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Successful Application of CranioSacral Therapy in a Case of Acute Ptosis Following a Covid-19 Infection.

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Introduction

Isolated partial Oculomotor nerve palsy or Third cranial nerve (CNIII) palsy following a Covid-19 infection has been reported relatively few times in the literature (Tan *et al.*, 2023; Prajwal *et al.*, 2022; Iwasaki *et al.*, 2023). The Oculomotor nerve innervates the levator palpabrae superioris muscle and the muscles that allow visual tracking and gaze fixation. From an autonomic system point of view, it innervates the sphincter of the pupil and the lens (Netter, 2014). If there is no pupillary involvement and only the motor components of the nerve are affected, as in this case, it is considered a partial palsy (Tan *et al.*, 2023).

To date, the treatment that has been identified in the literature for CNIII nerve palsies, when the patient does not require hospitalisation, consists of either observation (Tan *et al.*, 2023; Iwasaki *et al.*, 2023) or a short course of oral corticosteroids (Tremblay and Brace, 2023). An Internet search of Pubmed, Google scholar and Cochrane library done on the 3rd Feb 2024 using the keywords "craniosacral therapy" and "ptosis" did not reveal any results. It is thought that this is the first case that describes implementing a CST- glial specific protocol with success to treat a patient with a partial CNIII palsy following a Covid-19 infection.

The premise of CST is that it sees "the individual as an integrated totality" (Upledger and Vredevoogd, 1983, p5) with inherent self-healing abilities. Using soft and non-intrusive touch, the therapist's intention is to 'blend and meld' with the client's body, which means therapist and client become synchronised. In other words "the therapists' hands do what the client's body does" (Upledger and Vredevoogd, 1983, p20). From that point, the therapist can connect to tissues at varying depths to assess their balance by 'tuning in'. 'Tuning in' is the ability to listen to the body rhythms using intention and light touch. When the tissues show a state of imbalance (i.e. they start twisting or bending or compressing etc.), the therapist follows the tissues' 3-D pattern of movement in what is termed the 'direction of ease'. The 'direction of ease' is the position or the shape that the tissues want to assume when they are

supported by the therapist's hands which enables them to be most relaxed. Over time, holding the tissues while allowing for the motions to continue brings on 'tissue release' (Upledger and Vredevoogd, 1983, p56). That is felt as balancing, softening, lengthening and/or spreading of the tissues and often is followed by heat release. Those signs signify that the 'self-correction' process has reached completion.

The rationale for choosing to implement a glial-specific protocol is based on recent evidence about the importance of the glia and the glymphatic system as well as the meninges and the dural lymphatic system in keeping the Central Nervous System (CNS) healthy (Reeves *et al.*, 2020; Ringstad *et al.*, 2018). Glia cells are involved in almost all aspects of the CNS development, structure, function, health and healing (Wanveer 2015, p10). Looking through a CST lens at the types of glial cells and their functions within the CNS as well as the meningeal layers, they can be viewed as contributing to nine brain and spinal cord specialized systems: Cerebrospinal fluid (CSF) drainage (Sakka, Coll, and Chazal, 2011), glymphatic system (Reeves *et al.*, 2020), blood-brain barrier (BBB) and neurovascular unit (Gao *et al.*, 2023), radial glia (Beattie and Hippenmeyer, 2017), tripartite synapse (Farhi-Tselnicker and Allen, 2018), extracellular space (Dzyubenko and Hermann, 2023), CNS communication (Pistono *et al.*, 2021), myelin (Hughes, 2021) and gliosis (Galea and Graeber, 2023). From the above, a CST therapist can 'blend and meld' with a particular glial-related system or meningeal layer, can 'tune in' to its specific 3-D movement pattern and can facilitate 'self correction'.

Case and timeline

The client was a 49 year old female, healthy and on no medication. She worked in customer services and enjoyed regular walks and swimming. She reported attending a pub gathering in April 2022. Then 3 days later, she started feeling unwell with strong body aches in the pelvis

and legs, sensations of hot and cold and left sore throat. The next day she tested positive for Covid-19 (using a Lateral Flow Test as per UK government guidelines at that time). Her symptoms deteriorated as she lost her appetite, her energy levels were very low and her sleep was very disturbed. The following day she woke up with left eyelid ptosis (table 1).

Timeline of infection and recovery

Sat 2nd Apr	Tue 5th	Weds 6th	Thurs 7th	Fri 8th	Sat 9th	Tue 12th	Sat16th Apr
		Day1	Day2	Day3	Day4	Day7	Day10
Social gathering	Generalised symptoms (strong body ache)	Positive Covid test	Left eyelid ptosis (severe)	ptosis (moderate)	ptosis (mild)	full eyelid recovery	Negative Covid test
			1st CST treatment	2nd CST treatment			

Table 1: Timeline of Covid-19 infection, left eyelid ptosis, CST treatment intervention and effect on recovery and finally testing negative for Covid-19.

On inspection the eyelid was on the level of the pupil, which according to the ptosis classification system is considered severe (fig.1). The pupillary reflex was unaffected.

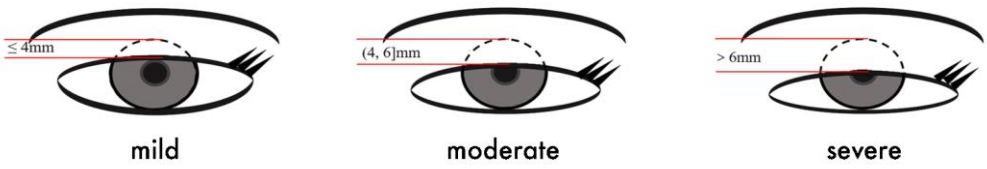

Figure 1: Ptosis classification showing mild, moderate and severe ptosis (modified from Zhu et al., 2022).

She also had restricted movement and soreness when trying to move her eyeball in all directions. She stated that there was no blurriness or double vision. Additionally, she stated that this was the first time she ever experienced anything like this and was emotionally

shocked and worried. On day 2 of the infection we implemented a CST- glial specific protocol.

First treatment - Day 2

Evaluation

The client was supine on the treatment couch. The therapist evaluated the CranioSacral Rhythm (CSR) of the whole body and of the 9 different brain and spinal cord specialized systems. The CSR of the CSF drainage system was identified as showing the least strength or fullness, suggesting diminished vitality of its drainage capacity. If it is diminished, it is an indication that that particular system needs support. The CSR has been used as an evaluation tool for many decades in an experiential way (Upledger and Vredevoogd, 1983, p31). It has 2 phases; flexion when the whole body expands and extension when the whole body contracts. A CST therapist can evaluate through palpation its characteristics, which involve the symmetry, the quality, the amplitude and the rate of the CSR. If the quality and amplitude are diminished, it is thought that the system has diminished vitality (Upledger and Vredevoogd, 1983, p7-8). The most recent experimental study (Rasmussen and Meulengracht, 2021), which showed the existence of a third rhythm in the human head, distinct from the cardiac and the respiratory rhythm, shares similar rate characteristics to what has been described in the past (Upledger and Vredevoogd, 1983, p31).

Treatment

According to the glia protocol, the treatment starts with the thoracic diaphragm (thoracic inlet or outlet area). It is thought that releasing the tension of the tissues of the neck and throat facilitates the fluid return from the head to the thorax (Upledger and Vredevoogd, 1983, p52). According to a recent study (Albayram *et al.*, 2022), “the vascular-carotid space in the neck

is very important for the CerebroSpinal-fluid-Interstitial Fluid (CSF-ISF) drainage from the brain". The vascular carotid-space extends from the jugular foramen of the skull to the aortic arch. It houses the carotid artery, the jugular vein, the cranial nerves IX to XII and the deep cervical lymph nodes. The carotid sheath is made of local and deep cervical fascia (Jones *et al.,* 2024). The study by Albayram *et al.* (2022) showed that in humans, the CSF and ISF drains from the intracranial meningeal lymphatics to the deep cervical lymph nodes via the cranial nerves IX-XII and their foramina. Previously, in a study using animal models, it appeared that when the lymph nodes of the neck of mice are mechanically occluded, the concentration of Beta-Amyloid protein in their brains increases significantly compared to control mice (Wang *et al.*, 2019). From the above, we can hypothesize that if there is excess muscle/ fascia tension in the neck, it could affect the tension of the carotid space. That could potentially lead to the disturbance of the brains' drainage capacity towards the thorax, causing congestion in the brain.

Working with the client for 10-15 minutes at the thoracic diaphragm and following the tissues in their direction of ease, allowed self-correction to happen. There was a sense of fluid flow, heat release and widening of the tissues. Once there was a sense of completion, the next part involved tuning in to the CSF drainage system, first along the spinal cord and then the brain.

Evaluation showed that the system's 3-D movement pattern had a tendency to move to the right as a whole at the spinal cord level and to the left at the brain level. Following the tissues of the system, in their direction of ease and then finding the balancing point (dynamic poise) allowed self-correction to occur. Upon completion, the natural rhythmical movement of the system (CSR) was followed for a few cycles using a technique called 'cranial pumping'. 'Cranial pumping' refers to following the movement of the system to the end of its expansion

phase and then to the end of its contraction phase adding a soft nudge at the end of each range. The treatment lasted for approximately 30 minutes.

Second treatment - Day 3

The client's ptosis improved significantly following the initial treatment; the left eyelid now was above the pupil (photo 1a) and, according to the ptosis classification system, could be classed as moderate (fig.1). She still reported soreness when moving the eyeball but was able to hold her gaze longer before coming back to neutral. We agreed to have a second treatment.

Photo 1 (a,b,c): Photos showing the left eyelid ptosis on Day 3 (after the 1st treatment), on Day 4 (after the 2nd treatment) and on Day 5. The client made a full recovery at Day 7 (not shown).

Evaluation and Treatment

The process was similar to the first treatment although on this occasion, what appeared to need attention were the glia participating in the blood-brain-barrier (BBB). As previously, the treatment started at the thoracic diaphragm, which brought balancing to the local tissues. Then the focus moved to the BBB along the spinal cord and then the brain, following the same process as before. The 3-D movement of the BBB was followed until self-correction was palpated. At the end, the CSR of the system was followed using the cranial pumping technique for a few cycles for integration. The treatment lasted for approximately 30 minutes.

Day 4

Upon waking up the day after the second treatment, the client reported continued improvement of the eyelid positioning and ability to lift it (photo 1b). According to the ptosis classification system it could now be classed as mild (fig.1). There was further reduction in soreness when moving the eyeball. She also noticed that the rest of her Covid-19 symptoms had improved too. She felt confident that the improvement would continue so she decided not to have any more treatment.

Day 5

The client reported further improvement with regards to soreness and the ability to lift her eyelid (photo 1c). Overall, there was an improvement in all aspects of her symptoms; her sleep was normalised, her appetite returned and she was now able to do chores around the house and in the garden. Furthermore, she reported feeling back to normal at Day 7 since she had tested positive for the virus. It took 5 days for the ptosis and associated eyeball muscle soreness and gaze movement to resolve. It took 10 days to test negative for Covid-19 and then she was able to go back to work.

Discussion

This case study showed that the patient recovered fully 5 days after the partial left Oculomotor nerve palsy was observed. Within that time, she also gained full recovery of the eyeball movement and gaze. Furthermore, all other symptoms improved as well. According to the available literature (Prajwal *et al.*, 2022), it is a consistent finding that isolated cranial nerve palsies are rare, they happen with mild Covid-19 infections and the affected people don't usually require hospitalisation. That was also the case with this client; her symptoms were not severe enough to require medical attention.

A systematic review analysed 11 cases of 'isolated Oculomotor nerve palsy'. Nine were from separate cases studies and 2 were case presentations from the researchers (Tan *et al.*, 2023). Out of the 11 subjects, 5 were reported as healthy adults and not on medication. They all had ptosis and no associated pupillary involvement. The above baseline presentation is consistent with the presentation of the subject of the present study. Their age range was between 21-55yo and their recovery range was between 6-17 days with an average of 9.4 days. Four out of five recovered naturally; the 5th patient required hospitalisation and medication for other Covid-19 related symptoms.

Another case report (Iwasaki *et al.*, 2023) analysed a healthy man in his 40's who presented with acute left ptosis and a diagnosis of Covid-19 the day before. He had no other cranial nerve deficits and no pupillary involvement. This patient did not require any medication or hospitalisation and made a natural recovery in 14 days.

From the above, if we combine the average rate of recovery of the above 5 patients it is 11.7 days. When that is compared to the recovery following CST application, albeit within a very small sample of patients, CST shows the possibility that it could halve the recovery time, thus speeding up the recovery process.

The mechanism of the Covid-19 virus causing cranial nerve palsies is not clear. There have been proposed (Spiteri, Barakat and Vukicevic, 2023): ischemic changes, micro-thrombi formation, neuro-inflammation and autoimmune processes. The consensus is that Covid-19 can affect different organs of the human body through various mechanisms, causing an array of symptoms at various degrees of severity (The C-MORE group, 2023).

In the case report by Iwasaki *et al.* (2023), the diagnostic tests that were performed excluded ischemic causes, thrombi formations, thickening of the Oculomotor nerve and autoimmune causes. They concluded that potential causes could have been ischemia or neuro-inflammation caused by Covid-19. Our understanding of the above is that any changes were not severe enough to be detected through the available testing.

In our case study, the aetiology remains unclear, as the client did not seek medical attention so there was no diagnostic tests performed. Potentially, like in the above case, there could have been some ischemic changes and/or some neuro-inflammation affecting the environment and/or the Oculomotor nerve itself. Looking at the CST-glial/ CSF techniques that were used, namely the CSF drainage and the blood brain barrier (BBB), a hypothetical mechanism can be proposed: the CSF drainage potentially helped to improve the environment of the nerve (i.e. removing waste) thus improving the fluid flow and the space around it. Then working with the form of the BBB, potentially repaired the BBB's integrity, which improved the blood flow towards the Oculomotor nerve.

Conclusion

This case study showed the successful application of CST combined with a glial/CSF specific protocol in treating a client with left ptosis following a Covid-19 infection. Some hypothetical mechanisms of action are suggested. Further research is required to shed more light on the efficacy of CST in nerve pathologies following a viral infection.

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