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*The application of Bio-Oss and Bio-Gide as implant materials  
in the complex treatment of the aggressive periodontitis*

In aggressive periodontitis, in which vertical bone defects take place, after the utilization of all possibilities of conservative treatment, we can offer our patients methods leading to either the correction or regeneration of the lost tissues (2, 4, 6, 7, 9, 10, 11). Both of them aim at the shallowing of the periodontal pockets, enabling the patients to control dental plaque better which eventually eradicates inflammatory processes. The aim of treatment of periodontal diseases should not be correction but regeneration of the tissues lost as a result of the inflammatory process, morphologically and functionally identical with the lost ones. One of the surgical techniques that allows to achieve such result is controlled tissue regeneration with the use of re-absorbable Bio-Gide membrane and Bio-Oss material. Bio-Oss (Geistlich Biomaterials, Switzerland) is a natural inorganic structure obtained from cattle bone. It does not include any organic components or bacteria. It is low-crystalline, natural apatite comparable with mineralized human bone. Porous granules sized 0.25–1mm and trabecular structure of the material perform the function of the framework, integrate and are absorbed during the natural process of bone reconstruction. Re-absorbable Bio-Gide collagen membrane prevents penetration of the gingival tissues in the healing process. It easily adapts to the shape of the alveolar process and when it soaks with blood, it sticks to the bone in the defect environment. The compact layer adjacent to soft tissues is not permeable for the cells and it prevents the growth of the connective tissue into the space protected by the membrane. The porous layer adheres to the bone defect and plays an important part in clot stabilization.

The aim of work was clinical and radiological evaluation of the complex periodontological treatment of patients with aggressive periodontitis treated in our Department who had Bio-Oss and Bio-Gide applied during the flap operations.

#### MATERIAL AND METHODS

Surgical procedures were preceded by routine conservative treatment. In the first stage the removal of supra- and subgingival deposits was performed, together with polishing of the tooth root. If there was a need, the existing traumatic nodes were corrected and loss of teeth were restored with prosthetic methods. Each patient received a detailed instruction concerning the method of teeth brushing and cleaning of the interdental spaces with additional appliances such as

dental floss, tooth prick, interdental brushes, etc. A month after performing the procedures mentioned above, oral hygiene was controlled in patients. Only those who showed effective oral hygiene care (API <25%) were qualified to be surgically treated.

Complex conservative and surgical treatment was employed in 8 patients aged 17-55 with aggressive forms of periodontitis. Totally, 34 intrabony pockets were operated. In the preoperative examination the depth of periodontal pockets PPD and the loss of the attachment CAL were noted with the use of periodontological probe WHO in artificial lighting. The measurements were conducted in 6 points at every tooth and the highest value at a given tooth was noted in the patient's record. The patients also had panoramic X-ray and local tooth roentgenograms performed or radioimaging before and in the period of 8 to 12 months after the surgery. The surgeries were performed in local anaesthesia with the use of 12% lignocaine. In each case it was a flap operation in which bone defect and tooth root were completely cleaned off the remaining deposits and inflammatory granulation. Surfaces of the tooth root which were not embedded in the bone were thoroughly smoothed. The operating field was rinsed with the solution of physiological saline and bone defects were filled with Bio-Oss spongiosa, to prevent further retraction of collagen membrane into bone defects. Then, Bio-Gide membrane was placed on the buccal and labial lamella of bone in the alveolar process and in the bare surface of the teeth roots so as to surround the region of the tooth neck. The flap was reponated and the wound was tightly stitched. The dressing used was Solcoseryl Dental. No antibiotic therapy was administered after surgeries. The sutures were removed after 14 days. In the postoperative period patients applied Solcoseryl Dental dressings and rinsing with 0.1% Chlorohexidine solution twice a day for 1 minute. The application of cold compresses and a soft diet were recommended directly after the surgery as well as brushing teeth with soft brush after the removal of sutures. The follow-up examinations were carried out during the first twenty-four hours and on the seventh and the fourteenth day after the surgery.

Generally, the healing was normal, in 3 cases slight swellings were observed and 4 patients reported various intensified aches.

The results of the conservative and surgical procedures were evaluated after 8 to 12 months by means of clinical and radiological examination. The values of the studied features were submitted to statistical analysis with the use of Shapiro-Wilks and Wilcoxon's tests. Specification of the results is presented in the table and illustrated graphically.

### DISCUSSION

Table 1. Specification of the results after operations with the use of Bio-Oss and Bio-Gide materials

	M ± SD	Δ	p
Age	40.00 ± 2.90		
PPD - II	5.62 ± 2.16	- 2.87	< 0.0001
PPD - III	2.75 ± 1.03		
CAL - II	7.44 ± 3.04	- 2.57	< 0.0001
CAL - III	4.87 ± 2.21		
SBI - I	83.75 ± 17.47		
SBI - II	8.88 ± 0.99	- 3.88	< 0.05
SBI - III	5.00 ± 6.02		
API - I	83.88 ± 15.75		
API - II	19.25 ± 4.86	- 1.00	ns
API - III	18.25 ± 5.23		

I – preliminary; II – before surgical treatment; III – after surgical treatment

The effects of conservative preoperative preparation on the selected gingival pockets were evaluated through the control of API hygiene indices and the SBI indices of gingival pocket bleeding. The mean SBI values in the preliminary examination were 83.7%. Conservative treatment allowed the decrease of this index on average to 88%, and after the operation the value was 5.0%. Respectively, the mean API values were: 83.8% in the preliminary examinations, 19.2% before the operation and 18.25% after the operation. The results of periodontal pockets treatment were described by comparing their depths PPD and the loss of the attachment CAL before the surgical treatment and 8 to 12 months after it (Tab.1, Fig. 2). The use of Bio-Oss caused mean shallowing of pockets depth from 5.6mm to 2.7mm, on average the shallowing of the measuring depth of the pockets was less than 51.2%. In our studies the attachment loss decreased from 7.4mm to 4.8mm, 2.57mm on average, that is 34%. The alterations of the PPD and CAL values were highly statistically significant ( Fig. 1 ). The results presented in our study give the

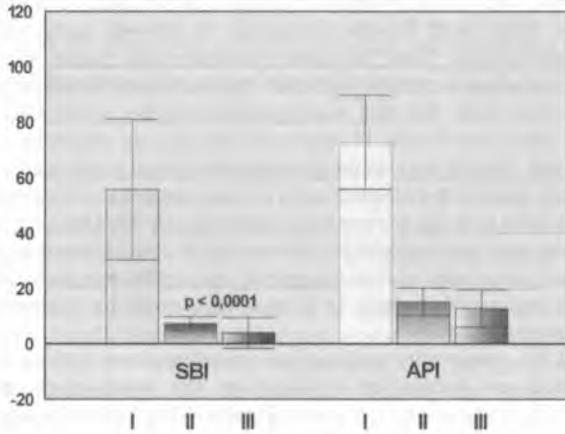


Fig.1 API and SBI indices values in the preliminary study, before and after the surgery

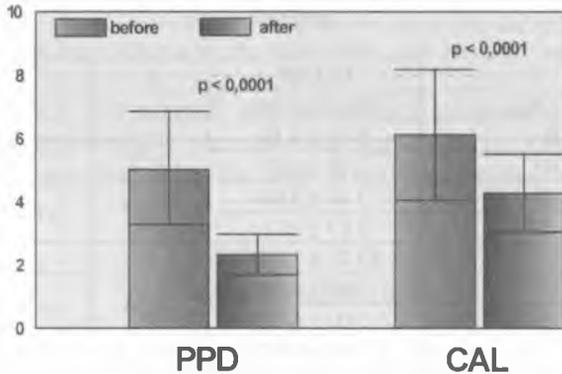


Fig. 2 PPD and CAL before and after treatment

evidence of high clinical effectiveness of the method of treatment that was used. It particularly refers to the restoration of alveolar process bone, reduction of deep periodontal pockets as well as growth of the connective tissue attachment. Clinical observations of other authors (1, 2, 3, 4, 6, 10, 11) revealed that the results of surgical treatment after the application of the osseous implants or implants together with the barrier membrane do not reveal essential differences in the decrease of the average pockets depth, reconstruction of the placement of the connective tissue attachment and in the filling of a bone defect. The majority of authors obtained about 50% of the shallowing of periodontal pockets. In the research on the results of the guided tissue regeneration in people it is practically impossible to estimate whether the healing process was the result of the formation of 'long' epithelial attachment or the expected, at least partial, tissue reconstruction. Therefore, it is possible that apart from the correction there is also a process of periodontal tissue regeneration (3). This process is definitely very complex and it depends on many factors. Therapeutic success is always determined by strict cooperation between the patient and the doctor in pre- and postoperative period as well as in the maintenance phase of the treatment. This phase is the continuation of the corrective phase and the condition of permanent periodontal disease remission (6, 11). It also depends on the selection of patients according to strictly defined directions such as: topography of bone defect, surface of the periodontium preserved at teeth, sufficient width of the attached gingiva, atraumatic surgery technique, strict compliance with the directions of manufacturers of implant materials and many other (1, 4, 6, 7, 11).

#### CONCLUSION

1. The treatment of bone defects in advanced periodontitis with surgical methods using Bio-Oss preparation leads to the essential shallowing of periodontal pockets and attachment reconstruction.
2. The application of Bio-Oss implant material in the treatment of aggressive periodontitis may be effective supplement of conventional conservative treatment.
3. To maintain good and permanent treatment results it is necessary to carry out constant control of the periodontium state, constant supervision of the level of oral hygiene and patient's motivation.

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## SUMMARY

In the presented study the results of the complex conservative and surgical periodontological treatment using Bio-Oss implant material and the regenerative Bio-Gide collágen membrane by Geistlich company were subjected to clinical and radiological evaluation. The measure depth of the periodontal pockets PPD was subjected to evaluation, the level of the epithelial attachment CAL and the defect of bone of the alveolar process were observed on radiograms. In all patients the state of oral cavity hygiene was examined using the index of API bacterial plaque and the percent of SBI index of bleeding gingiva. The analysis of the examined parameters concerned the period before surgeries and 8 to 12 months after the surgeries of the guided tissue regeneration. On the basis of the conducted research and the statistic analysis, the reduction of the periodontal pockets depth and the reconstruction of the attachment.

### Zastosowanie Bio-Oss i Bio-Gide jako materiału wszczepowego w kompleksowym leczeniu agresywnych zapaleń przyzębia

W prezentowanej pracy poddano kliniczno-radiologicznej ocenie rezultaty kompleksowego zachowawczo-chirurgicznego leczenia periodontologicznego z zastosowaniem materiału wszczepowego Bio-Oss i regeneracyjnej błony kolagenowej Bio-Gide produkcji firmy Geistlich. Ocenie poddano pomiarową głębokość kieszonek przyzębnych, poziom przyczepu nabłonkowego oraz ubytki kości wyrostka zębodołowego, obserwowane na zdjęciach rentgenowskich. U wszystkich pacjentów badano ponadto stan higieny jamy ustnej za pomocą wskaźnika płytki bakteryjnej API i procentowego wskaźnika krwawienia z dziąseł SBI. Analiza badanych parametrów dotyczyła okresu przed zabiegami oraz 8-12 miesięcy po zabiegach chirurgicznych sterowanej regeneracji tkanek. Na podstawie przeprowadzonych badań i analizy statystycznej wysoko oceniono redukcję głębokości kieszonek przyzębnych i odnowę przyczepu.