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Research Article

Therapy Taping Method

Physiotherapy approach in children with Duchenne Muscular dystrophy: Therapy Taping Method

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Introduction: The Therapy Taping Method (TTM) uses the Therapy Tex® bandage, recommending the bandage for as much time as possible during 24 hours, which can influence motor behavior through neurophysiological effects, providing external support over the body or to an entire segment. Thus, the purpose of this study wasto investigatethe influence of MTT in the executionof motor functions in children with Duchenne Muscular Dystrophy (DMD). **Materials & Methods:** Patients with a confirmed clinical diagnosis of DMD were included in the study. The confirmation was done by genetic testing and muscle biopsy. Patients were selected from the Out patents department of the paediatric department of the medical college. A trained expert assesses the degree of motor function in the children with the help ofthe MFM-20-P scale. **Results:** The initial evaluation showed an increase in the D1, D2 and D3 values in both cases at the end of one month. The evaluation after six months showed the value increased in D1, D2 and D3 value and also increased in the total score is compared to the initial value and evaluation at the end of one-month. **Discussion & Conclusion:** we can encourage the possibility that the MTT in DMD enables an extension of the proper muscle condition, delaying the loss of ambulation evident at around 8-10 years of age since in both cases there was an increased score in the dimension 1 (D1) and total score. The overall posture balance was improved in both the children. Also, there was a reduction in pain after the application of the bandage.

Keywords: Duchenne Muscular Dystrophy, Therapy Taping Method, Plasticity, Bandage

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Introduction

Muscular dystrophy refers to a group of inherited muscle disorders characterized by progressive muscle weakness. It is caused by a genetic abnormality that affects the muscle structure and function, which over time leads to increasing disability. Duchenne muscular dystrophy affects mainly boys and is the most severe and common form of muscular dystrophy. Symptoms are usually apparent by age three [1,2]. Although there are several types of muscular dystrophy, they all involve muscle weakness and a loss of muscle mass. The arms and legs are often impacted first, and other muscle groups follow later. Some children with severe forms of the disorder never gain the ability to walk; others lose the ability to do so over time. Although no cure exists, some treatments can help lengthen the time of muscle functioning. As the muscles progressively weaken due to the condition, physical therapy can significantly improve a child's abilities and quality of life [3]. Duchenne muscular dystrophy (DMD) is a genetic condition that affects the muscles, causing muscle weakness. It is a serious condition that starts in early childhood. The muscle weakness is not noticeable at birth, even though the child is born with the gene which causes it [4]. The weakness develops gradually, usually evident by the age of three. Symptoms are mild at first but become more severe as the child gets older.DMD is characterized by well-known patterns of progressive muscle degeneration and weakness, postural compensations, risk of progressive contracture and deformity, and functional losses resulting from dystrophin deficiency [5].

During the last three decades, significant progress has been made in the field of muscular dystrophies, leading to the discovery of molecular and genetic causes underlying the disease. There is no cure for muscular dystrophy: scientific advances have not been paralleled by findings of effective therapeutic tools so far. Patients have to rely on symptomatic treatments in which continuous physiotherapy is supposed to play a central role. Physical therapists help children with muscular dystrophy maintain function by managing complications of the disorder's progression, such as muscle weakness and contractures [6]. Each child with muscular dystrophy has unique needs based on age, the type of dystrophy, and the progression of symptoms. Physical therapists work With children and their families, as well as with other health care professionals, to develop individualized treatment plans to help children reach their full potential [7].

There are currently several brands of bandages, having as one of the first the KinesioTaping®. The Therapy Taping Method (TTM) uses the Therapy Tex® bandage, recommending the bandage for as much time as possible during 24 hours [8], which can influence motor behavior through neurophysiological effects, providing external support over the body or to an entire segment. Thus,this study aimedto investigate the influence of MTT in the execution of motor functions in children with DMD.

Materials &Methods

Study Design: The present is the longitudinal and descriptive analysis.

Study Setting: The present study was done in the department of Paediatric, in the medical college associated with a hospital.

The institute ethical committee was informed about the study, and the ethical clearance certificate was obtained from them beforestartingthe study.

Inclusion Criteria: Patients with the confirmed clinical diagnosis of DMD were included in the study.

Exclusion Criteria: The patients oversix years during the research were excluded from the study.The confirmation was done by genetic testing and muscle biopsy. Patients were selected from the OPD of the paediatric department of the medical college. For inclusion in the study, it was necessary to apply the MFM-32-P scale that is possible in children less than six years only. The patients included in the study were able to follow orders as per requirement without any additional elastic support in the body. The children wouldalso be excluded if they missed two consecutiveweeks due to the continuous treatment requirement of the bandage application protocol.

A trained expert assesses the degree of motor function in the children with the help of the MFM-20-P scale. They performed a month of physical therapy in the therapy pool without usinga bandage to verify their primary functionality degree and evolution with only conventional treatment. The treatment aims to stretch the upper limbs,

Lower limbs and trunk region. After the treatment, children were reassessed according to the MFM-20-P scale. They were asked to attend the clinic tochange the bandage and continue thetreatment in the therapy pool weekly for a total of 24 weeks. At the end of the proposedperiod, the MFM-20-R scale was applied again. Atthe beginning of the treatment, the two childrenunderwent muscle resonance image(MRI) examination to do topography ofthe intensity of the deposit of fat and theconditions of the muscle fibres.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to the data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5%, respectively.

Results

The included child was of age four years, born by caesarean section. As per the history, the child showed delayed development in motor skills. At 12 months of age, the patient was referred to the paediatrician to investigate the clinical presentation, observing a level of creatine kinase (CK) above 2000 UL. During two years, the patient was accompanied for control of CK levels, always presenting levels higher than expected. At three years old, the patient was referred to Unicamp's Neuromuscular Diseases Clinic, where muscle biopsy was performed and was submitted to genetic testing, confirming the diagnosis of DMD.The other included child was of age six years, was born at the age of 38 weeks gestation. As per the history presented by the mother, the patient presented motor development within the normal range, and at one year and four months of age started showing early falls, and after that difficult to walk long distances, to go up and down the stairs. The muscle biopsy was done, and they confirmed the DMD diagnosis.The evaluation was done after one month of the usage of elastic bandages and also after the end of 6 months. The initial assessment showed an increase in the D1, D2 and D3 values in both the cases at the end of one month. The evaluation after six months showed the value increased in D1, D2 and D3 value and also increase in the total score is compared to the initial value and assessment at the end of one month

Table 1: Evaluation for case 1 before and after the application of the elastic bandage

	D1	D2	D3	Total score
Initial Evaluation	57.25	85.69	82.52	78%
After 1 month	58.25	87.96	82.52	79%
After 6 months	63.78	94.27	92.45	83%

Table 2: Evaluation for case 2 before and after the application of the elastic bandage

	D1	D2	D3	Total score
Initial Evaluation	38	99	85	72%
After one month of hydrotherapy	47	86	85	65%
After 24 weeks of hydrotherapy	65	96	100	87%

Discussion

Duchenne muscular dystrophy (DMD) is one of the most severe and commonly diagnosed neuromuscular dystrophies. The etiology of this congenital X-linked disease affecting 1 in 3500–6000 boys are mainly deletions, duplications or point mutations of the dystrophin gene [9]. The DMD patients and their families should follow the World Health Organization (WHO) recommendations applicable for the general population, such as regular and thorough cleaning the hands with soap and water or alcohol-based specific products, social distancing and self-isolation [10].

During the last three decades, important progress has beenmade in muscular dystrophies, leading to discovering molecular and genetic causes underlying the disease. There is no cure for muscular dystrophy: scientific advances havenot been paralleled by discoveries of effective therapeutic tools sofar [11]. Patients have to rely on symptomatic treatments in whichcontinuous physiotherapy is supposed to play a central role. DMD is characterized by well-known patterns of progressive muscle degeneration and weakness, postural compensations, risk of progressive contracture and deformity, and functional losses resulting from dystrophin deficiency [12].

Physical therapists practice in various settings, including hospitals and nursing homes, outpatient clinics, home health, and schools. Most individuals with myotonic dystrophy (DM) will probably first encounter a physical therapist in the multidisciplinary clinic where they receive care for their DM related problems [13]. In this setting, the physical therapist plays a consultative role providing evaluation, education, instructions

And recommendations based on individual patient needs. They may also act as a liaison and help coordinate care with school or community-based therapists who provide direct care services [14].

The elastic bandage has become fashionable in rehabilitation areas, especially in orthopaedic and sporting conditions. The bandage would induce pressure and a strain on the skin, activating mechanoreceptors statically or dynamically (depending on thestimulated receptor type), providing continuousfeedback to the brain as the movement orposture is running, resulting in a constant muscular response. In our study, the bandage by MTT probably has facilitated a continuous motor response in muscles that still presented preserved fibres without the deposition of fat or connective tissue. Some studies, such as Bae et al. & Voglar and Sarabon, have observed that after application of the bandage in chronic lower back pain, muscular stem response was optimized by improving the early posture adjustment and motor disability [8].

In the present study, though the statistical analysis was not performed, we can encourage the possibility that the MTT in DMD enables an extension of the proper muscle condition, delaying the loss of ambulation evident at around 8-10 years of age since in both cases there was an increased score in the dimension 1 (D1) and total score. Another study with a large sample size is under the plan and will be conducted shortly according to favourable circumstances.

Conclusion

As disease-modifying treatmentsbecome available, questionswill emerge regarding potentialincreases in exercise capacityand muscle recovery, optimizingpotential benefit versus damagefrom specific types, durations, and exercise frequency.The overallposture balance was improved in both the children.Also, there was a reduction in pain after the application of the bandage.

Addition of the study to existing knowledge

The pathophysiological hallmark of the Duchenne Muscular dystrophy is that the slower/more oxidative muscle fibres are more resistant to pathological processes of degeneration of dystrophin than the faster ones. The precise mechanism of this increased resistance is Unknown, but factors suchas differences in protein composition in the sarcolemma,oxygentransport and intracellular calcium dynamics can contributetothis important physiological phenomenon

Contribution from authors

Dr Hardas K Chavda formulated the aims & objectives with study design and helped collect data from the medical record department, Dr Madhuben Hardas Chavda contributed to preparing the manuscript and Data analysis.

Reference

01. Emery AE. The muscular dystrophies. Lancet. 2002 Feb 23;359(9307):687-95. *doi: 10.1016/S0140-6736(02)07815-7 [Crossref] [PubMed][Google Scholar]*

02. Duan D, Goemans N, Takeda S, Mercuri E, Aartsma-Rus A. Duchenne muscular dystrophy. Nat Rev Dis Primers. 2021 Feb 18;7(1):13. *doi: 10.1038/s41572-021-00248-3 [Crossref][PubMed] [Google Scholar]*

03. Emery, Alan EH. Muscular dystrophy: The facts. Oxford University Press, USA, 2000. *[Crossref] [PubMed][Google Scholar]*

04. Tyler KL. Origins and early descriptions of "Duchenne muscular dystrophy". Muscle Nerve. 2003 Oct;28(4):402-22. *doi: 10.1002/mus.10435 [Crossref][PubMed][Google Scholar]*

05. Park EW, Shim YJ, Ha JS, Shin JH, Lee S, Cho JH. Diagnosis of Duchenne Muscular Dystrophy in a Presymptomatic Infant Using Next-Generation Sequencing and Chromosomal Microarray Analysis: A Case Report. Children (Basel). 2021 May 11;8(5):377. *doi: 10.3390/children8050377 [Crossref][PubMed][Google Scholar]*

06. Odom GL, Gregorevic P, Chamberlain JS. Viral-mediated gene therapy for the muscular dystrophies: successes, limitations and recent advances. Biochim Biophys Acta. 2007Feb;1772(2):243-62. *doi: 10.1016/j.bbadis.2006.09.007 [Crossref][PubMed] [Google Scholar]*

07. Birnkrant DJ, Bushby K, Bann CM, Apkon SD, Blackwell A, Brumbaugh D, et al. DMD Care Considerations Working Group. Diagnosis

And management of Duchenne muscular dystrophy, part 1: diagnosis, and neuromuscular, rehabilitation, endocrine, and gastrointestinal and nutritional management. Lancet Neurol. *2018 Mar;17(3):251-267. doi: 10.1016/S1474-4422(18)30024-3 [Crossref][PubMed][Google Scholar]*

08. Iwabe-Marchese, Cristina, and Nelson Morini Jr. "Therapy taping method: therapeutic approach in two children with duchenne muscular dystrophy. " Journal of Advances in Medicine and Medical Research (2016): 1-7. *[Crossref][PubMed][Google Scholar]*

09. Vengalil S, Preethish-Kumar V, Polavarapu K, Mahadevappa M, Sekar D, Purushottam M, et al. Duchenne Muscular Dystrophy and Becker Muscular Dystrophy Confirmed by Multiplex Ligation-Dependent Probe Amplification: Genotype-Phenotype Correlation in a Large Cohort. J Clin Neurol. 2017 Jan;13(1):91-97. *doi: 10.3988/jcn.2017.13.1.91 [Crossref][PubMed] [Google Scholar]*

10. Blake DJ, Weir A, Newey SE, Davies KE. Function and genetics of dystrophin and dystrophin-related proteins in muscle. Physiol Rev. 2002 Apr;82(2):291-329. *doi: 10.1152/physrev.00028.2001 [Crossref][PubMed] [Google Scholar]*

11. Falzarano MS, Scotton C, Passarelli C, Ferlini A. Duchenne Muscular Dystrophy: From Diagnosis to Therapy. Molecules. 2015 Oct 7;20(10):18168-84. *doi: 10.3390/molecules201018168 [Crossref] [PubMed][Google Scholar]*

12. Case, Laura E. "Physical therapy and orthotic devices. " Muscular Dystrophy. Springer, Cham, 2015. *73-104 [Crossref][PubMed][Google Scholar]*

13. LaDonna KA, Venance SL. Picturing the Experience of Living With Myotonic Dystrophy (DM1): A Qualitative Exploration Using Photovoice. J Neurosci Nurs. 2015 Oct;47(5):285-95. *doi: 10.1097/JNN.0000000000000160 [Crossref] [PubMed][Google Scholar]*

14. Rogers, Oaklee, et al. Occupational therapy's role in an interprofessional student-run free clinic: Challenges and opportunities identified. The Open Journal of Occupational Therapy 5. 3 (2017): 7. *[Crossref][PubMed][Google Scholar]*