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Prevention and Rehabilitation

Treatment of panic disorder by trigeminal nerve manipulation: A case series☆

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ABSTRACT

This is a report on two cases of patients with acute severe panic disorder relieved of their symptoms by manual manipulations of the trigeminal nerve's alveolar branches. The manipulations were performed via the oral cavity during one session, or two consecutive sessions less than a week apart. No other effective treatment was administered prior, concurrently or since the time of the treatment. The recovery from panic disorder was immediate and lasted for the entire period of observation of three years. The authors used the same procedure and achieved identical clinical results treating ten other clients over a period of three years. This was not a planned experiment or randomized study. Rather, this report presents clinical evidence and the authors' hypothesis based on clinical data and literature review.

1. Method

1.1. Introduction

The authors work in an integrative mental health and wellness practice where one of the authors uses manual therapy treating a wide variety of clients with mental and physical conditions. The following is the description of two cases of treatment of acute severe panic disorder (PD). The symptoms of PD were alleviated by *neural manipulations* of the alveolar branches of the trigeminal nerve. The manipulations were performed via the oral cavity in one or two treatment sessions. Prior to these sessions, both clients were diagnosed with PD by third party licensed physicians. Both clients went through extensive tests to rule out other conditions. Previously received pharmacological and psychotherapeutic treatments were not successful in either case. The clients reported no anxiety or panic due to having or anticipating dental care. At the time of their visit to the authors' office or prior, neither of the clients had tooth pain, symptoms of trigeminal neuralgia, or temporomandibular disorder (TMD).

1.2. Treatment method

In both cases described in this study, the author used *neural manipulations*, a manual therapy method of non-invasive evaluation and treatment of *neural fixations* developed by J.P. Barral and A. Croibier (Barral & Croibier 2007, 2009). According to Barral, *neural fixation* of a nerve may be identified by changes in its consistency, loss of its ability to glide and/or stretch, increase of intra- or perineural pressure, and sporadic hardening. In addition, *neural fixation* is characterized by "functional interferences (blood supply or electric and/or electromagnetic conductivity)" (Barral and Croibier, 2007: 69).

Osteopathic *listening* technique was used for tissue evaluation. Barral describes *listening* as "passive drawing of the palpating hand to a fixation in the tissue" (Barral and Croibier, 2007: 253). In the therapeutic phase of *listening* called *induction*, the hand ever so slightly induces the motion in the direction opposite to the fixation (restriction) and then is allowed to move with the tissue in the direction of ease (Barral and Croibier, 2009: 38).

In case of nerve tissue, the *neural listening* finger, placed on the tissue, becomes an extension of perceived *neural fixation*. When the *neural fixation* disappears, the sense of attraction and the perception of pulling in any direction (or *listening*) vanishes, and the nerve tissue is considered balanced. In the case when the listening finger contacts the targeted nerve indirectly, through a solid body of a tooth, the dysfunctional nerve creates a perception of an electric

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signal. When such perception disappears, the nerve is considered free of *neural fixation* or balanced (Barral and Croibier, 2009).

In the described cases, the *neural listening* and *induction* techniques were used during the treatment sessions to balance the trigeminal nerve branches through their attachments to the teeth. The *neural listening* and *induction* techniques were applied at the site of extracted teeth and non-erupted wisdom teeth, as well as to balance the residual part of the nerve in case of previously performed root canal procedures. The strongest *listening* was created by the molars affected by dental work.

1.3. Case 1

In May of 2015 a 34-year-old woman sought help for chronic pain related to scars and adhesions caused by a hysterectomy and bilateral salpingectomy-oophorectomy performed in 2010. The client was relieved from the symptoms related to her original complaint, and, in a few minutes remaining at the end of the session, she was treated for an insignificant tension in her first and second right upper molars, whose occlusal surfaces were flat after cavity repairs. The author anticipated fascial unwinding of periodontal ligaments. Instead, touching these teeth created the *neural listening*, which the author had never before experienced while working with teeth.

On the following day, the client reported by phone that in addition to pain relief, she stopped having panic attacks while walking up steps (this symptom was not reported at the time of the treatment session). According to the client, a slight increase in her heart rate created by walking up steps triggered severe panic attacks. The client also reported that for many years she had been suffering from severe claustrophobia. For example, the client never could be in a bathroom with the door closed. Even the thought of walking up steps or being in confined spaces triggered severe panic attacks. The client stated that she had been diagnosed with panic disorder (PD) in 2005, and was not receiving PD related treatment, because both pharmacological and psychotherapeutic treatments had not been effective. The client reported that she had have extensive dental work done since her teens (approx. 1996) until the time of her treatment with the author. The authors have no knowledge about the extent, succession and quality of the dental work performed between 1996 and the onset of PD in 2005.

The authors speculated that the abatement of the PD symptoms might be related to the previous day's *neural manipulations* through the client's molars. The client was summoned for another session on the day following the first session. During this session, the *neural listening* and *induction* of the alveolar branches of the trigeminal nerve were performed on all the client's molars. All of them were subject to dental work to some degree. The same technique was used at the site of the non-erupted lower third molars and the extracted upper third molars.

At the end of the session, the author suggested that the client attempt to stay in the bathroom alone with the door closed. The author was standing outside for support. After a few minutes, with the client's consent, the author switched the bathroom lights off and locked the bathroom door from the outside. The client spent about twenty minutes locked in the dark bathroom with no symptoms of panic attack.

During the following three years, this client reported no panic attacks and no additional treatment received. The client chose not to seek the diagnosis confirming the cessation of PD, because her symptoms were easily discernible for her. The possible connection between elimination of fixations in the innervation of molars and the cessation of the symptoms of PD was first established by this case.

1.4. Case 2

In August of 2015, a 31-year-old female client sought help for acute severe PD diagnosed in June 2015. Talk therapy and medications (Lexapro and Ambien), which she was taking at the time of her first treatment session, were ineffective, according to the client's self-report. In spite of her medical team suggestion, the client refused psychiatric hospitalization. This client's debilitating symptoms had been increasing steadily since the onset: she was unable to work or function in the family setting as a wife and a mother of a young child. The client could not drive and was experiencing constant anxiety and several panic attacks every day. The worst symptoms included severe panic attacks on awakening after a deep sleep. The fear of the panic attacks caused her to be afraid of falling asleep. At one point, the client discovered that her panic attacks were less severe upon awakening from napping while in a moving car. At the time of her first appointment, her father had been driving on the expressway every night for 7–8 h, with the client sleeping in the car.

Neural manipulations were performed through the right and left lower second molars that were subject to extensive cavity repair and on the sites of the removed four third molars. The client reported that the third molars were removed in her teens, and the most current cavity repair on her lower second molars was performed in the spring of 2015. At the end of the first treatment session, the author suggested the client to imagine an occurrence of a panic attack, but she could not. However, the client still was extremely afraid of the recurrence of panic attacks. The author reassured the client that, if the symptoms returned, she could call any time to set up an immediate emergency treatment session. In the following five days, the client called several times only to be reassured that such a session was immediately available.

On the sixth day, the client returned for a second treatment session. She reported being free of panic attacks since the previous session. The client was able to sleep in bed and wake up with no panic. The client reported returning to work and to most of her normal daily routines. She was still afraid to drive and still was afraid of the recurrence of panic attacks. The client continued taking her prescribed medications listed above. The trigeminal nerve manipulations were not needed during the second session, since the alveolar branches had no *neural fixation*. The client started driving on her own again soon after this reassuring session.

The client came back in seven months for a third treatment session. During this period, she had no panic attacks. The client reported that she had been taken off Ambien soon after the second session. The client reported that a few days prior to the third session, her PD diagnosis was withdrawn, and her prescription for Lexapro was about to expire. The client reported being anxious about discontinuing the medication. Manual therapy performed during the third session was not related to her PD. Within a couple of weeks, the client reported by phone no recurrence of panic attacks after fully weaning from the medication.

In the following years, the author has had seven more treatment sessions with this client for various reasons, with the last session in September 2018. During these visits, the client reported no PD symptoms and needed no trigeminal nerve manipulations.

2. Results

The method of relieving patients from PD symptoms was first established in Case 1. The second case described above (Case 2), was the most severe PD case in the author's years of practice. Both clients were successfully relieved of their symptoms and reported no panic attacks during the period of observation of the following three years. No adverse effects of the treatment were reported.

The authors did not establish the causation of PD. However, the authors present evidence that *neural manipulations* on alveolar branches of the trigeminal nerve provided an immediate and long-lasting relief from PD in two clinical cases.

3. Discussion

3.1. Hypothesis

The *neural manipulations* performed on the alveolar branches of the trigeminal nerve were correlated with the eradication of symptoms of PD in two clinical cases. This led the authors to a hypothesis that *neural fixations* in the alveolar branches of trigeminal nerve may have an adverse effect on reticular (American Psychiatric Association, 2013; Barral and Croibier, 2007, 2009; Klazen et al., 2018; Limansky, 1976; Nelson, 2015; Robert et al., 2005; Trevizol et al., 2016) formation and the vagus nerve that may be responsible for PD symptoms.

The strong *listening* associated with dental work or teeth malformation led the authors to the hypothesis that the affected molars and *neural fixations* in the trigeminal nerve might have a causal relationship. Such fixation, asymptomatic otherwise, might cause PD in some individuals. For such individuals the intervention of the dental work with associated mechanical activity in the proximity of the alveolar branches becomes an additional trigger.

The authors hypothesized that eradicating *neural fixation* in the alveolar branches modified electric and/or electromagnetic signal from the trigeminal nerve to the brain central regions related to mood and anxiety disorders, thus creating a lasting therapeutic effect.

3.2. Discussion of the strengths and limitations

The strength of this study is in the clinical results of the two cases described above. Since the fall of 2015, until the end of 2018, ten other clients suffering from PD were successfully treated by *neural manipulations* method. These affected clients had been suffering with PD symptoms for periods varying from several weeks to several years.

In the first clinical case described, the authors ruled out the placebo effect as a possible contributor since the treatment outcome was unexpected for both the client and the authors. The placebo effect could not be ruled out, and it might have played a role in the second case. The authors admit that the successful result in Case 1, could have biased them and brought their attention to the stomatognathic system.

The authors understand that the *neural listening* technique is not easily verifiable by medical instrumentation and its result may not be easily replicable.

3.3. Discussion of the relevant literature

Based on the reviewed literature, there appears to be no direct experimental or theoretical evidence of a correlation between PD and sensory input to the alveolar branches of the trigeminal nerve, or the state of the alveolar branches themselves. The authors found no treatment methods for PD similar to those being implemented in the above-described cases. The trigeminal nerve fixations, described in this study, might not have attracted clinical researchers' attention since such fixations did not create any clinical symptoms usually associated with trigeminal nerve disorders or injuries.

According to the DSM-5 (American Psychiatric Association, 2013), panic disorder is characterized by uncontrollable, recurrent episodes of panic and fear. Panic attacks peak within minutes and are accompanied by physical manifestations, such as heart palpitations, sweating, and dizziness as well as the fear of dying or becoming insane. Worry about having an attack may lead to additional anxiety and avoidance behaviors or to other problems in functioning (DSM-5 2013). By definition PD symptoms involve all levels of consciousness and especially visceral reactions.

In his fundamental study, Limansky conducted extensive experiments on the trigeminal nerve in cats and reviewed more than 900 sources related to trigeminal nerve research (Limansky, 1976). In the conclusion section of his monograph Limansky stated: ' … the afferent system of trigeminal nerve ending on the nuclei of the reticular formation and the hypoglossal and vagus nerves, forms the group of trigeminal-visceral reflexes that are apparent in the changes of the state of cardiovascular, respiratory and other visceral systems of the organism'. (Limansky, 1976: 206). Since the definition of PD includes visceral and emotional reactions, the trigeminal nerve connections, as described by Limansky, may be responsible for PD.

The experimental evidence of potential clinical efficacy of treating PD by trigeminal nerve stimulation was reported by Trevizol at al. in their open label proof-of-concept trial. (Trevizol et al 2016). Seven patients were enrolled in the project. The researches assessed PD severity by the 7-item Panic Disorder Severity Scale (PDSS). The treatment consisted of applying a neurostimulator delivering 120 Hz electric pulse transcutaneously through the orbital branch of the trigeminal nerve for 30 min per day. All patients experienced a mild paresthesia beneath the electrodes during stimulation. One patient dropped off after the fourth sessions due to tension headaches resulted from the treatment. At the end of ten-day treatment PD symptoms substantially improved and remained stable after one-month following the treatment (Trevizol et al 2016).

Trevizol's findings support authors' hypothesis that the signal from trigeminal nerve reaches brain central structures related to mood and anxiety disorders. However, the *neural manipulations* method had no adverse effects, required fewer treatment sessions and, most importantly, eliminated the *neural fixations*, which at least in part may had played a role in the onset of PD, while Trevizol applied the electric stimulation to a branch without fixations.

Stanley Nelson makes strong broad statements about the effect of the molars' shape on the function and the configuration of the temporomandibular joint (TMJ) and on human behavior and emotions (Nelson, 2015). These claims are reliable since they are included in *Wheeler's Dental Anatomy, Physiology and Occlusion* which has been a standard manual for generations of dentists since 1940 (Nelson, 2015). Nelson mentions, ' … remarkable tactile sensitivity in which threshold values for detecting foreign bodies between the teeth may be as little as 8 μm' (Nelson, 2015: 706). This high level of sensitivity allows for even minute imperfections of the teeth's contact surfaces to distort nerve signal inputs to the alveolar branches of the trigeminal nerve at every mastication and swallowing. Such frequently repeated distorted signals might, in some cases, lead to PD. Since PD includes both behavioral and emotional aspects, then Nelson's statement may substantiate the hypothesis that the affected molars and their innervation may be influential factors in the onset and development of PD.

Reviewing the literature on the subject of dental work, related to trigeminal nerve injuries, the authors only found references to studies where the injuries caused pain and/or neurosensory disturbances. In their 2005 article, Robert at al stated, that dental work and, especially, third molars' surgical removal has been known as a source of trigeminal nerve injuries. Robert at al stated that according to their survey, sent to all members of the California Association of Oral and Maxillofacial Surgeons, the self-reported rate of nerve injury of the inferior alveolar branch of the trigeminal

nerve was 4 per 1,000 of lower third molar extractions. (Robert et al., 2005).

According to the retrospective cohort study conducted by Klazen et al., in 2018, trigeminal nerve injuries were found to be increasing in frequency (Klazen et al., 2018). Their study examined 53 cases of iatrogenic trigeminal nerve injury seen at the Department of Oral and Maxillofacial Surgery, University Hospitals of Leuven between 2013 and 2014. The inferior alveolar nerve was most frequently injured, with most nerve injuries caused during third molar removal, followed by implant placement and local anesthesia injuries. The symptoms caused by injuries included: pain and/or neurosensory disturbances (Klazen et al., 2018).

No studies reviewed mentioned that dental injuries could create symptoms other than pain and/or neurosensory disturbances. The literature reviewed for this article did not provide evidence that the alveolar branches of trigeminal nerve play a role in the onset of PD. However, according to clinical results outlined above, the effect of *neural manipulations* of alveolar branches of the trigeminal nerve for eliminating symptoms of PD is worthy of further exploration using a multidisciplinary approach.

3.4. Clinical relevance

The primary “take-away” lessons of this case series:

- A skillful manual therapy practitioner should consider investigating the possibility of subtle *neural fixations* of the alveolar branches of the trigeminal nerve, especially in cases of extensive dental work and/or tooth malformation, and explore the results of their treatment on the client's emotional state, particularly in cases of PD.
- Oral and maxillofacial surgeons and dentists should be aware of the possibility that their work may be indirectly affecting the emotional state of their patients without creating any post-treatment pain and/or neurosensory disturbances.
- Although this article does not establish the causality of PD, mental health practitioners could benefit from understanding the possibility that even subtle alveolar branches fixations may become influential factors in the onset and development of PD.

Declaration of competing interest

None.

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