



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating 2017: 5.03
TPI 2017; 6(10): 243-247
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www.thepharmajournal.com
Received: 03-08-2017
Accepted: 04-09-2017

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Surgical treatment of patients with generalized periodontitis by improvement of specific technological parts of Cieszyński-Widmann-Neumann Surgery

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Abstract

46 patients with chronic generalized periodontitis (GP) of stage III were operated. They were divided into two groups. Group I included 20 people who underwent the traditional modified Cieszyński-Widmann-Neumann surgery; patients of Group II (26 persons) were performed modified Cieszyński-Widmann-Neumann surgery improved by periosteum penetration. After the treatment, the mean value of the Schiller-Pisarev test was found to be higher in the patients of Group I ($2.5 \pm 0.05\%$) compared to the corresponding index of Group II ($0.95 \pm 0.04\%$). After the treatment, the mean value of bleeding index constituted 0.77 ± 0.04 points in Group I and 0.32 ± 0.04 points in Group II.

The dynamic radiological examination of alveolar processes in patients in 6 months after the operation detected clear signs of osteo-reparative processes. The slight increase in the height of the alveolar process by 19% in patients of Group I and by 40% in the patients of Group II indicated to this process. With the increase in the observation time, the bone structure in the patients of Group II changed and differentiated into a mature one with a characteristic trabecular pattern, and it did not differ from adjacent bone sites. Consequently, the use of periosteal penetration in the surgical treatment of patients with GP of stage III has advantages over the traditional treatment.

Keywords: generalized periodontitis, advanced flap surgery, radiological and ultrasound examinations

Introduction

Problem statement and analysis of the resent research

Periodontal diseases take the lead among all dental diseases taking into account the prevalence of this pathology among the population and its negative consequences (teeth loss and dentofacial system dysfunction). The severity of generalized periodontitis (GP), frequent relapses and complications lead to the decrease in patients' quality of life, significant social and economic loss, mastication dysfunction and speech pathology.

Scientists consider that success in GP treatment is impossible without surgical methods use [10, 11, 12]. They believe periodontium flap surgeries to be the standard of surgical treatment of stage III GP. However, insufficient attention is given to periosteum during their performance [1, 2, 3]. Periosteum is one of the components of bone marrow nutrition. Therefore, insufficient periosteum trophism leads to GP development [6]. This requires further development of new treatment regimens. Most publications in periodontal surgery are related to the postoperative period, the prevention of complications, splinting of mobile teeth roots, guided tissue regeneration, vestibulum correction. Analyzing modern scientific developments, we have established that periosteum function in the treatment of GP has been studied insufficiently [3, 4, 5, 10].

The objective of the research: Was to increase effectiveness in the surgical treatment of patients with generalized periodontitis of stage III by improving specific technological components of Cieszyński-Widmann-Neumann surgery and periosteal cells activation.

Materials and Methods of the research

46 patients with chronic generalized periodontitis (GP) of stage III were operated. They were divided into two groups. Group I included 20 people who underwent Cieszyński-Widmann-Neumann surgery modified by V.I. Lukianenko (1977) and, in addition, developed by us improved modified mucogingivoplasty (with multiple periosteum penetrations and topical treatment with oral use of miramistin solution and applications of methyluracil ointment with

myramistin on periodontal tissues and postoperative stitches. Group II (26 persons) underwent modified Cieszyński-Widmann-Neumann surgery improved by the technique of periosteum penetration developed by us^[10].

Authorial improvement of the technological parts of Cieszyński-Widmann-Neumann surgery consisted in the following: after the detachment of the mucous- periosteal flap with ball-shaped bur, multiple periosteum penetrations with a distance of 2-3 mm between them and a depth of 1-1.5 mm

were performed (Figure 1) with oral use of miramistin solution and applications of methyluracil ointment with myramistin on periodontal tissues and postoperative stitches using Glutargin in the pre- and postoperative periods in the form of injections № 5 intravenously in a dose of 5 ml (2 g) by 200 ml of 0.9% sodium chloride solution 2 times a day and then in the form of tablets in a dose of 4 tablets of 0.75 mg 3 times a day during a month^[6, 7, 8].

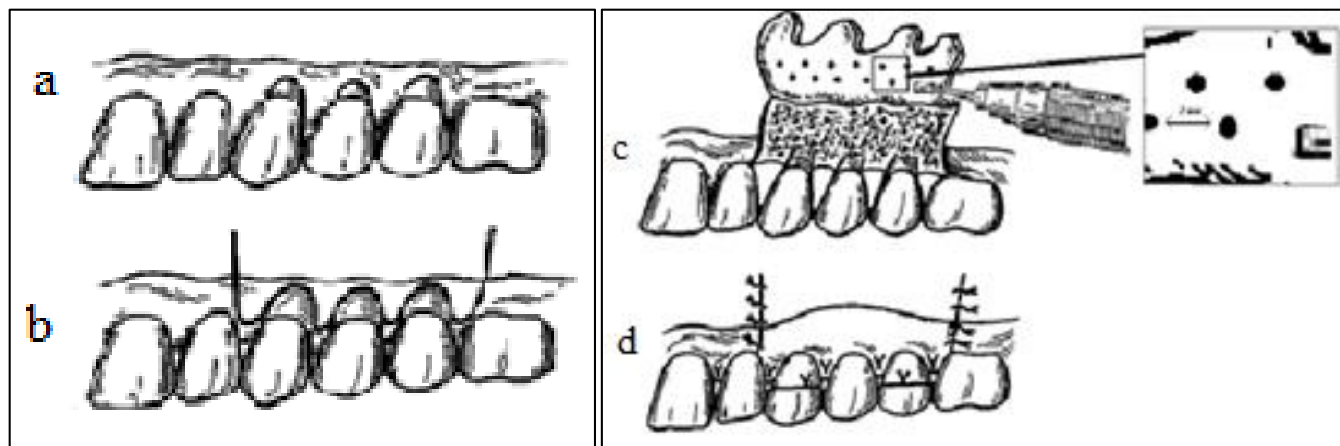


Fig 1: a - neck of tooth exposure – condition before the surgery; b – the scheme of mucous-periosteal flap formation; c – the scheme of periosteum penetration; d - mucous-periosteal flap is put in place and stitched with interrupted stitches

All patients gave an individual consent for the surgical treatment. Clinical, radiological examinations were performed before and over time after the surgical treatment. The device EOM-01-Ts echo-osteometer was used together with the use of standard diagnostic piezo units, osteometric study and index evaluation of periodontal condition applying the Schiller-Pisarev test and bleeding index. The examination of the patients was conducted before the surgery and in 1, 6 and 12 months after it^[2, 12]. Statistical processing of the digital material was performed using StatSof, Inc (2011) and STATISTICA and Microsoft Excel (2010) in order to determine the reliability of the results.

Results of the research and their discussion

14 (30.4 %) patients in Group I complained of varying intensity pain at the site of surgical intervention in the postoperative period. These events lasted from 1 to 3 days. The patients' pain was reduced by the prescription of analgesics. Body temperature rose to subfebrile values in five patients in Group I (10.9%) on the first day after the surgery. The condition of the patients in Group I was satisfactory in 15-16 days after the surgery, patients did not make any complaints. The mucous- periosteal flaps remained in a new position on the 16th day after the intervention. No signs of inflammation were observed. Gums became pink, did not bleed, tightly covered the teeth, swelling and hyperemia were not observed. Serous fluid periodically accumulated in very small quantities on the border of the teeth and mucous-

periosteal covering in half of the patients. Complications such as inflammations, suture line disruptions, excessive edema were observed in two patients constituting 5%.

16 (34.8%) patients in Group II complained of varying intensity pain at the site of surgical intervention during 3-4 days in the postoperative period. Body temperature rose to subfebrile values in 3 patients of Group II (6.5 %) on the first day after the surgery. In 15-16 days after the operation, the condition of the patients in Group II was satisfactory. Patients did not make any complaints. No signs of inflammation were observed. Gums became pale pink, did not bleed, tightly covered the teeth, swelling and hyperemia were not observed. Crevicular fluids of serous nature periodically accumulated in very small quantities in new gingival sulcus in 26.01 % of patients (12 persons).

The index of the Schiller-Pisarev test constituted 5.35 ± 0.68 points on average in the patients of Groups I and II before the treatment. Improvement of the hygienic state of the oral cavity to 1.86 ± 0.02 points was observed in the patients of Group I in one month after the treatment. This index improved to 0.83 ± 0.03 points in Group II. It improved to 2.40 ± 0.06 points in Group I and to 0.92 ± 0.08 points in Group II in 6 months. In twelve months this index constituted 3.29 ± 0.07 points in Group I and 1.1 ± 0.02 points in Group II indicating the decrease in the severity and prevalence of inflammatory process in periodontium in the patients of Group II (Fig. 2).

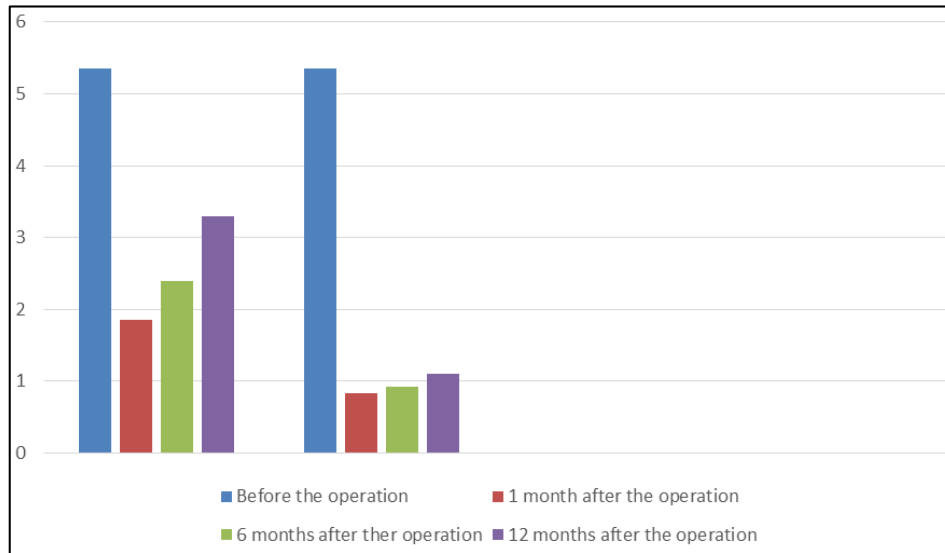


Fig 2: The dynamics of the Schiller-Pisarev test in the study groups depending on the terms of observation

Papillary bleeding index according to Mühlemann was determined in Groups I and II by probing using a button probe in 16, 12, 24, 44, 32, 36 areas. PBI constituted 2.80 ± 0.08 points before the treatment in Groups I and II. In a month after the treatment it constituted 0.65 ± 0.02 points in the patients of Group I and 0.20 ± 0.03 points in the patients of

Group II. In 6 months after the treatment it was 0.79 ± 0.03 points in the patients of Group I and 0.35 ± 0.05 in the patients of Group II.

In 12 months this index constituted 0.89 ± 0.06 points in the patients of Group I and 0.41 ± 0.05 points in Group II (Fig. 3).

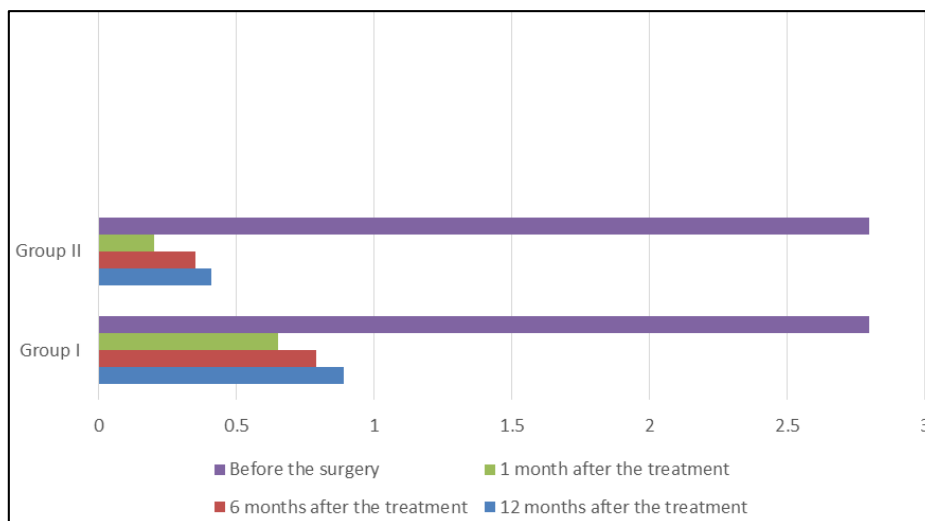


Fig 3: The dynamics of papillary bleeding index according to Mühlemann in the study groups depending on the terms of observation

Rather clear signs of active osteo-reparative processes were detected in the course of dynamic radiological examination of alveolar processes of the patients in 6 months after the modified flap surgeries. This was indicated by a slight increase in the height of the alveolar process by 19% in patients of Group I and by 40% in the patients of Group II. With the increase in the observation time, the bone structure changed and differentiated into a mature one with a characteristic trabecular pattern, and it did not differ from adjacent bone sites. Atrophy and deformation of jaw ridge bone at the site of surgical intervention were not observed during radiological examination. Consequently, active processes of osteogenesis were observed in the patients of Group II. Echo-osteometric indices changed after the treatment. Thus, the time of ultrasonic transmission before the treatment constituted 23 ± 0.15 microseconds on the upper jaw and 25.5 ± 0.14

microseconds on the lower jaw. One month after the surgery the time of ultrasonic transmission constituted 24 ± 0.12 microseconds on the upper jaw and 25 ± 0.16 microseconds on the lower jaw in the patients of Group I. It constituted 26 ± 0.21 microseconds on the upper jaw and 27 ± 0.19 microseconds on the lower jaw in 6 months after the surgery. The index comprised 28 ± 0.14 microseconds on the upper jaw and 31 ± 0.22 microseconds on the lower jaw in twelve months. Accordingly, the time of ultrasonic transmission in the patients of Group II constituted 24.5 ± 0.13 microseconds on the upper jaw and 25.5 ± 0.15 microseconds on the lower jaw in one month after the treatment. The index comprised 26.5 ± 0.17 microseconds on the upper jaw and 28 ± 0.11 microseconds on the lower jaw in 6 months. It constituted 28.5 ± 0.22 microseconds on the upper jaw and 31.5 ± 0.19 microseconds on the lower jaw in twelve months (Fig.4).

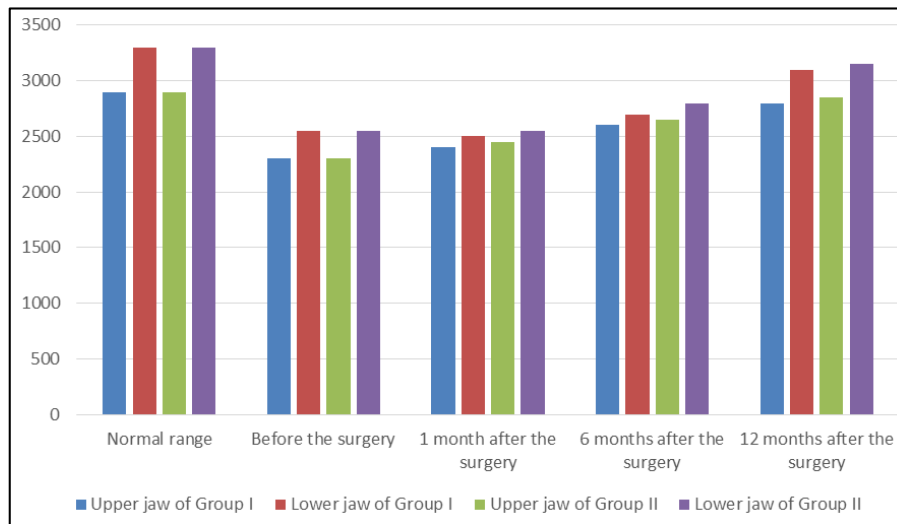


Fig 4: Dynamics of ultrasonic transmission speed on alveolar processes and parts of maxillary bones in the patients of Groups I and II

Thus, the results of osteometric studies of the patients in Group II indicated that active osteo-reparative processes occur during modified Cieszyński-Widmann-Neumann surgery since the speed of ultrasonic transmission on the bone is the higher, the less is its porosity and the higher is concentration of calcium, phosphate and other mineral components.

The results of our osteometric studies provide an opportunity to conclude that dynamic changes in the processes of reparative regeneration at the site of modified operations totally correlate with the clinical and radiological characteristics of the osteoregeneration processes in terms of ultrasound distribution rate over the jawbones both before the surgical intervention and in the long term after the surgery during a year. Osteometry confirms and complements the optimization of reparative processes in periodontium in patients who underwent periosteal penetration.

Thus, according to the abovementioned data we may conclude that surgical treatment of patients with GP of stage III with the use of periosteal penetration has the advantages over the traditional one, and the use of the developed method of peristaltic penetration is appropriate.

Conclusions

1. The conducted research resulted in the improvement of the technological part of the modified Cieszyński-Widmann-Neumann surgery for the treatment of patients with chronic GP of stage III by means of periosteal penetration.
2. Clinical study showed that the number of complications constituted 18% in the patients of Group I and 11% in the patients of Group II. Clear signs of osteo-reparative processes were detected in the course of radiological examination in patients in 6 months after the surgery. This was evidenced by a slight increase in the alveolar process height.
3. The time of ultrasonic transmission on the maxillary bone decreased by 17.86% on the upper jaw and by 17.74% on the lower one in the patients of Group I. In the patients of Group II it decreased by 19.3% on the upper jaw and by 19.05% on the lower jaw.

Prospects of the further research: the remote results of the proposed method of the technological part of the Cieszyński-Widmann-Neumann surgery improvement for the treatment of

patients with chronic GP of stage III will be studied. The ultrastructural changes of platelets after surgical intervention on periodontal tissues are to be studied.

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