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Congenital torticollis: Evidence in physical therapy treatment

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Crossref doi 10.56238/rcsv14n4-014

ABSTRACT
Due to the need to evaluate the treatments of Congenital Muscular Torticollis, this study aimed to review the literature on the evidence of physical therapy treatment. Because they have recent articles on the subject, articles between the years 2012 and 2019 were selected, obtained from the Pubmed and Scielo databases. The keywords were: Congenital Torticollis, Physiotherapy, Not Surgery. The main evidence found was: Conventional Physical Therapy; Microcurrent; kinesiological tape; Chiropractic; Osteopathy and Ultrasonography. It was also observed the combination of one or more techniques for better functional recovery of patients, ranging from neonates to 10 years of age. Regarding the application of treatments, it was also evidenced that both evaluation and early treatment exert a significant gain. It was also found that there are few studies on the physical therapy treatment of CMD, opening the need for more studies that collaborate with such evaluations and evidence, making it impossible to replicate these findings.

Keywords: Torticollis, Congenital, Child, Physical Therapy, Non-Surgery.

INTRODUCTION

Congenital Muscular Torticollis (CMT) is a musculoskeletal disorder that occurs in neonates, with characteristics of an excessive contraction or unilateral shortening mainly of the flexor, tiltor and rotator muscle of the head, the sternocleidomastoid. Among the children's musculoskeletal reasons why this pathology occurs, the following are included: tumor in the sternocleidomastoid muscle; abnormalities in the cervical spine and dysfunction in the cranio-cervical junction[1] It is believed that CMD is linked to muscle trauma during the delivery process, chronic repetitive microtrauma, as an example in prolonged intrauterine poor posture[2] or after birth, when mesenchymal cells differentiate into muscle, fibrous and adipose tissues and then the appearance of a pseudotumor occurs, thus bringing an imbalance caused by fibrogenesis, adipogenesis and myogenesis, which can cause the development of mass in CMD[3].

There are 2 other types of Torticollis that can affect a child in addition to CMD, also known as Classic Congenital Orthopedic Torticollis, they are: Suboccipital Tension[4] and Decreased Range of Motion[5]. Torticollis caused by suboccipital tension occurs due to a kinematic imbalance causing a dysfunction of the upper cervical spine governed by the suboccipital musculature. Torticollis due to

decreased range of motion, on the other hand, is related to evident joint dysfunctions in conjunction with muscle tension, especially in the region of the sternocleidomastoid muscle.

The consequences commonly generated by torticollis are evidenced by changes in the entire body dynamics, such as Facial Scoliosis, Infantile Scoliosis and Plagiocephaly[6].

Currently, there are several forms of approach and treatment for CMD, and there is no standardization for the therapeutic system, however, the most indicated initial approach is physical therapy[7]. With physical therapy treatment, 90 to 95% of children improve before the first year of life and 97% of patients improve if treatment is started before the first six months[8]. When physical therapy treatment does not occur in the first year, that is, when it occurs late, patients may present complications such as compensatory cervical and/or thoracic scoliosis in addition to chronic pain[9].

When there is an early diagnosis and when physical therapy is indicated, the first approaches to physical therapy treatment are usually at home, since the daily and constant performance of exercises can be associated with the improvement of CMD[10]. Thus, the encouragement of the child's guardians to participate in the entire process, the number of interventions and the methodology used are determinant both for the duration of treatment and for the patient's rehabilitation. In this context, the study aimed to address the different forms of physical therapy treatment in CMD and to evaluate the evidence of interventions for the rehabilitation of patients.

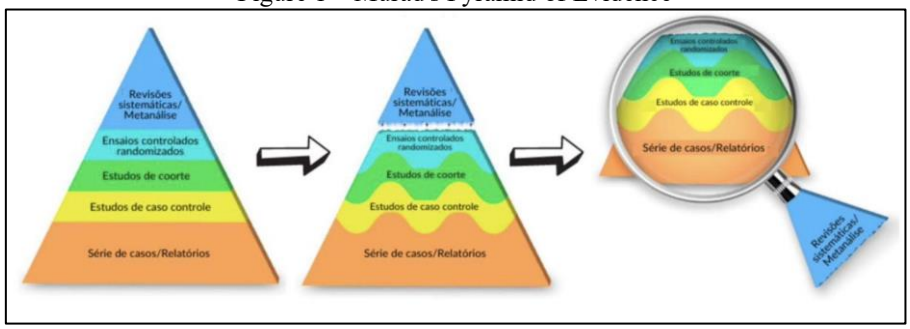
METHODOLOGY

Initially, the study was classified as exploratory, that is, a study carried out on a problem or research question with little previous study on the subject. From readings, surveys of the literature, a search was initiated with the intention of locating certain relevant information, of previous knowledge about CMD. The search in databases was carried out in order to identify scientific articles published between 2011 and 2019 that addressed the methods and techniques of physiotherapeutic treatments for CMD. The filtering processes used for the search were: Congenital Torticollis, Physiotherapy, Not Surgery**.** The studies were obtained from the Pubmed and Scielo databases. A total of 33 articles on the subject were located in the last 8 years, and in order to select the works on the proposed subject, articles that dealt with surgical interventions, non-original articles and duplication of research were rejected. Thus, nine studies were included in the table to reference the physical therapy intervention in CMD.

The articles that dealt with forms of assessment and CMD interventions included in the results of this research were evaluated according to Munrad's proposal[11]. The Pyramid of Evidence arises from the need for scientists to resort to systematic methods to produce quality evidence, and such evidence is classified in a hierarchical manner, illustrating in the form of a pyramid (FIGURE

1), according to the design or design of the study employed. At the top of the hierarchy, randomized controlled trials (RCTs), considered the best approach to answer questions about the efficacy and safety of treating diseases. In the medical literature, RCTs are referred to as the "gold standard" among the sources of evidence to establish causal relationships[12]. From the perspective of the Pyramid of Evidence, the evaluative classifications were monitored by two examiners, and if there were divergences, they were discussed and scored by consensus. After this process, the classification was also submitted to a third methodological evaluator in the health area, to define the final score, according to the criteria: 1) Definition of objectives; 2) Blinded study as a primary form of reliability; 3) Randomization; 4) Existence of a control group; 5) Sample size of groups; 6) Clarity of the research; 7) Blinded study when applicable; 08) Objectively measured results; 09) Adequate statistical treatment; 10) Definition of the monitoring of results; 11) Discussion of the clinical implications of the results and 12) Submission to an ethics committee. After defining evaluation criteria, the score was established in which each article obeyed a degree of importance according to the guidelines of the evidence pyramid, in which the higher the quality of the evidence, the higher the score: 1 = Case or Case Series; 2 = Case-Control Study; 3 = Cohort Study and 4 = Randomized Blinded Study.

Figure 1 – Murad's Pyramid of Evidence



The new pyramid of evidence. Adapted from Murad MH, Asi N, Alsawas M, et al 2016

RESULTS

After the articles were found (Table 1), the selection process was carried out, based on the application of the inclusion and exclusion criteria listed.

Table 1: prepared by the author.

Searched Keywords	
Databases	Congenital Torticollis; Physiotherapy; Not Surgery
PUBMED	32
SCIELO	1

Analyzing the results, duplicate articles, those that did not fit the inclusion criteria, and those that also presented exclusion criteria were excluded. After this selection, nine (9) studies were eligible to be placed in Table 2. The table (Table 2) below summarizes the results of studies that dealt with evaluation methods and interventions for congenital torticollis.

Table 2: Prepared by the author.

FONTE	MÉTODO	OBJETIVOS	SUJEITOS	INTERVENÇÃO	AVALIAÇÃO	RESULTADOS	PONTOS
Fradette J, Gagnon I, Kennedy E, Snider L, Majnemer A (7)	Estudo Randomizado	Identificar os fatores que influenciam a determinação das necessidades de intervenção de lactentes com TMC.	Grupo 1: 271 pediatras via correio e Grupo 2: 40 pediatras via entrevista (incluídos do grupo 1)	Grupos focais e pesquisas e lista de fatores que influenciam as necessidades de intervenção.	Avaliação rotineira de bebês para o desenvolvimento global como parte dos cuidados com o bebê.	A amplitude de movimento e a gravidade do torcicolo foram relatadas por 77% dos terapeutas, seguidas pela idade de apresentação (52%), capacidade dos pais para realizar os exercícios (48%), plagiocefalia (39%) e função motora grossa (36%)	4
Xiong et al. (3)	Estudo Randomizado	Examinar neonatos com um dia de idade para TMC e, em seguida, acompanhamos os pacientes diagnosticados com TMC por três anos.	2.564 Neonatos	Rotação passiva do pescoço e exame ultrassonográfico	Cada neonato foi examinado em decúbito dorsal, apalpou o pescoço e, em seguida, realizou uma rotação passiva do pescoço para verificar a falta cervical movimento.	Proporcionou uma oportunidade de tratamento regular e evitou a cirurgia em pacientes. exame ultrassonográfico é um método eficaz e seguro para diagnosticar a TMC em bebês.	4
Zanusso Pagnossin L, Frederico S. Schmidt A, Murray Bustorff-Silva J, Tadeu M. Marba1 S, Sbragia L. (9)	Estudo Randomizado Controlado	Avaliar a evolução clínica e comparar a eficácia do tratamento fisioterapêutico intensivo ou mínimo, em neonatos e lactentes com TMC.	47 neonatos à lactentes de até seis meses de idade, sem doenças neurológicas, com diagnóstico de TMC.	Analgesia local superficial, massoterapia e alongamentos para o esternocleidomastoideo em decúbito dorsal, flexão lateral da cabeça.	a) antecedentes maternos; b) antecedentes pessoais da criança; c) achados clínicos; d) tratamento.	O tratamento intensivo consistiu na realização diária de sessões fisioterapêuticas. A cura foi observada em 77% das crianças do grupo de tratamento mínimo e em 100% das crianças do grupo de tratamento intensivo. O total de complicações evolutivas e o tempo para a cura foram significantemente menores nos pacientes submetidos ao tratamento intensivo.	4
Keklicek H, Uygur F (13)	Estudo Randomizado Controlado	Investigar-se o uso do Osteopatia para gerenciar a TMC em bebês com inclinação leve a moderada da cabeça.	29 neonatos à lactentes de até seis meses de idade separadas em dois grupos para tratamento.	Osteopatia	Os bebês foram avaliados inicialmente, às seis semanas, às 12 semanas e ao acompanhamento às 18 semanas, com escala da função muscular, inclinação da cabeça e amplitude de movimento para flexão e rotação lateral do pescoço.	Os resultados deste estudo mostraram que a intervenção fisioterapêutica via mobilização de tecidos moles é eficaz no tratamento do torcicolo muscular congênito e acelera a recuperação.	4
Giray et L (2)	Estudo Randomizado, Controlado e Cego	Investigar os efeitos da fita cinesiológica e diferentes tipos de técnicas de aplicação, além de exercícios terapêuticos.	33 crianças separadas em 3 grupos	Fita Cinesiológica e Fisioterapia (exercícios terapêuticos)	Amplitude de movimento na flexão lateral e rotação do pescoço, a função muscular e o grau de alterações craniofaciais foram avaliados no pré-tratamento, pós-tratamento e 1 mês e 3 meses após o tratamento.	A análise de Friedman das alterações dentro do grupo ao longo do tempo revelou diferenças significativas para todas as variáveis de resultado em todos os grupos, exceto a rotação cervical no Grupo 3 (P <0,05). Não foram encontradas diferenças significativas entre os grupos em nenhum dos momentos de acompanhamento de nenhuma das variáveis de resultado (P> 0,05).	4
Hobaek Siegenthaler M (4)	Estudo Controlado	Descrever a apresentação clínica e o gerenciamento de casos de duas crianças com TMC.	2 crianças: 6 e 10 anos	Quiropraxia, massagem e alongamento do pescoço	Testes de arremessos com bolas, Teste de Equilíbrio com uma das pernas, apalpação segmentar, radiografia da coluna cervical	As duas crianças descritas neste artigo responderam positivamente ao tratamento quiroprático e fisioterapia combinados. O resultado do tratamento consistiu em melhorias na postura, aumento da ADM ativa e passiva no pescoço e melhora das habilidades motoras e coordenativas.	2
Öhman A, Beckung E (14)	Estudo Controlado e Cego	Investigar-se o TMC ou o tempo em um posição de bruços quando criança teve alguma influência no desenvolvimento motor na idade pré-escolar	81 crianças entre 3,5 à 5 anos	Não houve intervenção	Battery Assessment Battery for Crianças (MABC-2) e O programa estatístico SPSS 15.0.1	Para as crianças deste estudo, nem TMC ao nascimento nem tempo gasto na posição prona quando acordado durante os primeiros 6 meses de vida influenciaram o desenvolvimento motor em 3-5 anos de idade, conforme medido pelo MABC-2. O resultado indica que a preferência pela virada da cabeça pode ter alguma associação com a mão dominante.	2
Hobaek Siegenthaler M (1)	Estudo de Caso	Descrever o tratamento quiroprático de uma criança.	Criança de 23 meses	Quiropraxia, massagem e alongamento do pescoço	A palpação segmentar mostrou uma diminuição do jogo articular e reação à dor no nível C1 / C2 à direita.	O paciente respondeu favoravelmente ao tratamento quiroprático, mostrando uma possível causa mecânica da coluna vertebral para o seu torcicolo e para a fixação anormal secundária desenvolvida do olho direito.	1
Kaplan S, Coulter C, Fetters L. (15)	Estudo de Caso	Descrever o primeiro episódio de tratamento, usando tratamento conservador, massagem e microcorrente.	Criança de 19 meses	Microcorrente e massagem e tratamento conservador.	Dez semanas de fisioterapia proporcionaram alongamento, fortalecimento, massagem e educação dos pais, acrescentando FSM nas semanas 3 a 10 para esse paciente.	A combinação de alongamento, fortalecimento, massagem, reeducação postural e resultou em amplitude total e boa força em um tempo excepcionalmente curto. A combinação de massagem e microcorrente, não relatada anteriormente, são ferramentas que podem ser eficazes no tratamento do TMC.	1

DISCUSSION

From the spreadsheet to review the results of CMD interventions, it is observed that there are several ways to evidence the results of CMD treatment based on various physical therapy interventions(1), such as: conservative therapies, kinesiological tape; myokinetic stretching, microcurrent, chiropractic, osteopathy. It is also perceived that the need for clinical decision-making

in these cases is due to the consequences observed when physical therapy treatment is not chosen. However, interventions require good evaluation, accurate examinations, and appropriate choice of optimal treatment resources.

The strategies frequently used in the conservative management of babies with torticollis include manual stretching of the affected muscle groups, in addition to specific handling and positioning strategies(3). In the midst of searches on the subject, there are the Clinical Practice Guidelines for Physical Therapy Management of Babies with Congenital Muscular Torticollis[13]. This clinical practice guideline for physical therapy management aimed to document references to guide physical therapy practice and inform the need for ongoing research related to the physical therapy management of CMD. By understanding the intervention needs of children with torticollis, through an analysis of therapists' decision-making, it allows the design of tools for comprehensive assessment that can correctly represent the condition. According to the authors, a more accurate view of the needs obtained through an adequate assessment could lead to the creation of more appropriate intervention strategies that could help to solve torticollis more effectively(3).

Still on the factors that influence decision-making, the randomized study (1) aimed to identify factors evaluated by pediatricians and physiotherapists, and reports that all babies with CMD need intervention based on 5 factors, described as the most important in validation research. ROM and Torticollis Severity were mentioned by 77% of the therapists, followed by Age at Presentation (52%), Parents' Ability to perform the exercises (48%), Plagiocephaly (39%) and Gross Motor Function (36%). To endorse the need for interventions in the first months, in relation to the most predominant factor in this study, an investigation on ROM in a blinded controlled study(7) shows the importance of evaluating treatment in the first months of the baby's life, observing the impact on the preschool age of these patients.

Still on the importance of early evaluation and intervention and the importance of the results of these aspects in CMD, the randomized study (2) shows how good screening, palpations and conventional maneuvers help in the diagnosis and also in the treatment and recovery of ROM, as well as in the severity of CMD. In this study, children up to 6 months old were evaluated and treated through passive rotations, and these results later avoided the need for more comprehensive treatments and surgical interventions. In the same study, the parents' ability to get involved in helping with treatment was also scored as important for the final outcome. It is important to note that this study, with a good sample size, followed 2,564 neonates for 3 years and there was no ADM damage in this period.

The randomized study (3) also reports the treatment of neonates, with a relatively smaller group, but its intention was to evaluate the results of minimal physical therapy treatment (which the

authors classify as sessions performed exclusively by physical therapists) and intensive treatment (treatment with physical therapists together with the participation of parents). This study showed that functional recovery was observed in 77% of children in the minimal treatment group and in 100% of children in the intensive treatment group, corroborating the scores of the previous study (2). The total number of complications and the time to functional recovery were significantly shorter in patients undergoing intensive care.

The randomized study (4) brings Osteopathy as an alternative treatment. As a result of the evaluation of soft tissue manipulations in the treatment of CMD, the study points out that this type of physical therapy intervention is effective and accelerates recovery. The study in question points to a satisfactory result for pure manual therapy, however, on the other hand, the case study (9) revealed a reliability in the use of microcurrent, specifically to give greater stretching combined with conventional manual manipulations. This study also shows that, even with the older age for treatment, and low parental adherence, the patient's ability to keep the head in lateral flexion against gravity improved from 25 to 70 degrees, the head tilt angle reduced from 12 to 2 degrees at rest, with a greater ability to keep the head in the midline. The study (5) also goes into the combination of treatments to aid in the recovery of CMD. In this case, kinesiology tape and conventional treatment were used with 33 children aged 3 months to 12 months, but divided into three groups with different forms of applications: Group 1 (exercise group), Group 2 (exercise + kinesiology recording applied to the affected side) and Group 3 (exercise + kinesiology tape applied to affected patients and unaffected sides). Each group showed improvements by time in all outcome measures, except Group 3 who did not see improvements in cervical range of motion in rotation by time. None of the groups did not demonstrate superiority in relation to any of the outcome measures. According to the study findings, kinesiology recording did not provide any greater benefit to exercise therapy in terms of the muscle function of the lateral neck flexors of infants with CMD.

The case study (6) shows the treatment of torticollis through chiropractic and conventional manipulations, in children with advanced age, the patients submitted to the treatment obtained excellent results, and the first 6-year-old improved in the period of 3 weeks (7 sessions), with evidence in posture, but still presenting a slight flexion of the head and neck to the right side. In addition, no differences were observed in leg length, and the curve in the thoracic spine was resolved, in addition to follow-up every 6 months for 3 years. In the case of the second 10-year-old child, after 5 weeks (10 sessions), complete ROM was achieved in the cervical spine, the joint play in C1/C2 on the left was improved, although it did not become fully normal, there was no change in plagiocephaly and facial scoliosis. The results for gross motor skills were more significant. In this study, the patient was followed up until the age of 12 years, and it was found that cervical ROM

remained normal during this period of time. To corroborate with this case study, a case study (8) with the same chiropractic treatment technique and conventional manipulations, in a 23-month-old child for 4 weeks (3 sessions), in this case, the torticollis was almost completely resolved and the abnormal fixation of the right eye was no longer apparent. No recurrence of symptoms was observed at a follow-up visit at 26 months.

These few studies demonstrate that manipulative strategies can be important in the treatment of CMD, but the association of strategies seems to be the best alternative in the approach to CMD both in neonates and in childhood. Analyzing the studies (2, 3, 4) we can show in terms of comparison that the gains and results with neonates are expressly considerable, thus there are advantages in starting an early physical therapy treatment, as some factors observed present greater results, undoubtedly because the child is at the beginning of the development and maturation of the musculoskeletal system, thus reducing the dysfunctions of a possible CMD[14]. Early diagnosis, in this sense, is just as important, and can be performed based *on criteria of suspicion in neonates*, from the performance of unilateral neck flexion and head tilt maneuvers during the inspection, minimal restriction in the range of motion of the neck on physical examination and/or severe plagiocephaly could bring the need to use other *criteria to establish a diagnosis of CMD.* Continuing the initial examination and investigation, unilateral neck flexion, head tilt, limited range of motion of the neck, palpable tumor, and abnormal echotexture observed on ultrasonography would establish the possibility of early treatment[3]. The study (1) also proposes that one of the advantages of treating neonates is to have a careful evaluation of the baby's CMD related to their environment, and how the family-centered model can bring a considerable improvement in treatment, as well as study (4), in which the treatment of neonates up to 6 months was addressed, corroborating the importance of the family in the recovery process working with soft tissue stretching.

FINAL CONSIDERATIONS

The present study aimed to address the different forms of physical therapy treatment in CMD and to evaluate the evidence of interventions for the rehabilitation of patients. The results of the study showed that the following types of interventions are in use: conventional physiotherapy; microcurrent; kinesiological tape; Chiropractic; osteopathy, and union of one of these with other treatment techniques in an associated way, such as microcurrent and ultrasound, for example.

As a way of contributing to the theme, it was observed that both evaluation and early treatment exert a significant gain, as well as intensive treatment, in which there is the participation of the family. It was also found that there are few studies on the physical therapy treatment of CMD, opening the need for more studies that collaborate with such evaluations and evidence, making it

impossible to replicate these findings, however, we observed that, for the most part, the treatments have been applied through basic guidelines and professional experience, obtaining results that benefit the recovery of patients with CMD.

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