



УДК 616.716.4-006-08-036.82:616.212.1

REHABILITATION OF PATIENTS WITH ORONASAL COMMUNICATION AFTER COMBINED TREATMENT OF MALIGNANT NEOPLASMS OF THE UPPER JAW

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Abstract. Purpose of the study is to develop a medical rehabilitation method of the patients with oronasal communication by manufacturing a separating mouth guard. A clinical examination of 15 patients with malignant neoplasms of the maxillary sinus after combined treatment was carried out on the basis of the State Institution "The University Dental Clinic". Clinically, patients had a postoperative defect of hard and soft tissues of the maxillofacial region: hard and soft palate, alveolar process of the upper jaw, anterior and lower walls of the maxillary sinus. Prosthetics were performed after radiation therapy in the long-term period for this group of patients (6 months). An impression was taken by a standard impression tray and alginate impression material in patients with a postoperative tissue defect. A plaster cast was made with the marking the defect border. A separating obturating mouth guard was made by thermovacuum forming process using a crystal (hard) and soft polymer plates with dimensions of 125×125 mm and a thickness of 2 mm. The edge of the mouth guard was smoothed to prevent trauma to the oral mucosa and was fixed in the oral cavity. The developed technology for manufacturing a separating obturating mouth guard by thermovacuum forming process makes it possible to improve the functional and aesthetic results of prosthetics, to reduce the treatment time (the mouth guard is made in one visit). The process of adaptation of patients took a short period of time due to the elastic properties of the polymeric material for the manufacture of mouth guards and the method of manufacture. The maximum number of corrections was 3 visits (for 1 patient). One mouth guard correction was required for 73.3 % (11 patients), two for 20 % (3 patients). Medical rehabilitation of patients with oronasal communication may include a prosthetics with the manufacture of a separating obturating mouth guard in a short time in one visit according to individual anatomical features of a postoperative defect of hard and soft tissues.

Keywords: rehabilitation, prosthetics, malignant neoplasms, maxillary sinus, oronasal communication.

Introduction. Postoperative defects of the maxillofacial region, formed as a result of the combined treatment of patients with malignant neoplasms of the maxillary sinus, are a serious pathology, since the destruction of the anatomical formations of this area leads to functional and cosmetic disorders, which significantly worsens the quality of life of patients and creates great problems in their social adaptation and rehabilitation [1, 4, 6, 7]. Postoperative defects of the upper jaw lead to loss of teeth, cause asymmetry of the face. It means that the aesthetic optimum of a person is destroyed.

Typical chewing and swallowing disorders occur, when there is connection of oral with nasal cavity. Food gets in the sinus and causes chronic mucosal inflammation. Dysfunction of the maxillofacial system leads to pathological changes in the structure of temporomandibular

joint. Diseases of the gastrointestinal tract are developed or the course of them get heavier, when the function of chewing and swallowing is destroyed [1, 2, 3].

Oronasal communication causes respiratory distress. The body's resistance to the development of colds reduces, because the warming of the air in the nasal cavity is not carried out. In addition, the presence of constant nasal secretion causes inflammation and atrophy of the tissues in the oral cavity, worsening the hygienic characteristics of the prosthesis [4, 5].

There is a resonance lesion of the pharynx and nasopharynx cavities, the speech becomes to be unclear due to nasal sound distortion, acquires a nasal tone due to rhinophony, and generally the sound formation is distorted after surgical treatment of patients. In addition, pronounced structural and functional disorders of

the maxillofacial region lead to the psycho-emotional status changes of patients [3, 5, 7].

According to special literature, prosthodontic treatment is the most effective method for restoring functional and aesthetic disorders in cancer patients with postoperative defects of the upper jaw. However, there is no unified approach to the medical rehabilitation of this group of patients nowadays. The purpose of prosthodontic treatment of postoperative defects of the upper jaw is to restore lost functions, which increases the social adaptation and quality of life of patients, contributes to the most complete medical and social rehabilitation.

At present there are two methods of prosthodontic treatment of the defect of the upper jaw — immediate and remote. The immediate prosthesis is prepared before the operation and fixed immediately after the operation on the operating table. A remote prosthesis is made at various times after the operation, on average 3–4 months after surgery.

The advantage remains with immediate prosthetics, due to the fact that scarring of the postoperative wound occurs around the prosthesis in accordance with its shape and leads to the formation of a tissues in the oral cavity, and this improves the fixation of the prosthesis on the healthy part of the jaw remaining after surgery. The healing of soft tissues occurs arbitrarily in the absence of an immediate prosthesis. The resulting massive scars worsen the fixation of a prosthesis made in the remote term, which cause the appearance of mobility of the teeth remaining on the jaw and leads to their loss.

Medical rehabilitation of patients with this pathology is associated with the elimination of extensive postoperative defects by prosthetics and remains one of the most urgent problems of modern dentistry.

Purpose of the study is to develop a medical rehabilitation method of the patients with oronasal communication by manufacturing a separating mouth guard at the stage of prosthetics.

Materials and methods. Clinical examination and prosthodontic treatment of patients was carried out on the basis of the State Institution “The University Dental Clinic”. Totally 39 patients with a defect in the upper jaw as a result of surgical operation of a malignant neoplasm of the maxillary sinus were examined, 15 of them were selected with defects in the upper

jaw and with partial secondary adentia, who had not previously received an immediate construction. All patients had combined treatment, including surgery, radiation therapy and/or chemotherapy.

The peak incidence was in the group of patients aged 50 years and older (50,4 %), the average age was 57 years. Approximately 72,0 % of patients had a prevalence of the tumor process in the volume of stage III–IV. In this group of patients, prosthetics was carried out after combined treatment in the remote period (6 months). The oronasal communication was tamponed by the patients themselves with gauze tampons during the postoperative period.

At the time of treatment, patients complained of breathing, speech disorders and the presence of nasality. They were in a depressed psychological state and noted difficulty in communicating with people. In 100,0 % of patients, the main complaint was a chewing and swallowing disorder, the loss of hermetic isolation of the oronasal communication of the postoperative defect by tamponade, the liquid migration into the nasopharynx during eating.

An objective examination was carried out after a detailed collected anamnesis. During external examination attention was paid to the general configuration of the face, the size of the lower part of the face, the position of the lips, cheeks, the severity of the nasolabial folds, the symmetry of the face, the deformation of the soft tissues, the presence of scars, the degree of mouth opening. In most cases patients had speech disorder, nasality, facial asymmetry due to retraction of the buccal region and upper lip on the side of the defect.

The hygienic state of the oral cavity was analyzed during the intraoral examination. The degree of atrophy, the shape and direction of the alveolar process, the presence of exostoses, the size of the alveolar arches, the ratio of the jaws, the condition of the mucous membrane (color, compliance and moisture) at the localization of previous tumor, possible structural changes in nearby organs and tissues, the presence of scar changes at the points of frenums attachment was analyzed in the upper jaw. Clinically, patients had a postoperative defect of hard and soft tissues of the maxillofacial region: hard and soft palate, alveolar process of the upper jaw, anterior and lower walls of the maxillary sinus.



Figure 1 — Postoperative hard and soft palate defect, oronasal communication



Figure 2 — Taking an impression with a standard impression tray and alginate material



Figure 3 — Isolation of undercuts and marking the defect border

Particular attention was paid to the characteristic of the communication of the oral cavity with the nasal cavity and maxillary sinuses, as well as the totality of the dentition. The dentition in the region of the preserved area of the upper jaw is extremely important for creating an additional retention point in order to hold and stabilize the prosthesis. An X-ray examination was performed to clarify the state of hard tissues of teeth, periodontal tissues, the degree of bone resorption.

A separating obturating mouth guard was made by thermovacuum forming process for the patients for the period of manufacturing of the final prosthesis-obturator. Clinical and laboratory stages are shown in Figures 1–4. In patients with a postoperative tissue defect (Figure 1) an impression was taken by a standard impression tray and alginate impression material (Figure 2). A plaster cast was made with the marking the defect border (Figure 3). A separating obturating mouth guard (Figure 4) was made by thermovacuum forming process using a crystal (hard) and soft polymer plates with dimensions of 125×125 mm and a thickness of 2 mm. The edge of the mouth guard was smoothed to prevent trauma to the oral mucosa and was fixed in the oral cavity (Figure 5).

After fitting and applying a separating obturating mouth guard, the patient was taught the rules for using and caring for the prosthesis and was invited to follow-up examinations for correction the next day, after 3 days, and then, as necessary. The subjective state of the patient (complaints), the state of the tissues in the oral cavity (areas of hyperemia, erosion, ulcers), the hygienic state of the oral cavity and the hygienic state of the prosthesis were monitored. It was obligatory to control the functional effectiveness of the mouth guard and its tightness (test with cheek puffing and swallowing water).

Results and discussion. The developed technology for manufacturing a separating obturating mouth guard by thermovacuum forming process makes it possible to improve the functional and aesthetic results of prosthetics, to reduce the treatment time (the mouth guard is made in one visit). The process of adaptation of patients took a short period of time due to the elastic properties of the polymeric material for the manufacture of mouth guards and the method of manufacture. The maximum number of corrections was 3 visits (for 1 patient). One

mouth guard correction was required for 73,3 % (11 patients), two for 20 % (3 patients). A significant improvement in the psycho-emotional state of patients was noted with the use of a separating obturating mouth guard.

The staged prosthetics technique has received the greatest recognition in the prosthodontic treatment nowadays [1, 2, 5, 7].

The first stage of prosthetics is the manufacture of an immediate prosthesis in the preoperative period. The aims of prosthetics at the first stage: providing the possibility of eating after a surgical operation, fixing a bandage with medicines in the postoperative cavity, maintaining speech, creating a reliable separation between the wound surface and the oral cavity.

The second stage of prosthetics is the manufacture of a forming prosthesis-obturator on the 10th day after the operation or 2–3 weeks after the operation. The aims of prosthetics at the second stage: improving chewing, swallowing, breathing, speech, preventing the development of scar deformation of the face, creating a tissues for the obturating part of the permanent prosthesis.

The third stage of prosthetics is the manufacture of the final prosthesis-obturator in 3–6 months or in the period from one month to a year after the operation. The aims of prosthetics at the third stage: restoration of lost oral cavity functions (chewing, swallowing, breathing, speech), achievement of tightness of the oral and nasal cavities, preservation of the patient's aesthetic optimum, improvement of the quality of life, social rehabilitation.

In the majority of cases, prostheses are made without taking into account the individual reaction of the tissues of oral cavity and the body to the prosthesis itself and the prosthetic materials used. This approach to complex prosthetics is due not only to the limited choice of constructional materials, but also to the lack of theoretical knowledge of this problem.

Up to now general methods of prosthetics in the immediate postoperative period have not been developed. There is no consensus on the timing of prosthetics. There are still many controversial and unresolved issues that require further development and study regarding the structure of the prosthesis that replaces the defects of the maxillofacial region, formed as a result of the combined treatment of patients with malignant neoplasms.



Figure 4 — The mouth guard manufactured by thermovacuum forming process



Figure 5 — A mouth guard fixation with obturation of oronasal communication in the patient's mouth

Conclusion. An important component in the complex of rehabilitation measures is medical rehabilitation. Restoring the integrity of the lost organ or part of it (jaw, palate, alveolar margin, etc.) is the first step. Medical rehabilitation is aimed at full or partial restoration or compensation of one or another lost body function. Medical rehabilitation of patients with oronasal communication may include a prosthetics with the manufacture of a separating obturating mouth guard in a short time in one visit according to individual anatomical features of a postoperative defect of hard and soft tissues.

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Реабилитация пациентов с ороназальным сообщением после комбинированного лечения злокачественных новообразований верхней челюсти

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Реферат. Целью исследования является разработка методов медицинской реабилитации пациентов с ороназальным сообщением путем изготовления разобщающей каппы на этапе протезирования. На базе ГУ «Университетская стоматологическая клиника» проведен клинический осмотр 15 пациентов со злокачественными новообразованиями верхнечелюстной пазухи после комбинированного лечения. Клинически у пациентов определялся послеоперационный дефект твердых и мягких тканей челюстно-лицевой области: твердого и мягкого неба, альвеолярного отростка верхней челюсти, передней и нижней стенки верхнечелюстной пазухи. Данной группе пациентов протезирование проводилось после лучевой терапии в отдаленные сроки наблюдения (6 месяцев). У пациентов с послеоперационным дефектом тканей получали оттиск при помощи стандартной оттисковой ложки и альгинатного оттискового материала. Изготавливали гипсовую модель с нанесением границ пластинки. С помощью вакуумного формователя и полимерной заготовки Crystal (твердые) и Soft (мягкие) с размерами 125×125 мм толщиной 2 мм изготавливали разобщающую obtурирующую пластинку, проводили фиксацию каппы в полости рта с заглаживанием края каппы для предотвращения травматизации слизистой оболочки полости рта. В результате разработанной технологии изготовления разобщающей obtурирующей каппы методом термовакуумного прессования улучшились функциональные и эстетические исходы ортопедического лечения, сократились сроки лечения (изготовление каппы проводится в одно посещение). Медицинская реабилитация пациентов с ороназальным сообщением может включать ортопедический этап лечения с изготовлением в короткие сроки за одно посещение изолирующей obtурирующей каппы с учетом индивидуальных анатомических особенностей послеоперационного дефекта твердых и мягких тканей.

Ключевые слова: реабилитация, протезирование, злокачественные новообразования, верхнечелюстная пазуха.

Поступила 13.06.2023