

**02 - THE USE OF SWIMMING AS A STRATEGIC MECHANISM FOR THE PRODUCTION OF PARESTÉSIC STIMULES IN INDIVIDUAL CAUGHT BY TRANSVERSE MYELITIS**

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**INTRODUCTION**

Transverse Myelitis (TM) is an acute inflammatory process that affects a focal area of the spinal cord with clinical neurological manifestations in motor, sensory, and autonomic nerves. (Maciel, 2014). It is a pathology in which an immune-mediated inflammatory process of the spinal cord occurs causing neural lesions due to complete or incomplete spinal cord transection, resulting in motor, autonomic and sensory pathway dysfunctions. (MURTHY JM, 1999; STOKES M, 2000; MUMENTHALER M., 2007).

It is one of the diseases of the spinal cord that are frequent pathologies of the central nervous system (CNS) and occur in various causes: hooked up, neoplasms, demyelinating diseases, heredity, parasitoses, infectious processes, degenerative diseases, congenital malformations, endemic diseases and disorders hematological. (Brito JC, et al 2001). It is an acute inflammatory disease of the spinal cord, with potentially serious consequences (WILMSHURST J, 1999; BANWELL B, 2007).

The present study aims to use swimming as a stimulating mechanism for the development of paresthesia in a subject affected by transverse myelitis.

**LITERATURE REVIEW**

Acute Transverse Myelitis (MTA) is a rare and poorly understood disease, defined as a focal demyelinating inflammatory disorder in the spinal cord, its diagnosis and prognosis being difficult and resulting in several levels of weakness - usually in the lower limbs - sensory alterations and autonomic dysfunction, manifesting over a period of hours or weeks. It may exist as part of a multifocal disease of the middle nervous system (CNS). (Tartaglino LM, et al 1996, Adams RD, 1998). The prognosis of acute transverse myelitis depends on the recovery of functional disability and the risk of recurrence (Bruna et al., 2006; Debajo et al., 2009; Gajofatto et al., 2010). Transverse Myelitis is a common manifestation within the course of demyelinating diseases of the middle nervous system. Among children, it is a frequent feature of acute disseminated encephalomyelitis, which typically occurs after infection or immunization and is associated with clinical evidence and characteristic imaging findings (Krishnam, 2006).

Injuries to the spinal cord are generally recognized as having a significant risk of death and major impairment of quality of life. This ends up socially reaching the population, which leads to a high cost in public health. (Ho et al., 2007). Transverse myelitis (TM) is a clinical syndrome in which spinal cord injury is a consequence of a mediated immune mechanism. It can also occur in association with post-infectious processes and be post-vaccinal. (DALALIN G, 2017).

In the general population, the incidence is estimated at 1-4 cases per million inhabitants per year, and can reach all ages. However, the highest incidence is in the age groups of 10-19 years and 30-39 years (Vergara E. et al., 2004), being one of the biggest causes of disability in the world. (Borschers, Gershwin, 2012).

Some cases of transverse myelitis involvement may be directly related to neurological complications of hepatitis B vaccination, with transverse myelitis being considered as demyelinating (transverse myelitis and GBS), optic neuritis, lumbosacral and brachial plexopathy, and may appear from day to week (50% occurred after the first dose), although the assertion that the vaccination was responsible for the demyelinating process had no statistical significance and is now considered to be coincidental and the vaccine is safe. (PIYASIRISILP S, 2002).

Early signs and symptoms are usually characterized by acute or subacute motor, sensory and / or autonomic neurological dysfunction in addition to fever, back pain (at the time of the affected region), myalgia (muscle pain), paresthesia (tingling) in the feet and paresis (decreased muscle strength), progressing to urinary and intestinal incontinence, fold (muscle paralysis) and, consequently, muscle atrophy of the lower limbs. (Vergara E, 2004; TMCWG, 2002). However, the symptomatology of myelopathies may suddenly install or develop slowly, taking months or years to complete depending on the degree and intensity of the lesion. (BRITO JC, 2001; MUMENTHALER M., 2007).

Another clinical feature consists of signs and symptoms of neurological dysfunction in motor, sensory and autonomic nerves and spinal cord nerve pathways, which develop acutely or subacutely, and may progress rapidly within minutes or hours in some TM patients, or they may progress within days or weeks in others. When the maximum deficit level is reached, 50% of patients have loss of all movements of their feet, all patients have some degree of bladder dysfunction, and 80 to 94% of patients suffer from insensitivity, paresthesia, or loss of some of the senses in private of tact - dysesthesia. Patients usually have a bladder dysfunction that develops over time from an atonic bladder initially to one that is spastic with episodes of urinary incontinence. These patients when affected by transverse myelitis of the sacral (complication of the caudal spinal tube) may have a permanently flaccid bladder if the lower motor neurons of the bladder are damaged. (KERR, 2001).

Feitoza, 2016 reports in a comparative study of the medullary involvement between idiopathic acute transverse myelitis and optic neuromyelitis, that idiopathic acute transverse myelitis presents an earlier evolution to the clinical deficit nadir, greater concomitant involvement of the sensory, motor and sphincter systems, greater degree of functional disability, more often single-phase course, greater medullary axial involvement and more low back pain compared to Optic Neuromyelitis. Vasconcelos et al., 2002, reports that the presence of a sensitive level as presented by the patient of his research is rarely observed.

One of the ways to diagnose is through the general history and the physical examination, however often these tests do not give enough clues about the cause of the spinal cord injury. One of the medical concerns that evaluates a patient complaining and examinations suggestive of a spinal cord disorder is to rule out a mass lesion occupying what may be compressing the spinal cord. If magnetic resonance imaging is not available or the images are wrong, myelography should be performed. A myelogram is a set of X-rays taken after a lumbar puncture was performed either in the neck or the lumbar region and a contrast agent (dye) is injected into the sac that surrounds the spinal cord. The patient is then tilted up and down to allow dye flow and delineate the spinal cord while X-rays are taken (LYNN, 1997).

Based on reevaluations and physiotherapeutic sessions, the transitional phases of this lesion were observed in the

cervical, flaccid and spastic phases. The treatment was performed within 01 year and 03 months and a structural and functional improvement was obtained throughout the treatment program. It was verified the importance of physical therapy rehabilitation in patients with Transverse Myelitis, where the affected subject has many functional limitations and requires immediate and permanent intervention since there was a notable positive evolution in variables such as muscle strength, postural control, righting and protection reactions, bed function, proprioception, static and dynamic balance, neuromuscular coordination, orthostatism and ambulation. (Heiner, 2010).

Regarding recovery, transverse myelitis can be divided into three thirds: one third has a good recovery, one third has a moderate recovery and one third does not recover. Recovery that does not start between one and three months after starting treatment is unlikely to occur (BORGES, 2015).

#### METHOD

The sample is composed of a male subject, 42 years old, affected by transverse myelitis (TM) at 16 years of age. The method used was swimming, 02 times a week, for 06 years. The protocol used was: after educational swimmers such as crawl and butterfly strokes at various levels of difficulty, the subject swam for 05 minutes at the swim crawl by mentally analyzing the movement of the legs in the water, even though the legs do not move. After swimming for about five minutes the swim crawl within this principle, the subject stood for twelve seconds holding the edge of the pool without performing the crawl stroke and mentally analyzing first: the legs running the crawl in the water and then the legs stopped (12 seconds for the leg executing the movement and 12 seconds for the leg without performing the movement). The exercise was repeated with the subject performing strokes at the edge of the pool.

The same procedure occurred with the butterfly swim. The subject performed educational strokes for the butterfly swim at various levels of difficulty and then performed the butterfly swim for 05 minutes by mentally analyzing the movement of the legs in the water - butterfly leg. Then the subject stood for twelve seconds holding on the edge of the pool without performing the stroke of the butterfly swim and mentally analyzing first: the legs running the leg of the butterfly swim in the water and then the legs stopped. These exercises were performed with the arms stopped at the edge of the pool. The exercise was repeated with the subject also performing strokes at the edge of the pool.

#### RESULT

The result was that when the subject thought of the legs performing the crawl-leg movement as well as running the leg of the butterfly swim, the hip moved. When the guy thought about his legs without doing the swinging motion of the swim crawl, and when he thought of the butterfly swim, his hip did not move. This led to the appearance of paresthesia in the trunk, hip and legs (TABLE 1). There was an interesting progression: in the first year the use of swimming caused the appearance of paresthesia only in the feet. In the second year the use of swimming caused the appearance of paresthesia also in the hip and in the third year the use of swimming caused the appearance of paresthesia also in the trunk. This evolution is limited so far with paresthesia reaching from the feet to the trunk.

#### CONCLUSION

It was concluded that the use of swimming as a stimulatory mechanism for the development of paresthesia in a subject affected by transverse myelitis was a treatment that caused the onset of paresthesia and the development of the same in a subject with this pathology. We suggest that other researchers seek to investigate in this area to improve performance of other subjects affected by transverse myelitis can be contemplated and / or benefited.

#### ABSTRACT

The present study aims to use swimming as a stimulating mechanism for the development of paresthesia in a subject affected by transverse myelitis. Transverse Myelitis (TM) is an acute inflammatory process that affects a focal area of the spinal cord with clinical neurological manifestations in motor, sensory, and autonomic nerves. (Maciel, 2014). It is a pathology in which an immune-mediated inflammatory process of the spinal cord occurs causing neural lesions due to complete or incomplete spinal cord transection, resulting in motor, autonomic and sensory pathway dysfunctions. (MURTHY JM, 1999; STOKES M, 2000; MUMENTHALER M., 2007). The result was that when the subject thought of the legs performing the crawl-leg movement as well as running the leg of the butterfly swim, the hip moved. When the guy thought about his legs without doing the swinging motion of the swim crawl, and when he thought of the butterfly swim, his hip did not move. This caused the appearance of paresthesia in the trunk, hip and legs. There was an interesting progression: in the first year the use of swimming caused the appearance of paresthesia only in the feet. In the second year the use of swimming caused the appearance of paresthesia also in the hip and in the third year the use of swimming caused the appearance of paresthesia also in the trunk. This evolution is limited so far with paresthesia reaching from the feet to the trunk. It was concluded that the use of swimming as a stimulatory mechanism for the development of paresthesia in a subject affected by transverse myelitis was a treatment that caused the onset of paresthesia and the development of the same in a subject with this pathology. We suggest that other researchers seek to investigate in this area to improve performance of other subjects affected by transverse myelitis can be contemplated and / or benefited.

Key-words: swimming, transverse myelitis, paresthesia.

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TABLE 1.

SWIN	ARMS	USING THINKING	HIP
SWIN CRAWL	With arm in the border	Thinking about the execution of the stride	HIP MOVED
SWIN BUTTERFLY	With arm in the border	Thinking about the execution of the stride	HIP MOVED
SWIN CRAWL	Without arm in the border	Thinking about the execution of the stride	HIP MOVED
SWIN BUTTERFLY	Without arm in the border	Thinking about the execution of the stride	HIP MOVED
SWIN CRAWL	With arm in the border	Not thinking about running the stride	HIP DOES NOT MOVE
SWIN BUTTERFLY	With arm in the border	Not thinking about running the stride	HIP DOES NOT MOVE
SWIN CRAWL	Without arm in the border	Not thinking about running the stride	HIP DOES NOT MOVE
SWIN BUTTERFLY	Without arm in the border	Not thinking about running the stride	HIP DOES NOT MOVE

REPORT 01 OF THE SUBJECT: Subject R. A. M. reports that in 1991 he worked in a car workshop where he was a lantern. When he started to work, everything was going well until he began to feel a pain in the stomach and began to feel nauseated. The nausea increased and he reports that he asked a friend to buy a medicine for nausea and taking the medication the nausea subsided. However, minutes later the pain increased and passed to the chest until it reached the back.

He then asked to be taken to the hospital and inside the car he positioned himself with his back on the driver's door and his feet on the hitchhiker's door. The pain was intense and, according to him, the sensation was that he was "shrinking." Then he lost sight-then returned-and began to scream a lot, for the pain was intense. It was then that the colleagues transferred him to another car and took him to the hospital. When he arrived at the hospital he was medicated, but the pain did not pass. Then he was sedated and became sleepy and fell asleep. This happened on a Saturday. He reports that he woke up Monday only without the movements of his legs, no longer feeling them on some levels and with a urinary catheter.

Today it is in a wheelchair, with no movement of the legs. He was hospitalized in Rio de Janeiro, RJ for 5 years and 6 months. There was no diagnosis, because the exams showed nothing. No one even explained why, there was no diagnosis.

It was then that a North American doctor appeared in the hospital and that he visualized a "deviation of nerves" that in the examination seemed that the nerves were united, but in fact they were so close together that could not even pass a needle -

thus the doctor reported to him. This diagnosis was performed at the Hospital of Fundão, RJ, where he was hospitalized for 40 days.

For 01 year could not even sit. After 01 year the spasms began. He also did not feel the urination and the stool leave. Today feels.

He believes he can walk again because 02 doctors told him that just as the pain came and he lost his gait, the pain can come back and he returns with his gait.

As they did not obtain an accurate diagnosis, the incidences pointed to a diagnosis of transverse myelitis, which is the report that it has today.

REPORT 02 OF THE SUBJECT: He reports that the feeling he has today, after he leaves swimming lessons and goes home, it seems that the back muscles of the back are "docking." You have the feeling that "nerves and muscles are agitated." I feel my legs burning and tingling every day, with greater intensity on the soles of my feet, my fingers and the joints of my knees. He also feels an "itch" in the back at a specific point that he says is the point of the spinal cord injury.

I do not know if it's an improvement or a worsening. I only know that it is new, different and good, says the subject R. A. M.

#### THE USE OF SWIMMING AS A STRATEGIC MECHANISM FOR THE PRODUCTION OF PARESTHÉSIC STIMULES IN INDIVIDUAL CAUGHT BY TRANSVERSE MYELITIS.

Development of paresthesia in a subject affected by transverse myelitis. Transverse Myelitis (TM) is an acute inflammatory process that affects a focal area of the spinal cord with clinical neurological manifestations in motor, sensory, and autonomic nerves. (Maciel, 2014). It is a pathology in which an immune-mediated inflammatory process of the spinal cord occurs causing neural lesions due to complete or incomplete spinal cord transection, resulting in motor, autonomic and sensory pathway dysfunctions. (MURTHY JM, 1999; STOKES M, 2000; MUMENTHALER M., 2007). The result was that when the subject thought of the legs performing the crawl-leg movement as well as running the leg of the butterfly swim, the hip moved. When the guy thought about his legs without doing the swinging motion of the swim crawl, and when he thought of the butterfly swim, his hip did not move. This caused the appearance of paresthesia in the trunk, hip and legs. There was an interesting progression: in the first year the use of swimming caused the appearance of paresthesia only in the feet. In the second year the use of swimming caused the appearance of paresthesia also in the hip and in the third year the use of swimming caused the appearance of paresthesia also in the trunk. This evolution is limited so far with paresthesia reaching from the feet to the trunk. It was concluded that the use of swimming as a stimulatory mechanism for the development of paresthesia in a subject affected by transverse myelitis was a treatment that caused the onset of paresthesia and the development of the same in a subject with this pathology. We suggest that other researchers seek to investigate in this area to improve performance of other subjects affected by transverse myelitis can be contemplated and / or benefited.

Key-words: swimming, transverse myelitis, paresthesia.

#### L'UTILISATION DE LA NATATION EN TANT QUE MECANISME STRATÉGIQUE POUR LA PRODUCTION DE STIMULES DE PARESTHÉSIC EN INDIVIDUEL TENU PAR MYÉLITE TRANSVERSÉ.

Développement de paresthésie chez un sujet affecté par une myélite transversale. La myélite transversale (TM) est un processus inflammatoire aigu qui affecte une zone focale de la moelle épinière avec des manifestations neurologiques cliniques dans les nerfs moteurs, sensoriels et autonomes. (Maciel, 2014). C'est une pathologie dans laquelle un processus inflammatoire médié par l'immunité de la moelle épinière provoque des lésions nerveuses dues à une transection complète ou incomplète de la moelle épinière, entraînant des dysfonctionnements moteurs, autonomes et sensoriels. (MURTHY JM, 1999; STOKES M, 2000; MUMENTHALER M., 2007). Le résultat a été que, lorsque le sujet pensait que les jambes effectuaient le mouvement de la rampe et de la jambe de la nage, la hanche se déplaçait. Quand le gars a pensé à ses jambes sans faire le mouvement de balancement de la nage, et quand il pensait que le marteau nageait, sa hanche ne bougeait pas. Cela a provoqué l'apparition de paresthésie dans le tronc, la hanche et les jambes. Il y a eu une progression intéressante: dans la première année, l'utilisation de la natation n'a causé l'apparition de paresthésie que dans les pieds. Au cours de la deuxième année, l'utilisation de la natation a provoqué l'apparition de paresthésie également dans la hanche et, dans la troisième année, l'utilisation de la natation a provoqué l'apparition de paresthésie également dans le coffre. Cette évolution est limitée jusqu'à présent avec la paresthésie atteignant les pieds au tronc. Il a été conclu que l'utilisation de la natation comme mécanisme stimulant pour le développement de la paresthésie chez un sujet affecté par une myélite mycéliste transversale était un traitement qui provoquait l'apparition de paresthésie et le développement de celle-ci chez un sujet présentant cette pathologie. Nous suggérons que d'autres chercheurs cherchent à enquêter dans ce domaine pour améliorer les performances d'autres sujets atteints par la myélite myrhénique transversale peuvent être envisagés et / ou bénéficiés.

Mots clés: natation, myélite transversale, paresthésie.

#### EL USO DE LA NATACIÓN COMO MECANISMO ESTRATÉGICO PARA LA PRODUCCIÓN DE ESTIMULOS PARESTÉSICOS EN EL TRATAMIENTO INDIVIDUAL POR MIELITIS TRANSVERSA.

Desarrollo de parestesias en un sujeto afectado por mielitis transversa. La Mielitis Transversa (TM) es un proceso inflamatorio agudo que afecta a una zona focal de la médula espinal con manifestaciones neurológicas clínicas en los nervios motores, sensoriales y autónomos. (Maciel, 2014). Es una patología en la que se produce un proceso inflamatorio mediado por inmunidad de la médula espinal causando lesiones neurales debido a una transección de la médula espinal completa o incompleta, dando como resultado disfunciones motoras, autonómicas y de la vía sensorial. (MURTHY JM, 1999, STOKES M, 2000, MUMENTHALER M., 2007). El resultado fue que cuando el sujeto pensó en las piernas que realizaban el movimiento de la pierna de rastreo y corriendo la pierna de la mariposa nadando, la cadera se movió. Cuando el chico pensó en sus piernas sin hacer el movimiento de balaneo de la nadada, y cuando pensó en la mariposa nadar, su cadera no se movió. Esto causó la aparición de parestesias en el tronco, la cadera y las piernas. Hubo una progresión interesante: en el primer año el uso de la natación causó la aparición de parestesia sólo en los pies. En el segundo año el uso de la natación causó la aparición de parestesia también en la cadera y en el tercer año el uso de la natación causó la aparición de parestesia también en el tronco. Esta evolución es limitada hasta ahora con parestesias que se extienden desde los pies hasta el tronco. Se concluyó que el uso de la natación como mecanismo estimulador para el desarrollo de parestesia en un sujeto afectado por mielitis transversa fue un tratamiento que provocó el inicio de la parestesia y el desarrollo de la misma en un sujeto con esta patología. Sugerimos que otros investigadores busquen investigar en esta área para mejorar el desempeño de otros sujetos afectados por mielitis

transversa pueden ser contemplados y / o beneficiados.

Palabras claves: natación, mielitis transversa, parestesia.

#### O USO DA NATAÇÃO COMO MECANISMO ESTRATÉGICO PARA A PRODUÇÃO DE ESTÍMULOS PARESTÉSICOS EM INDIVÍDUO ACOMETIDO POR MIELITE TRANSVERSA.

O presente estudo tem como objetivo utilizar a natação como mecanismo estimulador para desenvolvimento de parestesia em sujeito acometido por mielite transversa. A Mielite Transversa (MT) é um processo inflamatório agudo que afeta uma área focal da medula espinhal com manifestações clínicas neurológicas em nervos motores, sensoriais, e autonômicos. (Maciel, 2014). É uma patologia na qual ocorre um processo inflamatório imunomediado da medula espinhal causando lesões neurais devido a uma transecção medular completa ou incompleta, resultando em disfunções de vias motoras, autonômicas e sensoriais. (MURTHY JM, 1999; STOKES M, 2000; MUMENTHALER M., 2007). O resultado foi que, quando o sujeito pensou nas pernas executando o movimento de pernada de crawl tanto quanto executando a pernada do nado borboleta, o quadril movimentou-se. Quando o sujeito pensou nas pernas sem executar o movimento o de pernada do nado crawl e quando pensou na pernada do nado borboleta, o quadril não se movimentou. Isto ocasionou o aparecimento de parestesia no tronco, quadril e pernas. Houve uma progressão interessante: no primeiro ano o uso da natação ocasionou o aparecimento de parestesia apenas nos pés. No segundo ano o uso da natação ocasionou o aparecimento de parestesia também no quadril e no terceiro ano o uso da natação ocasionou o aparecimento de parestesia também no tronco. Esta evolução está limitada até o momento com a parestesia atingindo dos pés até o tronco. Conclui-se então que o uso da natação como mecanismo estimulador para desenvolvimento de parestesia em sujeito acometido por mielite transversa foi um tratamento que ocasionou o aparecimento de parestesia e o desenvolvimento em cadeia da mesma em sujeito com esta patologia. Sugerimos que outros pesquisadores busquem pesquisar nesta área para maior desempenho de outros sujeitos acometidos por mielite transversa possam ser contemplados e/ou beneficiados.

Palavras-chaves: natação, mielite transversa, parestesia.