

Anti-edema treatment after orthognathic surgery

Postępowanie przeciwobrzękowe po zabiegu ortognatycznym

INTRODUCTION

Stellate epithelium is an extremely complex structure that undergoes constant reconstruction throughout our lives. It is primarily responsible for chewing, articulating, swallowing, and even breathing. It consists of many craniofacial elements, the proper functioning of which depends on each other, i.e. teeth, bones of the maxilla and mandible, the musculoskeletal system or nervous tissue. They also include the temporomandibular joints that connect the mandible with the temporal bones. Dysfunction of the facial-maxillofacial complex can lead to serious problems in everyday life, such as problems with chewing and swallowing, and breathing disorders. Moreover, it plays an important role in human appearance, therefore its dysfunction may be associated with complexes and a sense of rejection [1].

All bone abnormalities in the jaw, mandible, teeth and other structures included in the above-mentioned complex are corrected by orthognathic procedures [2].

They aim to change the position of the upper and lower jaws, as a result of which the patient obtains the correct crossbite anterior. One of the most common malocclusion bone defects is prognia (mandibular prognathism). Its characteristic feature is the front hypertrophy of the mandible in relation to the maxilla, which can be observed as an excessive protrusion of the chin. Surgical treatment remains the only and effective method of relieving the patient from prognia. If left untreated, it can lead to problems with chewing food and speech disorders [3].

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ABSTRACT

Malocclusions of varying severity affect approximately 60% of the world's population and they include abnormalities in the position of the maxilla in relation to the mandible. If left untreated, they can have very serious consequences for the entire body. The only effective form of treatment turns out to be orthognathic surgery, which determines the correct crossbite anterior. In addition to improving the quality of chewing, breathing and swallowing, the patient also gains perfect face harmony as a result of changes in the soft tissues of the nose, lips, cheeks, chin and jawline. Unfortunately, in the first few days after surgery, symptoms such as swelling, bruising or sensory disturbances appear in the jaw area. This paper aims to present ways to reduce swelling after orthognathic surgery, and to use kinesiotaping as one of the main methods.

Keywords: orthognathic surgery, prognia, temporomandibular joint, facial edema, kinesiotaping

STRESZCZENIE

Wady zgryzu o różnym nasileniu dotyczą około 60% populacji na całym świecie i obejmują nieprawidłowości w położeniu szczęki względem żuchwy. Nielezione mogą mieć bardzo poważne konsekwencje dla całego organizmu. Jedyną skuteczną formą leczenia okazuje się operacja ortognatyczna warunkująca prawidłowy zgryz. Oprócz poprawy jakości żucia, oddychania i połykania, pacjent zyskuje także idealną harmonię twarzy w wyniku zmian w obrębie tkanek miękkich: nosa, warg, policzków, brody i podbródka. Niestety w ciągu pierwszych kilku dni po przebytej operacji pojawiają się objawy w postaci obrzęków, siniaków czy zaburzeń czucia w okolicach żuchwy.

Celem pracy było przedstawienie sposobów redukcji obrzęku po zabiegu ortognatycznym z ze szczególnym uwzględnieniem kinesiotapingu.

Słowa kluczowe: zabieg ortognatyczny, prognia, staw skroniowo-żuchwowy, obrzęk twarzy, kinesiotaping

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ORTHOGNATHIC SURGERY - STAGES

Orthognathic surgery, depending on the operated area, is divided into: single-jaw surgery (it covers only the jaw or only the mandible) or two-jaw surgery (covers both bones) (rehabilitation of patients after orthognathic procedures). Due to the interference with soft tissues, large groups of which are present on the face, post-operative rehabilitation is recommended as soon as possible. Physiotherapy should include both physical and manual therapy. Treatments, after prior consultation with a doctor or physiotherapist, should be aimed at analgesic, anti-inflammatory and anti-swelling effects.

Preoperative stage

The patient should seek physiotherapeutic advice immediately after the surgical consultation and discussion of the treatment plan. The physiotherapist determines whether it is possible to start rehabilitation before the surgery or introduces the patient to the treatment plan immediately after and a few days after the surgery [4]. A physiotherapist is obliged to perform a functional and manual examination in order to check the correct functioning of the facial-maxillofacial complex [5].

Early postoperative stage

Ideally, rehabilitation should start on the zero day, i.e. the day of surgery. If this is not the case, the patient should see a physiotherapist in the first week after the operation [5]. Late postoperative stage includes all activities after the fourth week after surgery. Completion affects the recovery of full mobility and efficiency in the masticatory system, which is individual. Physiotherapy in maxillofacial surgery [4].

SWELLING REDUCE AFTER ORTHOGNATHIC SURGERY

The anti-edema management is part of the early postoperative stage. The swelling is greatest 48-72 hours after the operation.

The first actions are usually lymphatic drainage and kinesiotaping. They have both anti-edema, analgesic and anti-inflammatory effects. It is recommended to use them earlier than 48 hours after surgery [6, 7]. They move fluid from the swollen area to the nearby lymph nodes, which leads to faster relief of the swelling and prevents inflammation. Additionally, this procedure limits the spread of postoperative hematoma. They do not require specialized equipment, so they can be done in a hospital room next to the patient's bed.

Other postoperative methods include the use of slowly changing electromagnetic fields, such as magnetostimulation and magnetoleotherapy. The magnetic field affecting the tissues has an analgesic, anti-inflammatory and anti-swelling effect. In addition, it speeds up the process of

healing wounds, bones and soft tissues, and also regenerates nerve fibers [8, 9]. The results of the research confirm the effect of slowly changing electromagnetic fields, where after ten days the patients gave up on painkillers and the swelling disappeared [10]. The anti-inflammatory effect is also demonstrated by a low-energy laser (1-6 mW) [4]. First of all, it is characterized by analgesic and regenerative effects. It accelerates the improvement of peripheral circulation, including the absorption of hematomas, including postoperative ones. It reduces lymphoedema and the formation of blood clots. The dose should be selected individually for the patient, taking into account the repeatability of laser treatments, i.e. at least ten days [11].

The effects of heat and cold therapy can also be used to reduce swelling. The most common form is the use of compresses. In the case of higher temperatures, it can be paraffin or peloid compresses. Heat has an anti-congestive, analgesic, relaxing and regenerative effect [11]. Paraffin wraps (42-48°C) consist of applying liquid paraffin to the swollen area. By peeling off the paraffin from the skin, it additionally detaches the dead cells, exudate and bacteria remaining on the skin [12, 13].

Peat compresses have an anti-inflammatory effect on the gums and reduce bleeding. Moreover, they reduce swelling and act analgesically. Where possible, it is recommended to use peloid instead of paraffin, especially in women, due to the research on paraffin causing osteoporosis [13]. Peat and paraffin wraps should be performed 2-3 times a day, for 10-15 minutes, every other day in a series of 10-15 treatments [14].

Heat therapy also includes the use of lamps. A sollux lamp (infrared radiation) with a red or blue filter is used. The red filter is used in the treatment of inflammation of soft tissues. The use of blue filter has an analgesic effect and has a positive effect on the treatment of neuralgia [15, 16]. Irradiation lasts 15 minutes, approx. 20 cm from the irradiated area, 8-10 treatments in series. Irradiation with the sollux lamp shows a superficial effect, it is not effective in irradiating the muscles of the deep layer, such as, for example, the lateral wing and the medial pterygoid muscles [17]. In turn, cold therapy has anti-inflammatory, analgesic and anti-swelling properties. Cold compresses do not require specialized equipment. Ice packs, gel compresses - coldpacks or a cooling mask are used [4]. The cooling time and breaks should be determined by the doctor, however, cold compresses can be used relatively often (up to 8 times a day), in short series, taking into account breaks at least twice as long as the cooling period [18, 19].

KINESIOTAPING AS A METHOD OF SWELLING REDUCE AFTER ORTHOGNATHIC SURGERY

Kinesiotaping, or dynamic taping, involves covering the skin surface with special plasters that do not restrict the movement of muscles and joints. The phenomenon of self-healing of the body is used, because the patches do not contain drugs. Kinesiotaping has a positive effect on microcirculation, supports the natural anesthetic systems of the human and normalizes muscle tension [20]. The patches are resistant to water and can be kept on the skin for several days. They support the tissues, reducing pain in muscles and joints, reducing swelling, helping in muscle work and ensuring the proper positioning of a joint.

Lymphedema usually increases up to four days after surgery and gradually subsides over the next few weeks. Research shows that the use of kinesiotaping significantly reduces swelling 10 days after the procedure [21, 22]. The advantage of using dynamic taping is that it does not preclude or interfere with the use of other physiotherapeutic activities. Examples of slicing methods are shown in the following photos (Fig. 1-3). The tapes are put on without stretching. When wrapping the neck, the patient takes a head position that stretches the tissues over which the patches will run. Tapes will take a folded form when the head returns to the axis.



Fig. 1 Ways of taping by Valerio Palmerini therapy of temporomandibular joints – side of the neck
Source: authors' own archive



Fig. 2 Ways of taping by Valerio Palmerini therapy of temporomandibular joints – side of the jaw
Source: authors' own archive

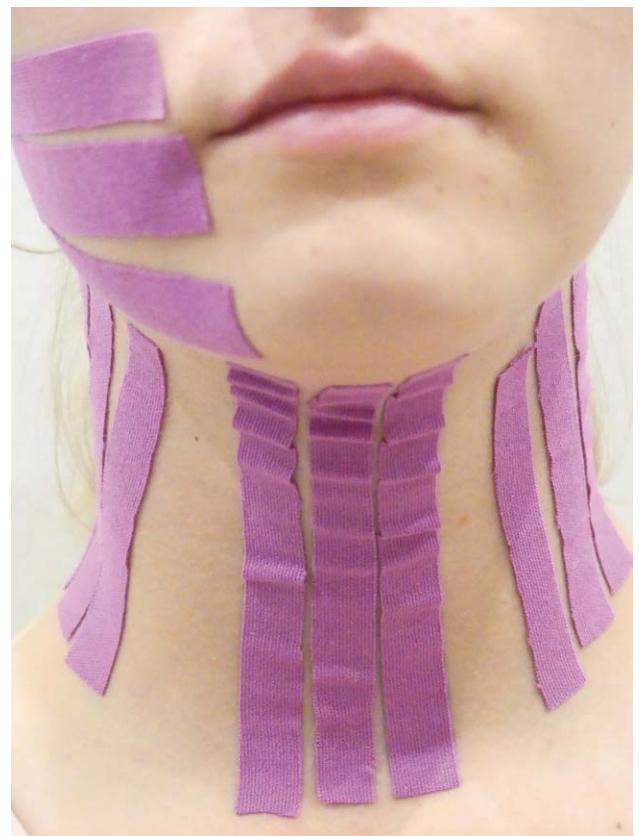


Fig. 3 Ways of taping by Valerio Palmerini therapy of temporomandibular joints – whole taping: sides and front of the neck and side of the jaw
Source: authors' own archive

SUMMARY

The use of physiotherapeutic treatments significantly reduces the formation of edema and allows to alleviate the swelling and inflammation that has arisen so far. It minimizes the pain and discomfort felt by the patient. The use of kinesiotaping in supporting the treatment of temporomandibular joints does not restrict the use of other physiotherapeutic actions. In addition, it brings the desired effects without requiring any specialist equipment. Bandages are widely used in classical techniques, and their multifunctionality allows them to be used also in cases of dental physiotherapy.

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