palsy had their MAS for spasticity of the calf muscle on the affected lower extremity, it assessed both before and after therapy.

Step 5: Within Group A With the patient in the prone position and the therapist by their side, a 120-second hold of the Roling technique of MFR was applied for the calf muscle.

Finger pads were allowed to sink into the middle location of the calf while doing the roling technique. Myofascial structures were then dispersed somewhat till the first barrier was felt after it was kept for 120 seconds to allow the tissue to soften.

Step 6: Within Group B The therapist performs passive stretching exercises on the patient without having them use their own muscles. When the therapist manually moves the patient's joint to its end range position, the muscle that needs to be stretched gets elongated. For three sets of five repetitions lasting twenty seconds hold each, the exercise was done four times a week for three months.

Step 7: For spasticity MAS was calculated , pre- and post-data were collected and analyzed using the relevant statistical tests.

Statistical analysis

The information collected was tabulated and analysed by using standard statistical software. Data was compiled on Microsoft Excel version 2007 and was presented in tabular form.

Data analysis was done with the help of standard statistical software (SPSS version 25) and paired t test was applied to compare the pre & post interventional assessment values.

RESULT

Table 1: Distribution of patient according to their age group

Age (in years)	frequency	In %
2-4	11	55%
5-7	6	30%
9-10	3	15%
Total	20	100%
Mean age	4.55	
Std. deviation	2.064	

Table 1 demonstrate that age distribution of the patients who are suffering from spastic hemiplegic CP calculated mean age of the children is 4.5 year while the standard deviation is 2.064 highlights the spasticity around this mean age.

Table 2: Gender distribution of patient suffering from spastic hemiplegic cerebral palsy.

Gender	frequency	In %
Male	13	65%
Female	7	35%
Total	20	100%

Table 2 shows the gender distribution of the patients who are suffering from spastic hemiplegic cerebral palsy and there are 13 males (65%) and 7 females (35%) out of a total of 20 children (Refer Figure 1).

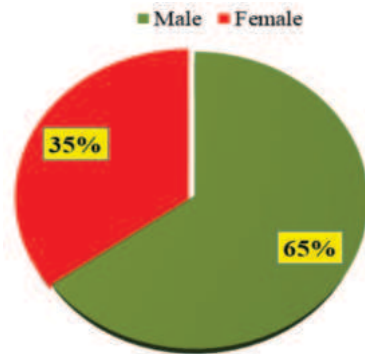


Figure 1: Gender wise distribution of study participants

Overall 20 Patients, 10 in each group, were taken in the study. Group A Roling technique (MFR) and stretching in Group B.

Roling techniques shows statistical significance change in spasticity(MAS) grade when compared with passive stretching .At baseline, the mean value is 3.0 with no standard deviation while at 3months; it's 2.2000 with standard deviation of 0.42164 and the main difference is 0.80000 the p- value is 0.000 (Table 3)

Table 3: Comparison of spasticity at Baseline and 3 Months in Group A- Roling technique (MFR)

Time	Mean	Std. Deviation	Mean difference	P-value
At base line	3.0000	0.00000	.80000	.000
At 3 month	2.2000	.42164		

Passive stretching shows slightly less statistical significance change in spasticity (MAS) grade when compared with Roling technique. At baseline, the mean value is 3.0 with no standard deviation while at 3 months; 2.6000 with standard deviation of 0.516400 and the mean difference is 0.4 0000, the p- value 0.037.(Table 4)

Table 4: Comparison of spasticity (MAS) at Baseline and 3 Months in Group B-Passive stretching.

Time	Mean	Std. Deviation	Mean difference	P-value
At base line	3.0000	0.00000	.40000	.037
At 3 month	2.6000	.51640		

The result show that both the treatment groups that is Roling technique of MFR and passive stretching show significant improvement In Group A and B but Group A technique showing slightly more effective than Group B technique.

DISCUSSION

The present study was conducted to see the effectiveness of roling technique and stretching on calf muscle in cerebral palsy spastic hemiplegia patient.The result showed that both the treatment groups are equally effective in spastic hemiplegia of Cerebral Palsy in releasing calf muscle but for the reduction of spasticity group A is slightly better than group B.

It suggested that MFR focus on neuroreflexive change. The hands-on method provides Afferent stimulation via receptor, which requires response-generating central processing at the spinal and cortical levels. Efferent inhibition often follows afferent stimulation. This principle applies to the MFR technique when an operator applies afferent stimulation to a stretch and then waits for the resultant relaxation to come from the stimulation.⁸

By preventing motor neuron excitability through extended stretching and compression on the muscle spindles, GTOs, cutaneous receptors, and joint receptors, spasticity is reduced.⁹

Experimental evidence suggests that increased resistance to movement is not exclusively dependent on stretch reflex activity but is also due to increased stiffness as a result of contracture. Therefore, by quantifying the resistance to passive movement, the Ashworth Scale measures a combination of neural and peripheral factors. Velocity-dependence of the stretch reflex has been well established with several studies reporting no stretch reflex during slow passive movements.¹⁰

In study “ The effectiveness of passive stretching in children with CP”

by Tamis Wai-Mum in 2006, there was evidence to indicate that sustained stretching was preferable to manual stretching in improving range of movement and reducing spasticity in targeted joints and muscles of children with spasticity.¹¹

CONCLUSION

The study conclude that Rolfing technique (MFR) and passive stretching offer viable therapeutic approaches for managing spastic hemiplegic cerebral palsy. However, the Rolfing technique shows promising results in reducing spasticity, indicating its potential as a valuable adjunctive therapy in the comprehensive management of cerebral palsy. Further research with larger sample sizes and longer follow-up periods may provide additional insights into the comparative effectiveness and long-term benefits of these interventions.

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