

# Multidisciplinary treatment of patients after a surgery due to cancers in the facial area: a clinical reports

Rolski D<sup>1\*</sup>, Dolegacz A<sup>2</sup>, Górski R<sup>2</sup>, Mierzwińska-Nastalska E<sup>1</sup>

<sup>1</sup> Department of Prosthetic Dentistry, Medical University of Warsaw, Poland

<sup>2</sup> Department of Periodontology and Oral Diseases, Medical University of Warsaw, Poland

## Abstract

Prosthetic rehabilitation of patients after surgical removal of carcinoma in the facial skeleton is one of the most difficult problems in therapy of the stomatognathic system, due to increasing incidence of head and neck carcinoma. Significant deformations of tissues, development of dysfunctions of the stomatognathic system with concurrent biological unbalance of the oral cavity environment are frequently a consequence of the treatment. Cicatricial scars, contraction of the oral crevice and limitation of mobility of the tongue are noted in numerous cases. Deformations of the facial area of the skull and of structures of the temporomandibular joint are also the reasons of occlusion and articulation disturbances. Two cases of surgery due to carcinoma in the facial skeleton that have required combined and stepwise multispecialistic treatment performed at Department of Prosthetic Dentistry and Department of Periodontology and Oral Disease, Dental Institute, Medical University of Warsaw are presented. The therapy has involved treatment of periodontitis and applying appropriate construction of prostheses that would relieve periodontium and splinting teeth.

**Key words:** head and neck neoplasms, radiotherapy, periodontitis, multidisciplinary treatment.

## Introduction

Surgical procedures supplemented with radiotherapy or chemotherapy are one of fundamental significance in the treatment of tumours of the maxillofacial region. The aim of an adjuvant therapy is to destroy neoplastic cells; but it is burdened with numerous side effects [1-5]. Consequently, a syndrome of clinical symptoms characterised by xerostomia, inflammatory changes of the oral mucosa and lowering of salivary pH may develop. This is often accompanied by increased caries and deposition of dental plaque, sometimes involving all tooth surfaces. Pathological attrition is also observed as a result of rapidly progressing demineralization of the hard dental tissues. There is a high incidence of caries and pathology in the region of the periodontal tissues and oral mucosa, particularly in patients subjected to irradiation. The increased incidence of caries in this group of patients is caused by the direct action of ionising radiation on the hard dental tissues and disturbances of the oral-cavity biocenosis, reduced saliva production, and a fall in its pH. Caries most commonly appears in the cervical region of the teeth in irradiated patients. In the majority of cases, it is encircling caries involving almost all of the teeth, therefore preventive measures are necessary in addition to treatment of the caries itself. Serious defects in speech and impaired swallowing can also occur. Major changes in facial appearance in postoperative patients are often the cause of depression [6-10].

## Aim of study

All of the described changes and disturbances pose serious difficulties in reconstruction of the stomatognathic system. The aim of our paper was to describe selected cases that required combined and staged multidisciplinary treatment carried out at the Department of Prosthetic Dentistry and the Department of Periodontology and Oral Diseases, Dental Institute, Medical University of Warsaw.

\* CORRESPONDING AUTHOR:

Dariusz Rolski, DDS  
Medical University of Warsaw  
Department of Prosthetic Dentistry  
ul. Nowogrodzka 59  
00-002 Warszawa, Poland  
Fax: +48 022 502 21 45  
e-mail: katedraprotetyki@amwaw.edu.pl

Received 23.03.2006 Accepted 30.03.2006

## Materials and methods

In postoperative patients who had procedures because of neoplasms in the facial region, attention was paid to the symptoms described in the medical history (dryness in the oral cavity, pain, burning, disturbances of taste, difficulty in swallowing food). The number of cigarettes smoked, the presence of coexisting organic and systemic disease and medication used were taken into account.

In the clinical examination of the oral cavity, attention was paid to the condition of the oral mucous membrane, tongue, teeth, periodontal tissues, and to oral hygiene.

The mucous membrane was examined using a dental mirror. Clinical examination of the teeth was carried out using a probe and the periodontal tissues were examined using the Florida Probe package, equipped with a computer-linked constant pressure probe, and with a WHO periodontal probe.

The periodontal examination consisted of measuring pocket depth and the level of connective tissue attachment loss (in mm). The results of these examinations were subjected to analysis taking into account the maximum values for a given patient (PDmax and CALmax) and the mean value for a given patient (PDmed and CALmed). The plaque and bleeding indices according to O'Leary were evaluated (they express the percentage relationship of bleeding measurement points on probing in 6 examined sites bleeding index and number of surfaces covered with plaque in 4 examined sites, plaque index, in all sites of measurement). Tooth mobility was assessed using the tooth mobility index according to Entina. The quantity of non-stimulated mixed saliva secreted was also measured, by collection over 5 minutes into a calibrated container (the method of Edgar and O'Mullane). This examination was carried out in the morning, at least 1 hour after breakfast. The patients were recommended to have mycological examinations (direct smear of the mucosa of the postoperative defect and tongue) to ascertain what fungi were present (with an antimycogram carried out using the diffusion-disc method).

The periodontal therapy included an initial phase of periodontal treatment consisting of professional cleaning of teeth and a corrective stage in which surgical procedures were performed on the periodontium. Due to the presence of dispersed postoperative defects, significant deformation of maxillofacial tissues, and temporo-mandibular joint and articulation-occlusion disturbances, the prosthetic reconstruction required the use of special treatment methods and the construction of prostheses that restored tissue defects and tooth loss, and which splinted retained teeth.

## Case reports

### Case 1

An 58-year-old man, after surgery of *carcinoma maxillae lateralis dextri* at the Department of Maxillofacial Surgery, Medical University of Warsaw. Partial resection of the right maxilla together with excision of submandibular lymph nodes on the right-hand side was performed in December 2000. Next, the patient was subjected to radiotherapy at a dose of 6000 cGy on

the maxillary-cribriform region and 5000 cGy on the neck. He was referred to the Department of Oral Medicine and Periodontology because of symptoms of burning and dryness in the oral cavity and associated difficulties in speaking and swallowing of food. The patient was not able to collect saliva for quantitative analysis and could speak only with frequent moistening of the oral cavity with water. The patient did not smoke and did not take any medicines. Extraoral examination showed an extensive scar on the facial skin and on the neck on his right side, dry and cracked lips and inflammation of the corners of the mouth. Intraoral examination revealed dry oral mucosa, light pink in colour, matt appearance; lack of continuity of the hard and soft tissues of the hard palate on the right side with a defect of approximate 1.5 cm diameter; dry tongue with limited mobility and numerous scars (as reported by the patient, the scars appeared after radiotherapy). Clinical examination indicated the presence of the following teeth: 11, 21, 22, 23, 24, 34, 33, 32, 42 and 43 containing numerous carious cavities (*Fig. 1a*). The mean gingival pocket depth (PDmed) was 1.65 mm, and the mean level of loss of connective tissue attachment (CALmed) was 3.7 mm. Maximum values were as follows: periodontal pockets (PDmax) 4 mm, loss of connective tissue attachment (CALmax) 7 mm. The number of teeth with loss of connective tissue attachment above 5 mm was 21%. The plaque index was 100%; the bleeding index 71%. On the basis of history taking, clinical examination and radiographs, severe chronic periodontitis was diagnosed.

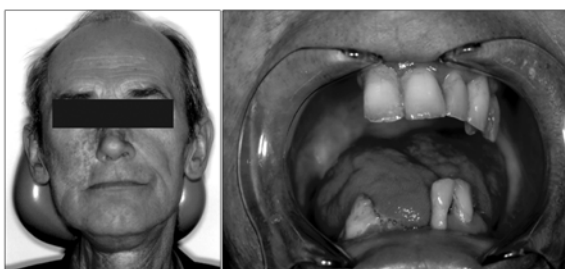
Initial phase periodontal therapy consisting of scaling and polishing using prophylaxis paste and rubber cups was carried out. Existing restorations were corrected (overhangs removed). The surfaces of all the teeth were covered with fluoride varnish – Fluor Protector. Oral hygiene instruction was given. Before commencing periodontal treatment, the patient was advised to have a mycological examination and conservative treatment of the teeth. Pharmacological therapy was used – Metronidazole (250 mg tablets [Polpharma]; 1 tablet every 8 hrs for 7 days and 0.1% pilocarpine mouthwash). A follow-up visit was scheduled after 7 days. Mycological examination was negative. Clinical examination again showed poor oral hygiene, which was indicated by a plaque index of 60%. The teeth were cleaned of deposits and oral hygiene instruction was given again. Further monthly visits were booked and the state of oral hygiene was controlled. After about two months from the beginning of treatment, the patient confirmed the appearance of saliva in the oral cavity in quantities that allowed for normal speaking. Ingestion of food without fluid was still not possible.

After 4 months, clinical examination revealed: the plaque index 30%, and bleeding index 18%. The quantity of secreted, unstimulated mixed saliva was 0.4 ml/5min.

Prosthetic treatment during the first stage consisted of tissue-borne partial dentures: the maxillary with an obturator closing the oro-antral fistula, with an elastic soft lining made of Softex (Zhermack). It allowed for better sealing of the obturator and reduction of pressure by the hard parts of the prosthesis on the poor quality mucosa in the region of the postoperative defect; the tissue-borne partial mandibular denture did not require any modification. The temporary prostheses allowed the patient to function normally at least to the greatest possible extent. The speech of the patient improved and chewing ability improved.

**Figure 1.** Patient after partial resection of the maxilla with excision of submandibular lymph nodes on the right side because of carcinoma maxillae:

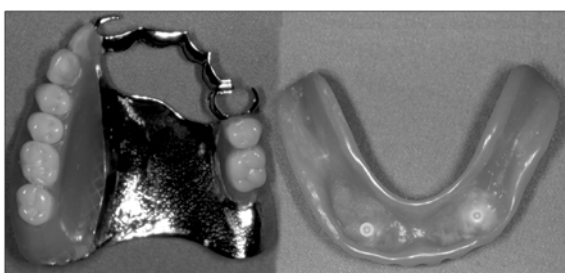
a) photo of patient's face and oral cavity before treatment



b) photo of patient's oral cavity with Rhein 83 ball retainers system on the roots of 33, 43 and roots of 34, 32, 43 with inlay posts with protective dowel caps



c) postoperative maxillary removable partial denture (RPD) and mandibular overdenture



d) photo of patient's oral cavity after treatment



These dentures also gave the patient the possibility of having conservative and periodontal treatment of the remaining teeth and they could be quickly and effectively corrected if necessary.

The second stage of prosthetic treatment was carried out after completion of conservative and periodontal treatment. In the maxilla, a removable partial denture – RPD (Fig. 1c, d) was constructed to replace the missing teeth and to splint those remaining. A complete obturator was made of acrylic and lined with Ufi-gel silicone soft lining (Voco). In the mandible, after previous endodontic treatment of 43, 42, 32, 33, 34, inlay posts with protective dowel caps on exposed root surfaces were constructed on 42, 32 and 34 and inlay posts with Rhein 83 ball retainers system on the roots of 43 and 33 (Fig. 1b). Next, a full mandibular overdenture was constructed (Fig. 1c, d).

## Case 2

An 46-year-old man, 3 years after surgery of *carcinoma palati duri* at the Department of Maxillofacial Surgery, Medical University of Warsaw. The surgical treatment carried out in June 1998 consisted of maxillary osteotomy on the right side and resection of the hard palate. After half a year, the patient was again admitted to the department for supplementary irradiation. He received a dose of 6000 cGy on the region of the hard palate and sinuses.

The patient received prosthetic treatment immediately after the resection of the hard palate – an acrylic obturator was constructed which the patient used during the radiotherapy and during the period of tissue healing after irradiation. Twelve

months after the completion of therapy, the patient turned to the Department of Prosthetic Dentistry for a further prosthetic treatment (Fig. 2a, b). During the first stage a new obturator, appropriately adapted to the new conditions in the oral cavity with a peripheral seal of plasticized acrylic Softex was made. This distinctly improved the patient's articulation and prevented the entry of food into the maxillary sinuses. Within a short time, a partial maxillary denture with a large cup-shaped seal of plasticized acrylic Softex was made (Fig. 2c). At this stage, the patient was referred to the Department of Periodontology and Oral Diseases, Medical University of Warsaw.

The medical history did not reveal any complaints from the patient. He was not taking any medicines and had not smoked for 2 years. Intraoral examination revealed the presence of 7 teeth in maxilla and 13 teeth in the mandible. The mean pocket depth (PDmed) was 1.9 mm and the mean level of loss of connective tissue attachment (CALmed) was 4.2 mm. Maximum values were: periodontal pockets (PDmax) 9 mm, loss of connective tissue attachment (CALmax) 7 mm. Pockets of depth more than 5 mm made up 12% of all pockets in this given patient, whilst the number of teeth with loss of connective tissue attachment of more than 5 mm was 39%. The plaque index was 100%, and bleeding index 85%. Severe chronic periodontal inflammation was diagnosed on the basis of the medical history, clinical examination and radiographs. The quantity of unstimulated mixed saliva secreted was 1 ml/5 min. Very large quantities of deposits on the teeth were found, both supragingival and subgingival, together with a few carious cavities.

**Figure 2.** Patient after osteotomy on the right side and resection of the hard palate because of carcinoma palati duri T2N0M0

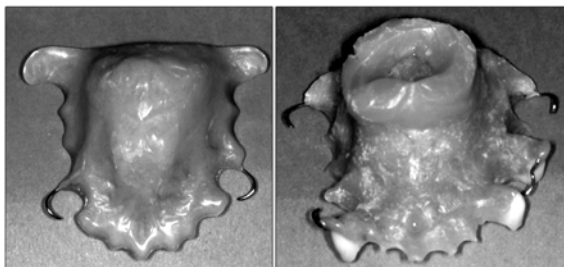
a) photo of patient's oral cavity before treatment



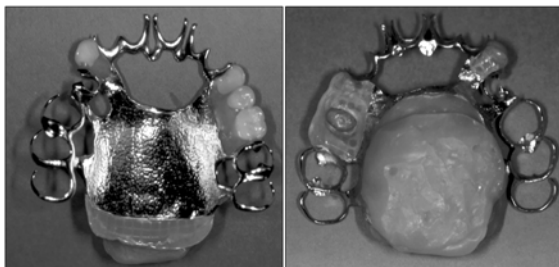
b) photo of patient's oral cavity with defect of hard palate



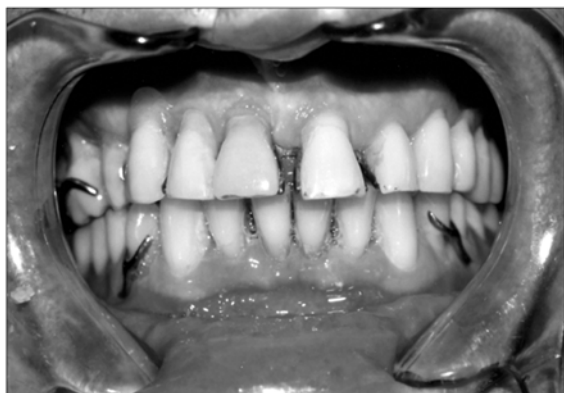
c) temporary removable partial dentures: immediate obturator plate and maxillary denture with obturator seal of plasticized acrylic Softex



d) postoperative splinting maxillary removable partial denture (RPD) with obturator lined with Ufi-gel silicone soft lining



e) photo of patient's oral cavity with postoperative denture



Initial phase periodontal therapy was carried out, consisting of scaling with planing of root surfaces and detailed oral hygiene instruction was given. The patient was advised to have a mycological examination and conservative treatment of the teeth. Pharmacological therapy was used – Metronidazole (250 mg tablets [Polpharma]; one tablet every 8 hrs for 7 days), 0.12% chlorhexidine mouthwash (twice daily) and 0.1% pilocarpine mouthwash. The next visit was arranged 7 days later. Mycological examination

was negative. Tooth deposits were again removed. On the follow-up visit after one month the plaque index was 31%, bleeding index 25%. Closed curettage was carried in the 14-25 region under local anaesthesia using Ubistesin 4%.

The second stage of prosthetic treatment was carried out after previous endodontic treatment of 11 and 25. An inlay post and core was manufactured for 11 and crown with porcelain veneer and a root inlay post with a Rhein 83 ball attachment



system in 25 was made. It was decided to construct a post and core inlay and porcelain – veneered crown for tooth 11 despite its I° mobility. This allowed for the shortening of the crown and setting it up in proper relation to the opposing teeth, and for the eradication of the traumatic bite, which could cause further mobility of 11 (radiological control 3 months after construction of prosthesis did not show any worsening of mobility of 11). Next, a splinting maxillary RPD was constructed (*Fig. 2d*). The extended arch splinting the maxillary teeth posed a certain problem of an aesthetic nature, but appropriate preparation of the approximal surfaces and incisal edges of the upper anteriors and the accurate construction of these elements by the dental technician minimized the unfavourable aesthetic effect. The major connector of the maxillary RPD had special retention elements on its mucosal surface for the attachment of a large cup-shaped obturator whose base was constructed out of acrylic and the mucosal surface was lined with Ufi-gel elastic silicone material. The prosthesis constructed with such an obturator allowed for improvement in the function of the patient's chewing apparatus, his speech became even more distinct and less "flat", as compared with the previous prosthesis. The peripheral seal of the obturator, the stability and ruggedness of the metal frame of the prosthesis allowed the patient to return to his previous dietary habits. The missing teeth in the mandible were also replaced by a splint type of RPD (*Fig. 2e*).

## Discussion

Recent studies have frequently raised the problem of changes arising in the oral cavity of patients receiving radiotherapy in the head and neck region. As a result of therapy, in the presence of unsatisfactory oral hygiene together with reduced defence mechanisms in irradiated individuals, the destruction of the tissues supporting the teeth is much more likely to occur [1,4,11]. Galler et al. described three cases of post-radiation necrosis of bone that developed in sites with active periodontal disease [12]. In the available literature, it has been shown that post-irradiation osteonecrosis most commonly occurs 3 to 6 years after irradiation and affects the mandible. Bone necrosis did not occur in patients described in our study. Dryness of the oral cavity and worsening of the general condition of the periodontal tissues did, however, develop in those patients who had coexisting poor oral hygiene.

The studies of many authors have shown the widening of the periodontal space and the disappearance of alveolar compact bone on radiographs taken at short intervals of time in patients subjected to irradiation. Fujita et al. observed widening of the periodontal space within 6 months after radiotherapy [2]. They did not, however, find destruction of periodontal tissue during the period of 3 months from commencement of irradiation. The poor condition of periodontal tissues in patients treated at the Department of Oral Medicine and Periodontology was not necessarily caused by radiotherapy alone. The coexisting poor oral hygiene (the plaque index in one of the patients was 100%) undoubtedly had an effect on the pathology of the periodontal tissues.

Professional tooth cleaning led to improvement of the periodontal tissues, as manifested by the reduction of periodontal

pocket depth, rebuilding of connective tissue attachment and stabilisation of the teeth. The effects of scaling and root planing together with plaque control on the reduction of the above-mentioned parameters have been confirmed by others. Among others, Garrett et al. showed reduction in pocket depth, and reconstruction of connective tissue attachment in patients with periodontal disease. After scaling and root planing in the group examined, a reduction of pocket depth of 0.9-1.3 mm was obtained after 9 months and the value for loss of connective tissue attachment was reduced by 0.7-0.9 mm [13].

The reduction of salivary secretion observed in our patients, giving rise to a feeling of dryness in the oral cavity was undoubtedly connected with the radiotherapy. This is confirmed by the reports of other researchers [1,3]. Dreizen in his study showed that 42 patients with neoplasms in the region of the oral cavity who were irradiated with doses in the region of 200 rad daily, 5 days per week, had a reduction of 57% in the mean value of salivary flow under the influence of stimulation by chewing during the first week of therapy, of 76% six weeks postoperatively and of 95% three years after radiotherapy. Some of these patients experienced a subjective reduction of dryness in the oral cavity one month after radiotherapy, but measurement of salivary flow did not show any increase in its secretion [1]. On the basis of 60 patients after radiotherapy in the region of the head and neck, Karlsson found that reduced salivary secretion should be classified as sialopenia (salivary secretion of 0.1-1.0 ml/15 min.) or as xerostomia (0.0-0.9 ml/min.). Differences in secretion of saliva after radiotherapy depend on the site of irradiation in the region of the large salivary glands (parotid, sublingual, submandibular), and to a lesser extent on the dose of irradiation. Studies have shown that the presence of salivary glands in the region of the irradiated field is the most important factor that makes it difficult to maintain their functioning. Therefore, all preventive procedures aimed at protecting the salivary glands should be planned with the oncologist before radiotherapy is begun [3].

Prosthetic reconstruction of patients after surgery for neoplasms in the maxillofacial region poses a great challenge for the prosthetist not only because of the obvious technical problems but also because of the need for follow-up treatment. Interdisciplinary treatment and cooperation between doctors of various dental and medical specialties allow for the effectiveness of treatment and improve the general condition of the patients. Rusiniak, Ciechowicz et al. emphasise the significance of individualised treatment planning of construction design for prostheses, allowing for maximal utilisation of residual teeth for retention and stability of postoperative prostheses and also for the protection of the periodontium of these teeth and the poor-quality denture foundation [7,8,14,15]. Dreher demonstrates the significance of regular follow-up examinations, dental, radiological, mycological and adjustment of prostheses. He also demonstrates the importance of using appropriate soft relining materials with the aim of protecting the underlying mucosa and bone [8,16,17]. Our observations over many years, supported by the opinion of many investigations [6,14-16], indicate that in patients who attend follow-up visits regularly and who allow for the adjustment of prostheses and the evaluation of the underlying tissues, and for on-going prosthetic treatment (change

of prostheses when they do not fulfil their function), positive results of rehabilitation of the stomatognathic system more frequently are obtained.

## Conclusions

1. Prosthetic rehabilitation of patients after extensive procedures for the removal of neoplasms in the maxillofacial region should, aside from the construction of prostheses, should include multidisciplinary treatment and prevention for protecting the poor-quality denture foundation.

2. Treatment procedures, conservative and periodontal, should be aimed to preservation of the greatest number of patient's own teeth to improve the retention of prostheses and to achieve a satisfactory function.

3. Multidisciplinary treatment of patients after surgery in the maxillofacial region, especially after radiotherapy, allows for better prosthetic reconstruction and maintenance of good long-term results for these patients.

## References

1. Dreizen S, Daly D, Drane J, Brown L. Oral complication of cancer radiotherapy. *Postgrad Med*, 1977; 61: 83-92.
2. Fujita M, Tanimoto K, Wada T. Early radiographic changes in radiation bone injury. *Oral Surg Oral Med Oral Pathol*, 1986; 61: 641-4.
3. Karlsson G. The relative change in saliva secretion in relation to the exposed area of the salivary glands after radiotherapy of head and neck region. *Swed Dent J*, 1987; 11: 189-94.
4. McClure D, Barker G, Barker B, Feil P. Oral management of the cancer patient, part II: Oral complications of radiation therapy. *Compendium*, 1987; 88: 90-2.
5. Spiechowicz E, Rusiniak-Kubik K, Skopińska-Rozewska E, Sokolnicka I, Zabuska-Jabłńska K, Brajczewska-Fischer W, Rolski D, Ciechowicz B, Gil M, Renner RP. Immunological status of patients with denture stomatitis and yeast infection after treatment of maxillofacial tumors. *Arch Immunol Ther Exp*, 1994; 4: 263-7.
6. Beumer J, Curtis T, Marunick M. Maxillofacial rehabilitation: prosthodontic and surgical considerations. Tokyo. 1996.
7. Ciechowicz B. Special considerations in the prosthetic rehabilitation of patients with facial defects. *Protet Stomatol*, 1985; 3: 142-7.
8. Dreher W. Possibilities of prosthetic rehabilitation on patients after operations for oral cavity, jaw and facial neoplasms. *Protet Stomatol*, 1980; 2: 109-11.
9. Meraw SJ, Reeve CM. Dental considerations and treatment of the oncology patient receiving radiation therapy. *J Am Dent Assoc*, 1998; 129: 201-5.
10. Podgórný J, Dreher W. Prosthetic treatment of a patient after extensive resection of the right and left maxilla. *Protet Stomatol*, 1984; 6: 317-20.
11. Yusof Z, Bakri M. Severe progressive periodontal destruction due to radiation tissue injury. *J Periodontol*, 1993; 64: 1253-8.
12. Galler C, Epstein J, Guze K, Buckles D, Stevenson-Moore P. The development of osteoradionecrosis from sites of periodontal disease activity: Report of 3 cases. *J Periodontol*, 1992; 63: 310-6.
13. Garrett S, Johnson L, Drisko C, Adams D, Bandt C, Beiswanger B, Bogle G. Two multi-center studies evaluating locally delivered doxycycline hyclate, placebo control, oral hygiene, and scaling and root planing in the treatment of periodontitis. *J Periodontol*, 1999; 70: 490-503.
14. Niesłuchowska M, Ciechowicz B, Rusiniak-Kubik K. Assessment of the effectiveness of treatment of denture stomatitis infected with yeast-like fungi in patients after surgical treatment of maxillofacial neoplasms. *Protet Stomatol*, 1987; 3: 122-6.
15. Rusiniak K, Ciechowicz B. Therapeutic management after prosthetic rehabilitation of patients surgically treated for pathological changes in the maxillofacial region. *Protet Stomatol*, 1983; 3: 193-8.
16. Dreher W, Piskorski P, Grzybowska-Jach M. Prosthetic treatment after resection of maxilla and mandible in immediate, early and late treatment. *Protet Stomatol*, 1980; 6: 361-6.
17. Dreher W. Early prosthetic management after maxillary resection. *Protet Stomatol*, 1976; 4: 235-9.