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Physiotherapeutic possibilities in the treatment of complications after tooth extraction

Możliwości fizjoterapeutyczne w leczeniu powikłań po ekstrakcji zębów

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Abstract

Introduction:

One of the most common complications occurring during or after tooth extraction is paralysis of the lower alveolar nerve. The nerve may be damaged or affected during removal of the retained lower third molars. Nerve damage may occur in the form of paresthesia, pseudoneuralgia or complete abolition of sensation in the surgical area.

Aim:

A review of the literature to verify the physiotherapeutic possibilities in the treatment of complications after tooth extraction.

Material and research method:

A literature review was conducted in terms of physiotherapeutic treatment methods as a result of disorders resulting from complications after tooth extraction. PubMed and Google Scholar were analyzed. Keywords used in the search were: "physiotherapy and tooth extraction", "manual therapy and tooth extraction" and "electrotherapy and tooth extraction". Five reports were analyzed.

Results:

There is a need to combine standard therapy with physiotherapy in order to accelerate the healing process as a result of complications after extraction.

Conclusions:

Physiotherapy is highly effective and non-invasive in the treatment of many complications that occur in dental surgery. The physiotherapist offers a range of therapeutic procedures that improve the function of damaged nerves.

Key words: physiotherapy, tooth extraction, interdisciplinary treatment

Introduction:

Incorrect placement in the arch of, inter alia, a wisdom tooth can cause its functional inability and occlusion disorders, which is the basis for extraction. Extraction of third molars can be performed by dentists or by maxillofacial or dental surgery specialists. The varied anatomical position of molars is significant in the difficulty of removing a tooth. A very good knowledge of anatomy, manual skills and professional experience are required from the dentist. Knowledge of detailed anatomy and the competence of a specialist are necessary to minimize complications that may occur during or after surgery. The ascending risk of intra- and postoperative complications determines the need to determine indications for molar removal [1]. Specialist thanks to computed tomography with conical radius - CBCT can see overlapping anatomical structures and spatial orientation, which makes it possible to assess the relationship of lower third molars relative to the mandibular canal. CBCT illustrates the spatial location of the roots in relation to the mandibular canal, thanks to which it is possible to perform, for example, precise planning of coronectomy and at a later stage of supplementary root extraction. Thanks to tomographic radiological examination, it is possible to detect irregularities earlier before performing the extraction procedure [2]. It should be remembered that there are some risk factors that may predispose to the occurrence of complications during the procedure, such as, for example, splits and hook-shaped apices, bends or narrow root structure of retained molars. The individual anatomical structure and topographic location of the nerve channel is also an important issue [3]. Iatrogenic factors occurring as a result of surgical complications include: tissue overheating, ischemia, improper use of instruments, local nerve traumatization during bone chiseling around the tooth, lamination of the lobe from the linguistic side [4]. One of the common complications occurring during or after extraction is the inferior alveolar nerve palsy. The nerve may be damaged or affected during the removal of retained lower third molars [5,6]. Nerve damage may occur in the form of pseudoneuralgia, paraesthesia or complete abolition of sensation in the surgical area [7]. Restoration of the normal function of damaged nerves requires a long rehabilitation period, and sometimes it is only partial. Inability to restore nerve function for a period of six months may cause permanent damage. As a consequence of iatrogenic nerve damage, anti-edema medications or B vitamins can be used in standard management [8].

Aim:

Verifying whether there are reliable reports showing physiotherapeutic methods in the treatment of complications after tooth extraction.

Material and methods:

Analysis of reports from medical databases and others describing physiotherapeutic possibilities in the treatment of complications after tooth extraction. Google Scholar and PubMed have been reviewed. Keywords used in the search were: "Physiotherapy and tooth extraction", "Manual therapy and tooth extraction" and "Electrotherapy and tooth extraction". The articles from the last 10 years were analyzed in terms of physiotherapeutic treatment methods as a result of disorders resulting from complications after tooth extraction. Polish and English reports were analyzed with the inclusion criteria:

1. therapy within the stomatognathic system as a consequence of iatrogenic trigeminal nerve damage,
2. original reports on the possibility of using physiotherapeutic procedures as a result of complications after the extraction of third molars.

The following exclusion criteria have been applied:

1. previous oncological and neurological diseases, and neuralgia,
2. damage to the nerves in the craniofacial region before tooth extraction.

After verification of the work, only the entry works were received. The search strategy resulted in 1244 reports from all databases. After being limited to the last 5 years, 5 full-text publications were received, as illustrated in Figure 1. The authors considered the problem in this work in a tabular study - Table 1 and descriptive content - results.

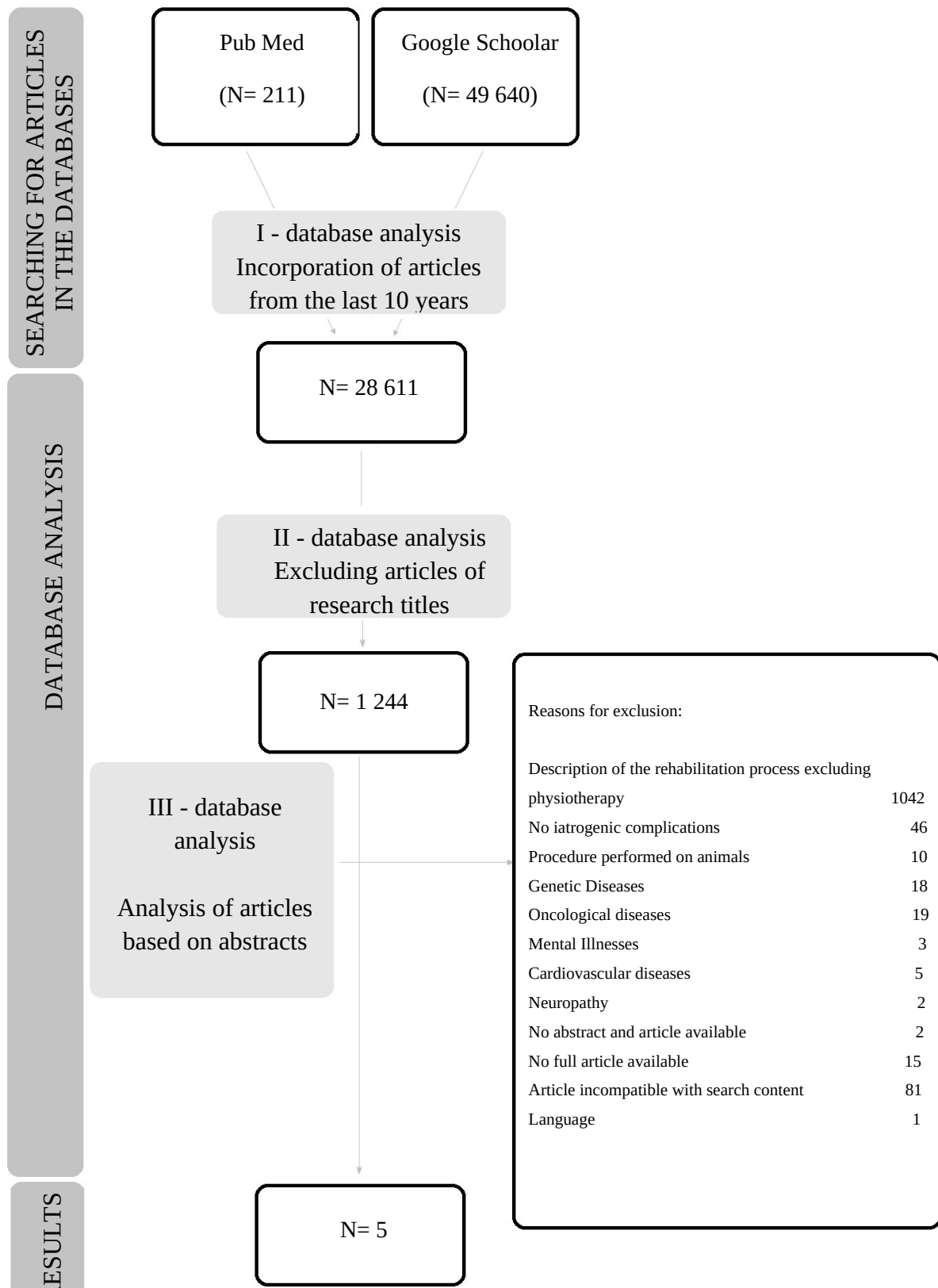


Fig. 1 Strategy for searching reports from medical databases.

Author	Aim	result	Summary
Opalko K., 2014	Characteristics of non-invasive therapeutic methods in the treatment of nervous disorders	An improvement in sensation from 60-100% was observed within previously damaged structures, i.e. the lingual or alveolar nerve	Magnetotherapy can be an effective complement to the healing process of patients who have suffered nerve damage.
Camino Junior, R. i wspł., 2015	Description of a rare case of anterior disc displacement without reduction with limited opening after traumatic extraction of the third mandibular molar.	Through physiotherapy, therapists have improved the range of mandible movement in the patient.	Manual therapy is an effective method of treatment in the early restoration of jaw movements.
Kazan P., 2017	Description of the possibility of rehabilitation of damaged nerves based on experience, own suggestions and physiotherapeutic options.	The implementation of an appropriate rehabilitation treatment plan with a good knowledge of nerve damage mechanisms gives the expected effect.	The implemented physiotherapeutic procedure brings a positive effect if during the trauma the nerve continuity was not completely interrupted and the patient was quickly referred to a physiotherapist.
Lepilin i wspł., 2018	After tooth extraction, laser beam therapy was used - 405 nm from the violet spectrum.	A reduction in edema and pain was observed. It was found that as a result of bactericidal action, the laser had a positive effect on wound healing.	Laser therapy is an effective, painless, safe and easy to perform procedure. It should be recommended as in dental clinics or maxillofacial hospitals.
Ilea i wspł., 2018	The use of an integrated therapeutic method in combination with laser therapy after tooth extraction.	After the therapy, the patient has 100% regained movement and sensation.	When the nerve is damaged, the healing process should be started as soon as possible to restore the function of the nerve tissue.

Table 1. Possibilities of applying physiotherapeutic procedures after removal of the iatrogenic tooth extraction as a consequence.

Results:

In three works, researchers: Opalko [13], Lepilin et al., [16], Ilea et al., [17] emphasized the importance of physical therapy in the treatment of complications after tooth extraction. Kazan [15] presented various physiotherapeutic methods in the field of manual therapy and physical therapy. Camino [14] noted that manual therapy is an effective method of treating patients after traumatic removal of mandibular molars. According to these authors, there is a need to combine standard therapy with physiotherapy to accelerate the healing process as a result of post-extraction complications.

Discussion:

One of the common dental complications with regard to nerves is damage to the lower alveolar and lingual nerve due to sensory fibers present in them. The symptom of damage to the lower nerve branches may be weakness or abolition of touch sensation, pain, the temperature on the lower lip, chin, teeth, gums and in 2/3 of the front of the tongue. Patients report paraesthesia as felt itching, burning or stinging. Sometimes, paralysis is also associated with pain sensations. Patients often complain of the discomfort associated with the inability to recognize the presence of food in the mouth, lips, and cheeks [8,9]. A number of therapeutic methods should be considered for a comprehensive patient treatment plan. As reports, Kubisz et al. biophysics methods are widely used in dentistry [10]. Kurpik et al. pointed out that laser therapy, inter alia, affects pain reduction and accelerating healing process [11]. According to Kazubowska et al., Laser therapy has a positive effect on the treatment of iatrogenic complications after tooth extraction. This treatment can cause patients to reduce their pain by up to 50%. Laser therapy has an anti-inflammatory effect and shortens the time of treatment [12]. As Lepilin et al. Reports, violet laser therapy (wavelength - 405 nm) was used during the therapy after post-extraction complications. As a result of the therapeutic process used, the researchers observed a decrease in the patient's edema and pain. In addition, it was found that through bactericidal action, the laser had a positive effect on wound healing. According to Lepilin et al., the use of laser therapy in the treatment of patients after a tooth extraction is a painless, safe, effective and easy to perform a procedure, and can also be recommended as a therapeutic procedure at work in dental clinics and maxillofacial hospitals

[16]. According to Ilea et al., laser therapy is a useful tool for every dentist. At the time of nerve damage, the healing process should be started as soon as possible to restore the function of nerve tissue [17]. Opalko emphasizes the impact of the use of variable-field magnetostimulation before anesthesia - the JPS system, thanks to which a specialist can reduce the dose of a painkiller. Magnetostimulation has a positive effect in the process of restoring sensation in motor and sensory fibers of, among others, the lingual of the alveolar nerve [13]. In his report, Kazan presented various physiotherapeutic options in both manual therapy and physical therapy in the treatment of complications after tooth extraction. Heat therapy treatments have the greatest impact on nerve regeneration. Fango, warmers, warm baths and wraps made of heated gels, Biopton or Sollux lamps are used. In addition, magnetotherapy and laser therapy reduce tissue swelling, restore touch, sensation, and temperature. Manual therapy includes neuromobilization. It improves blood and lymph microcirculation in the region of a given nerve, which has a positive effect on its regeneration. Physiologically, slide, shortening, and elongation of the nerve occur in combination. Kazan emphasizes that, in addition to the manual therapy used on the damaged nerve itself, the physiotherapist can additionally affect the structures adjacent to it, including muscles, blood vessels or the upper segments of the cervical spine in order to create appropriate conditions for the regeneration of this nerve [15]. Camino Junior et al. reported a rare case of anterior disc displacement without reduction with limited mouth opening after traumatic extraction of the third mandibular molar. Researchers applied manual therapy to the temporomandibular joint disc. After the therapy, the mandible's mobility was restored, which proves the effectiveness of manual therapy in dental cases [14]. Cakarer et al., as a result of facial nerve palsy in the upper part after the extraction of the third tooth used galvanic therapy in the field of physiotherapy. Due to the complexity of the clinical case, interdisciplinary treatment was implemented, where the medical team included a neurologist, otolaryngologist, ophthalmologist, and physiotherapist. Thanks to teamwork, patients can be diagnosed and treated quickly and efficiently [18].

Summary:

Physiotherapy is characterized by high efficiency and non-invasiveness in the treatment of many complications that occur in every dental specialty, and above all in the surgical one. The physiotherapist provides a range of therapeutic procedures that improve the function of damaged nerves. The knowledge of the physiotherapist and other specialists in the field of nerve damage mechanisms is extremely important. Thanks to the knowledge of this area of knowledge, specialists will be able to quickly implement a comprehensive treatment plan among patients with iatrogenic nerve damage. The implemented therapy can have a positive effect if during the trauma the nerve continuity was not completely broken and if the patient was quickly referred to a physiotherapist. On account of in view of the currently growing expectations and requirements in the field of aesthetic dentistry, combined with tooth extractions, e.g. in crowding, is extremely important. A dentist wanting to provide an esthetic correct bite should inform his patient about the plan of extraction orthodontic treatment and about other dental needs, as well as rehabilitation options. In order to coordinate and integrate the treatment process, the patient should be offered a comprehensive approach that maximizes aesthetics, function and oral health.

Literature:

1. Czechowska E, Rydzewska-Lipińska M, Szubert P, Sokalski J, Complications during the surgical removal of a wisdom tooth – a case report, *Dental Forum*, 1, XXXXI, 2013
2. Matthews-Brzozowski A, Matthews-Kozanecka M, Diagnostic value of CBCT in planning of coronectomy – surgical and psycho-ethical aspects, *Magazyn Stomatologiczny*, 5, 2015

3. Kim JH, Moon SY, Removal of a broken needle using three dimensional computed tomography: a case report, *Journal of the Korean Association of Oral and Maxillofacial Surgeons*, 2013, 5: 251-253.
4. Szubert P, Jankowski M, Krajecki M, Jankowska-Wika A, Sokalski J, Analysis of predisposing factors for complications after surgical removal of mandibular wisdom teeth, *Dental Forum*, 1, XLIII, 2015
5. Renton T, Oral surgery: part 4. Minimising and managing nerve injuries and Rother complications. *Br Dent J*, 8: 393-399, 2013
6. Dudek D, Segiet O, Reichman-Warmusz E, Wałach K, Matussek M, Helewski K, Osińska-Chybińska P, Sołtykiewicz K, Powikłania jatrogenne w chirurgii stomatologicznej – przegląd piśmiennictwa i opis przypadków, *Dental Tribune*, 04 (22), 2015
7. Hillerup S, Jensen R, Nerve injury caused by mandibular block analgesia, *International Journal of Oral and Maxillofacial Surgery*, 35: 437–443, 2006
8. Lesiakowski M, Opalko K, Sroczyk M, Piechowicz-Lesiakowska A, Lingual Nerve Rehabilitation with use of a slow alternating magnetic field a preliminary report, *Nowa Stomatologia*, 1: 20-23, 2004
9. Schunke M, Schulte E, Schumacher U, Voll M, Wesker K, pod red. Gielecki JS, Żurada A, *Atlas anatomii Prometeusz*, 2015
10. Kubisz L, Hojan-Jeziarska D, Biophysics and its methods in dental applications: diagnosis, therapy and material science, *Fizykodiagnostyka i rehabilitacja w medycynie i stomatologii- nowe trendy*, Poznań, 9-18, 2017
11. Kurpik J, Tuczyńska A, Matthews-Brzozowska T, Lasers in dentistry-a literature review, *Biofizyka a medycyna, pola magnetyczne, kolagen*, Poznań, 43-52, 2018
12. Kazubowska K, Hadzik J, Dominiak M, Iatrogenic damage to inferior alveolar nerve and lingual nerve – prevention and non surgical treatment on the basis of the literature and personal observations, *Magazyn Stomatologiczny*, 12, 2016
13. Opalko K, Fizykoterapia w chirurgii stomatologicznej, *Medical Tribune Stomatologia, Fizykoterapia w chirurgii stomatologicznej*, 09, 2014
14. Camino Junior R, Roberto Manzi M, Furtado de Carvalho M, Gualberto de Cerqueira Luz J, Castro Pimentel A, Zindel Deboni MC, Manual reduction of articular disc after traumatic extraction of mandibular third molar: a case report, *Dental Press J Orthod*, 20, 5: 101-7, 2015
15. Kazan P, Metody fizjoterapeutyczne w leczeniu powikłań jatrogennego uszkodzenia trzeciej gałęzi nerwu trójdzielnego, *Medical Tribune, Stomatologia*, 0471, 1, 2017
16. Lepilin AV, Rajgorodskij Yu M, Grigoryeva DA, Erokina NL, Bakhteeva GR, Domenyuk DA, Reasoning for application of violet laser physiotherapy device following surgeries in the oral cavity, *Stomatology*, 8(2): 111-114, 2018
17. Ilea A, Mirică IC, Boşca AB, Buhăţel D, Ionel A, Băbţan AM, Petrescu NB, Ştefănescu T, Câmpian RS, Bordea IR, Is Hypoesthesia in Mental and Incisive Nerves Areas A Complication of Inferior Alveolar Nerve Block or/and Wisdom Tooth Odontectomy?, *Biomedical Journal of Scientific & Technical Research*, 8 (3), 2018
18. Cakarar S, Can T, Cankaya B, Erdem MA, Yazici S, Ayintap E, O'zden AV, Keskin C, Peripheral Facial Nerve Paralysis After Upper Third Molar Extraction, *The Journal of Craniofacial Surgery* 21, 6, 2010