

Department of Periodontology, Medical University of Lublin
Clinic of Oral and Maxillofacial Surgery, Medical University of Lublin

MAŁGORZATA KIERNICKA, BARBARA OWCZAREK,
EWA GALKOWSKA, JOANNA WYSOKIŃSKA-MISZCZUK

The use of Emdogain enamel matrix proteins in surgical treatment of the aggressive periodontitis

Aggressive forms of periodontitis are the reason for the progressing bone loss of both the alveolar process and principal fibres. Although not all the details of these diseases pathogenesis have been explained, it is thought that injuries of the periodontal tissues result from direct and indirect action of microorganisms. The direct mechanisms thought to be responsible for the destruction are toxins released by microorganisms, enzymes and products of metabolism which among others activate inflammation mediators and osteoblasts. They also stimulate macrophages and neutrophilic granulocytes to produce enzymes that destroy host cells, they impair normal cell function and weaken the local defensive reaction. Indirect mechanism includes injuries related to local inflammation and the stimulation of immune system the result of which is the progress of periodontal disease – hollowing of periodontal pockets, loss of the attachment and the resorption of alveolar process bone. Thus, the basic stage of treatment is elimination of bacterial plaque (preliminary conservative treatment) (4, 5, 6, 8, 10). These actions inhibit progress of this disease, however, they do not lead to the regeneration of lost periodontal tissues. In recent years specialist therapeutic management has been used and although with various results, it leads to the reconstruction of lost periodontal tissues. During the surgical procedure, most frequently with the use of the method of modified flap operation, there are implants inserted with or without the combination with growth factors, as well as barrier membrane and various combinations of these methods and materials (6). One of the methods of periodontium regeneration is the attempt to imitate the biological process including teeth development and especially the development of the root and supporting tissues. Hydrophobic enamel matrix proteins included in Emdogain preparation assist not only in the amelogenesis but also take inductive part in the formation of cementum and next in the formation of all periodontal tissues. Emdogain contains amelogenins that come from pigs' tooth buds and the structure of these proteins is almost identical with human ones described in chromosomes X and Y (8). As it was revealed in the research, the enamel proteins perfectly survived the evolution process (350mln years) and the immune system does not consider them alien although they come from a different source. It excludes the possibility of the occurrence of immunological reaction (1).

The aim of work was clinical evaluation of the results of surgical treatment of periodontal bone loss using Emdogain.

MATERIAL AND METHODS

Patients qualified for the treatment were submitted to routine conservative procedure. After performing oral cavity assanation, scaling and after the period of patients monitoring only patients who achieved the indices levels $API < 25$ and $SBI < 10$ were qualified to surgeries. In the pre-operative examination the depth of periodontal pockets PPD was measured and the loss of the attachment CAL was evaluated with the use of periodontological probe WHO in artificial lighting. The measurements were done in 6 points at each tooth and the highest value at a given tooth was noted in patient's records. The patients also had panoramic X-rays, local roentgenograms and radio imaging performed before and within 8 to 12 months after the surgery. The procedures with Emdogain preparation grafting were performed in 11 patients aged 17–50. 35 intrabony pockets were operated altogether. In each case it was a flap operation in anaesthesia with 2% lignocaine. In the course of it bone loss and tooth root were completely cleaned off the remaining deposits and the inflammatory granulation. Evident reduction of bleeding was the evidence of its thorough removal. The tooth root was prepared with the use of EDTA in PH neutral (Pref Gel) for 2 minutes, which allowed effective removal of the synovial membrane and the exposure of collagen matrix of the cementum through the selective removal of the inorganic part. To remove premedication the surgery area was thoroughly rinsed with normal saline and then the dried root surface was covered with Emdogain using the syringe, starting from the bottom of bone loss so as to cover thoroughly all root surfaces with the preparation. The flap was reponated and the wound was tightly sutured. No antibiotic therapy was applied after surgical procedures. The sutures were removed after 14 days. In the postoperative period Solcoseryl Dental dressings were applied as well as rinsing with 0.1% Chlorhexidine solution twice a day for 1 minute. The application of cold compresses and a soft diet were advised to patients directly after the surgery. Brushing with soft toothbrush using the roll method was advised after sutures removal. The control study was performed in the first twenty-four hours after the surgery and also on the 7th and 14th day. The healing was normal without any complications.

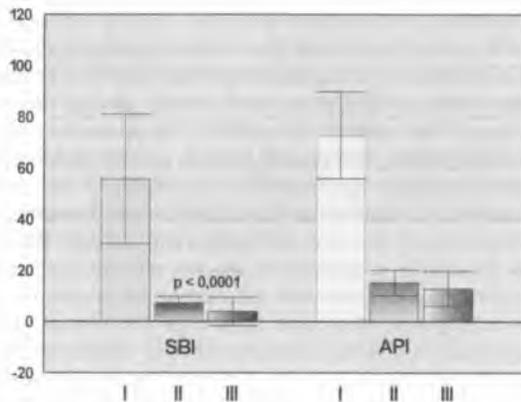


Fig. 1. Mean values of SBI and API indices in the preliminary investigation, before and after surgical treatment

The results of the conservative and surgical procedures were evaluated after 8 to 12 months by means of clinical and radiological examinations. Values of the examined features were submitted to statistic analysis using Wilcoxon and Shapiro-Wilks tests. The effects of the

conservative preparation of the procedure were evaluated through the control of API hygiene and gingival pocket bleeding indices (Fig.1). The results of gingival pockets treatment were described by the comparison of their depths PPD and the attachment loss (CAL) before surgical procedure and 8 to 12 months after the surgery.

DISCUSSION

With the use of Emdogain-the shallowing of gingival pockets was 2.68mm, reconstruction of the attachment was 1.84mm (Tab. 1, Fig. 2). Changes of these indices were extremely statistically significant. Beneficial clinical results after the application of Emdogain preparation were observed by many other authors (3,9,7). The attachment growth CAL obtained by us

Table 1. Specification of the results obtained in the preliminary investigation after the surgeries with the use of Emdogain

	M ± SD	Δ	p
Age	37.91 ± 10.76		
PPD - II	5.01 ± 1.84	- 2.68	< 0.0001
PPD - III	2.33 ± 0.64		
CAL - II	6.11 ± 2.06	- 1.84	< 0.0001
CAL - III	4.27 ± 1.23		
SBI - I	55.73 ± 25.39		
SBI - II	7.45 ± 2.34	- 3.45	< 0.05
SBI - III	4.00 ± 5.59		
API - I	72.82 ± 16.97		
API - II	15.18 ± 5.02	- 2.36	ns
API - III	12.82 ± 6.71		

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

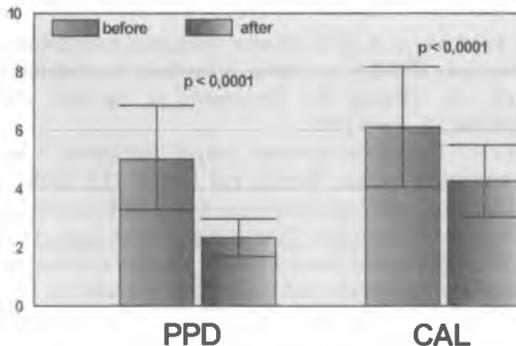


Fig.2. A comparison of PPD and CAL values before and after surgical procedure with the use of Emdogain

which on average was 1.84 mm which constitutes almost 30% of its loss and is related to Laskus-Perendyk and Górska results (2.1mm) and smaller than the result obtained by Pietruska (3mm) and Kempa (3.2mm). The shallowing of gingival pockets in our research was on average 2.68mm, which makes 53% of their primary depth, which corresponds with the results obtained by other authors (2,3,7,9). Our clinical observations reveal that the use of Emdogain gives beneficial results both in the clinical and radiological picture as well as in the subjective evaluation of patients who were satisfied because of better teeth stabilization and the regression of the inflammatory symptoms.

CONCLUSIONS

1. The treatment of bone defects in the advanced periodontitis with surgical methods using Emdogain preparation leads to essential shallowing of the gingival pockets and attachment reconstruction.
2. The application of Emdogain preparation in the treatment of the aggressive periodontitis may complement conventional treatment.
3. Emdogain preparation used in the regeneration of periodontium is easy to use, safe and well accepted by the periodontal tissues.

REFERENCES

1. Heijl L.: Zastosowanie białek substancji podstawowej szkliwa (Emdogain) w regeneracji przyzębia. *Stomat. Wspól.*, supl. 2, 19, 1999.
2. Kaczmarczyk-Stachowska A., Jurczyński W.: Emdogain w leczeniu kieszonek kostnych. Opis przypadków. *Stomat. Wspól.*, supl. 2, 27, 1999.
3. Kempa H., Sadlak J.: Emdogain w regeneracji tkanek przyzębia, pierwsze doniesienia własne. VI Toruńska Konf. Stom., 12, Toruń 1999.
4. Konopka T.: Algorytmy kompleksowego leczenia zapaleń przyzębia. *Czas. Stomat.*, LIV,6, 362, 2001.
5. Konopka T.: Czynniki ryzyka rozwoju zapaleń przyzębia. *Stomat. Wspól.*, vol. 5, nr 6, 415, 1998.
6. Kurchańska-Fliyskowska A. et al.: Białko substancji podstawowej szkliwa w leczeniu przypadków destrukcyjnej choroby przyzębia. *Poznańska Stomatologia*, 91, 2001.
7. Laskus-Perendyk A., Górska R.: Emdogain w leczeniu chirurgicznych chorób przyzębia. *Nowa Stomat.*, 5, 4, 40, 2000.
8. Miazek-Wagner M.: Emdogain (Enamel matrix derivative) – nowy sposób leczenia uszkodzeń tkanek przyzębia. *Stomat. Wspól.*, vol. 5, nr 2, 132, 1998.
9. Pietruska M.: Kliniczna i radiologiczna ocena wybranych technik regeneracyjnych w leczeniu przyzębnych ubytków kostnych. *Quintessence Period. Imp.*, 1, 41, 2002.
10. Sculean A. et al.: Comparison of enamel matrix proteins and bioresorbable membranes in the treatment of intrabony periodontal defects. *J. Clin. Periodontol.*, 70, 225, 1999.

SUMMARY

One of the ways of treating of the aggressive forms of periodontitis is the method of guided tissue regeneration using enamel matrix proteins included in Emdogain preparation. The aim of work was clinical evaluation of the complex treatment of those periodontolyses using the above mentioned material as the implant material. 35 intrabony pockets were operated in 11 patients aged 17-50. The treatment results were described with the use of clinical indices of API and SBI, indices of pockets depth PPD and the loss of the attachment CAL indices before and within the period of 8 to 12 months after the surgeries. The values of the examined features were submitted to statistical analysis using Shapiro-Wilks and Wilcoxon's tests. The treatment that was applied led to extremely statistically significant improvement of the examined parameters.

Wykorzystanie białek substancji podstawowej szkliwa zawartych w preparacie Emdogain w operacyjnym leczeniu agresywnych zapaleń przyzębia

Jednym ze sposobów leczenia agresywnych postaci chorób przyzębia jest metoda sterowanej regeneracji tkanek z wykorzystaniem białek substancji podstawowej szkliwa, zawartych w preparacie Emdogain. Celem pracy była ocena kliniczna kompleksowego leczenia tych periodontoliz z wykorzystaniem jako materiału wszczepowego tego preparatu. Zoperowano 35 kieszeni kostnych u 11 pacjentów w wieku 17–50 lat. Wyniki leczenia opisano za pomocą wskaźników klinicznych API i SBI, głębokości kieszonek PPD i utraty przyczepu CAL przed i w okresie 8–12 miesięcy po zabiegach. Wartości badanych cech poddano analizie statystycznej za pomocą testów Shapiro-Wilksa i Wilcoxona. Zastosowane leczenie doprowadziło do wysoce istotnej statystycznie poprawy badanych parametrów.