Head of the Department of Surgical Dentistry, Bukhara State Medical Institute, DSc. Under the guidance of Rakhimov Zokir Kayumovich

Ramazonov Hamza Hayotovich
Assistant of the Department of Surgical Dentistry,
Bukhara State Medical Institute
named after Abu Ali ibn Sina,
Uzbekistan
ORCID ID 0009-0000-0271-1840
e-mail:
ramazonov_hamza1990@mail.ru
ramazonov.hamza@bsmi.uz

INTRODUCTION OF A INNOVATIVE METHOD FOR THE TREATMENT OF PERI-IMPLANTITIS

Abstract: Purpose: comparative evaluation of clinical effectiveness of dental implantation (EMS, Switzerland) in complex treatment of patients with peri-implantitis and peri-implant mucositis and traditional methods.

Material and methods: the results of treatment of para-implant inflammatory diseases in 17 patients aged 24-56 years, 9 men and 8 women (the main group), with the period of implant use from 1 to 7 years were studied.

Results: comparative analysis of the two methods in terms of PIC depth reduction revealed statistically significantly greater effectiveness of the exploratory method compared to the control ($p<0.01$). In 3 and 6 months from the beginning of treatment the exploratory method resulted in more significant reduction of the PIC depth in comparison with the method used in the control group, which we explain by the better restoration of the peri-implant pocket tissues biocompatibility during the aqua-kinetic treatment due to the biofilm destruction in comparison with the traditional method.

Conclusions: the schedule of dynamic monitoring of patients with dental implants: one month after implantation, then every 3-4 months, in case of stable remission - 2-3 times a year. If necessary, light probing is performed, radiography is performed to assess the level.

Key words: dental implantation, peri-implantitis, traditional treatment, aquakinetic method.

Цель: Сравнительная оценка клинической эффективности дентальной имплантации (EMS, Швейцария) в комплексном лечении пациентов с периимплантитом и периимплантатным мукозитом и традиционных методов.

Материал и методы: Изучены результаты лечения пери-имплантационных воспалительных заболеваний у 17 больных в возрасте 24-56 лет, из них 9 мужчин и 8 женщин (основная группа), со сроками пользования имплантатами от 1-го года до 7 лет.

Результаты: Сравнительный анализ двух методов по показателям редукции глубины ПИК выявил статистически достоверно большую эффективность исследовательского метода по сравнению с контролем ($p<0,01$). Через 3 и 6 месяцев от начала лечения исследовательский метод привел к более значительному уменьшению глубины ПИК по сравнению с методом,

используемым в контрольной группе, что мы объясняем лучшим восстановлением биосовместимости тканей периимплантатного кармана во время аквакинетической обработки за счет разрушения биопленки по сравнению с традиционным способом.

Выводы: График динамического наблюдения пациентов с дентальными имплантатами: через месяц после имплантации, далее каждые 3-4 месяца, при стойкой ремиссии – 2-3 раза в год. При необходимости проводится легкое зондирование, для оценки уровня – рентгенография.

Ключевые слова: Дентальная имплантация, периимплантит, традиционное лечение, аквакинетический метод.

Introduction

Today almost every clinic (private and public) offers such type of dental care as implantation, which is an alternative to traditional treatment in many clinical situations. However, despite the widespread introduction of dental implantation into dental practice, the expansion of indications for it and the avalanche-like growth in the number of implants placed by dentists, the number of complications is not decreasing. The results observed in patients in the nearest future after implantation testify to the high level of dental care, but in the scientific literature there is more and more information about the risk of distant complications. One of the main problems of implantology is inflammation of the tissues surrounding the osseointegrated implant. At the meeting of the European Federation of Periodontologists on the basis of the modern scientific evidence base a consensus opinion on the infectious-inflammatory lesions in the area of dental implants was developed. It was proposed to distinguish peri-implant mucositis and peri-implantitis (1). Mucositis in the implant area is an inflammation of the surrounding soft tissues without disturbance of osteointegration. Dental peri-implantitis is an inflammatory reaction of the tissues surrounding an osseointegrated implant, accompanied by loss of supporting bone. The diagnosis of peri-implantitis is made on the basis of radiological bone changes in the form of crater-shaped destruction around the neck and even the upper third of the implant (2).

It is believed that mucositis can occur in 80% of individuals with dental implants, and the development of peri-implantitis has been described in 28-56% of those examined (Lindhe J., Meyle J., 2008). According to other data, mucositis is observed in 60-80% of persons having dental implants, and the development of peri-implantitis is described in 10-56% of patients. In our clinical practice such phenomena occur with a frequency corresponding to the data of scientific literature.

Pathological changes around implants can occur both in the nearest terms after prosthetics and after several months and even years. The main factors of complications development in the immediate postoperative period can be errors in performing surgical procedures and prosthetics, while the main cause of peri-implant tissue inflammatory process development in the distant postoperative period is the patient's non-compliance with the schedule of regular visits to the periodontist (hygienist) or their absence.

The main risk factors for the development of peri-implantitis are the lack of rational regular hygiene of natural teeth and prosthetic structures in the oral cavity and a history of periodontitis. Numerous microbiological studies indicate that the functioning of implants is accompanied by the development of biofilms on the extraosseous surfaces of the implant and prosthesis, and the microbiota of this subgingival biofilm is similar to that in periodontal pockets in periodontitis, at the same time the biofilm in the transmucosal (neck) area of the implant supra-constructions can

cause chronic productive inflammation in the peri-implant tissues and lead to peri-implant mucositis and peri-implantitis (Datdeeva M. O. O., 2010). The key role in the development of peri-implantitis belongs to the biofilm microflora (3), which is a community of microorganisms grouped in microcolonies, protected by lipopolysaccharide matrix produced by them.

The causal relationship between the accumulation of microbial biofilm and the development of inflammation in the tissues surrounding the implant is confirmed in experimental and clinical studies (Heitz-Mayfield L.J., Lang M.A., 2000). The developed peri-implantitis, the clinical and microbiological picture of which is comparable to that of periodontitis, leads to the reduction of the service life of the whole implant construction.

The mechanism of action of Perio-Flow® above the gingiva and up to 5 mm below the gingiva is similar to that of the Air-Flow method. The air from the turbine flows into the hose, then into the powder chamber, where it is evenly mixed with the powder and the resulting mixture is fed to the spout of the device. The tip has two channels: the outer channel is used to supply water, the inner channel is used to supply the air-powder mixture. At the same time, the water moves completely separately from the powder mixture to the spout, where they come out together without mixing. Water surrounds the powder mixture with a shell, forming (inducing) the working jet of the mixture, preventing it from spraying to the sides, bringing it to the tooth surface. The water-air jet with finely dispersed cleaning powder, the strength of which can be adjusted according to the individual clinical situation, removes the biofilm (4).

Subgingival treatment of peri-implant pocket depths greater than 5 mm is performed using a Perio-Flow handpiece with a disposable sterile Perio spout, which provides a triple cone-shaped delivery - easy access and circulation of glycine powder, air and water (5). The shape of the nozzle ensures low dynamic air pressure. Disposable nozzles guarantee hygiene. The gentle application of the biokinetic energy of the original Perio method eliminates the risk of gingival damage and scratching of the abutment and implant surface, provides easy access to any area and 100% biofilm removal without damage.

The bottom of the peri-implant pocket is not damaged, but is completely cleared of biofilm, necrotic masses and mature granulation.

Due to the powder atomisation under pressure in three planes there is a successful restoration of biocompatibility of the biofilm-covered surfaces, due to which the depth of the peri-implant pocket decreases(5).

According to some authors (Schwarz F., Ferrari D., Popovski K. et al., 2008), the application of aqua-kinetic technology Perio Flow - air-abrasive over- and under-gingival treatment with glycine powder with particle size 25 microns (EMS, Switzerland) - allows to remove 99.9% of biofilm without damaging the implant surface (Fig. 1).

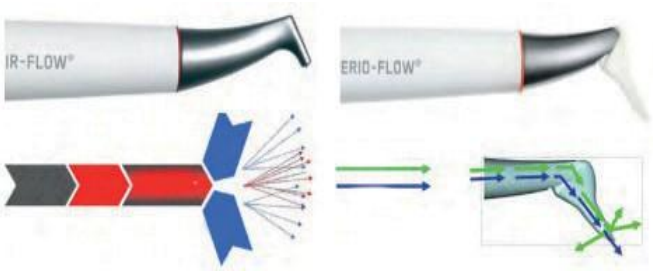


Figure 1. Mechanism of Perio-Flow® air-abrasion over the gingiva (left) and subgingivally (right).

Purpose of the study: Comparative evaluation of clinical efficacy of aquakinetic method Perio-Flow (EMS, Switzerland) in complex treatment of patients with peri-implantitis and peri-implant mucositis and traditional methods.

Material and methods: The results of treatment of para-implant inflammatory diseases in 17 patients aged 24-56 years, including 9 men and 8 women (main group) were studied. The period of use of implants (24 in total), which were both in the frontal areas and in the area of premolars and chewing teeth - from 1 year to 7 years. Most of the patients complained of bleeding, gingival discharge, discomfort, in 5 (29,4±0,7%) patients peri-implantitis was asymptomatic and was diagnosed during the examination.

All observed patients were subjected to clinical examination, besides radiological, microbiological and hygienic investigations.

The diagnosis of peri-implant mucositis was made in 2 patients, in the rest peri-implantitis was confirmed radiologically.

The control group consisted of 5 people who underwent the standard treatment: professional hygiene with the PIEZON 700 piezoelectric apparatus (EMS), in the implant area with the PI instrument (EMS) with plastic coating (Fig. 2), plaque removal with non-abrasive pastes by mechanical method. The reusable, autoclavable PI instrument, which was used for cleaning the implants from dental deposits, has a patented polyether-ketone coating, safe for the implant surface and ceramics, works with the piezoelectric handpiece by means of connection through the endocup at 1200.

In addition to standard professional hygiene, the patients in the main group underwent biofilm removal by Perio Flow subgingival aqua-kinetic treatment (EMS) on day 2 (2nd visit) and after 6 weeks (5th visit) (Fig. 3).

Fig. 2. Professional ultrasonic implant hygiene with a special instrument.

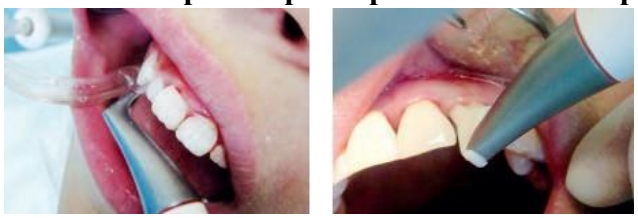
The complex of treatment of patients in both groups included motivation to rational oral hygiene (RH), training in the peculiarities of hygiene in the presence of dental implants with individual selection of basic and additional means of hygiene, local and by indications general antimicrobial and antimicrobial therapy, vitamin therapy, local immunocorrection, physiotherapy.

The treatment results were evaluated using the generally accepted clinical methods: the depth of probing around the implant or peri-implant pocket (PIC), the colour of the peri-implant gingiva, the consistency, the presence or absence of exudate from the peri-implant groove (pocket), the magnitude of peri-implant marginal bone resorption, the simplified index of GPR OHI-S (Green J.C., Vermillion J.K., 1963), index for quantitative determination of the plaque in the gingival area Silness - Loe (S-L) (Silness J., Loe, H., 1964), PMA (papillarmarginal-alveolar) index (Schour I., Massler M., 1947 in modification of S. Parma).

If indicated, targeted radiography was performed. Clinical parameters were analysed and index evaluation was performed at each of the patient's visits (on the 1st, 2nd, 5th and 10th day, after 6 weeks, after 3 and 6 months) - a total of 7 visits.

The obtained results were processed using standard statistical methods.

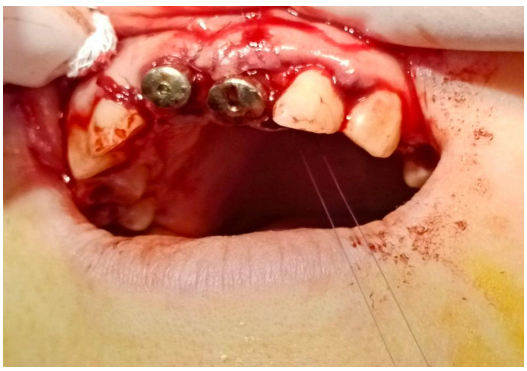
Fig. 3. Removal of biofilm in peri-implant pockets with a depth of up to 5 mm using a



conventional Air-flow handpiece with Perio powder, with a depth of more than 5 mm using a Perio-flow handpiece with a special glass plastic spout.

Results: Before treatment, the subjects in both groups had high Silness-Loe index (2.35±0.2 in the main group and 2.28±0.1 in the control group) and OHI-S (2.81±0.22 and 2.65±0.51, respectively), indicating unsatisfactory GPR. The PMA index averaged 58.5±2.8% in the main group and 57.3±2.4% in the control group.

As can be seen from the data we obtained, the level of GPR (according to OHI-S index values), which differed insignificantly between the patients of the two groups before treatment, reached 0.38±0.33 on the 5th day (by the 3rd visit) in the main group, remaining at this level. In patients of the control group the level of hygiene was worse and, having decreased by the 4th visit (after 10 days) to 0.48±0.27, after 6 weeks it was 0.53±0.23 ($p<0.001$).



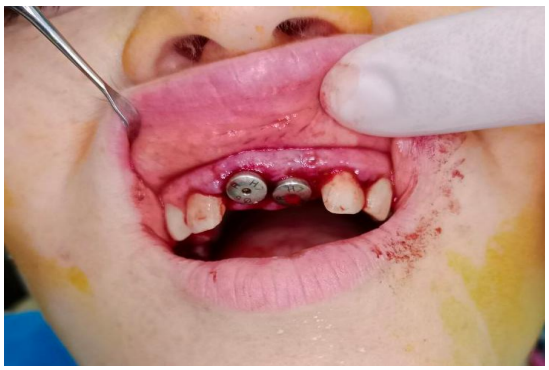


Fig. 4. Suturing after dental implant and abutment placement

The level of hygiene of the gingival region according to the Silness-Loe index value on the background of the conducted therapy significantly increased on the background of hygiene instruction and conducted therapy in patients of both groups, slightly worsening by the 5th visit (after 6 weeks). In the subsequent visits the difference in the index values was already established: in the main group after 3 months this index was equal to 0.92±0.31, in the control group - 1.96±0.38 ($p<0.001$), after 6 months - respectively 0.87±0.11 and 2.14±0.23 ($p<0.001$), despite regular control with hygiene correction.

As a result of the study it was found that in the course of treatment the condition of gingival tissues around implants, which was evaluated by means of PMA index, improved in patients of both groups, being 12.1±0.8, 11.7±0.6 and 11.9±0.9 by the time of the 5th, 6th and 7th visits, respectively. In individuals of the control group by the 6th and 7th visits this index was worse than after 6 weeks - 13.6±1.7, 16.9±1.3 and 17.8±2.1, respectively. As a result of the treatment, a decrease in the depth of PIC in patients of both groups was recorded. Moreover, in the main group there was a greater reduction of PIC depth in 6 weeks, 3 months and 6 months ($p<0.01$) compared to the control.

According to the data of the clinical study, we found that on the 5th day after the start of treatment the values of the gingival plaque index, simplified hygiene index, periodontal index decreased significantly. At the same time, the differences between the values of the studied indices before treatment and 5 days after its start in the groups of patients who received therapy with Perio Flow and those who used the traditional method were statistically reliable. The reduction of plantar tissue was confirmed clinically. Patients in the main group with the Perio Flow method showed a more marked and rapid improvement in a number of clinical parameters. In the control group after 3 and 6 months some patients had a recurrence of inflammation and deterioration of hygienic indices, which was reflected in the indices. The patients underwent plaque removal and were given additional instructions on oral hygiene.

A comparative analysis of the two methods in terms of PIC depth reduction revealed statistically significantly greater effectiveness of the exploratory method compared to the control ($p<0.01$). After 3 and 6 months from the beginning of treatment the exploratory method resulted in a more significant reduction of the PIC depth in comparison with the method used in the control group, which we explain by the better restoration of the peri-implant pocket tissue biocompatibility during the aqua-kinetic treatment due to the biofilm destruction in comparison with the traditional method.

Conclusions.

1. The schedule of dynamic observation of patients with dental implants: one month after implantation, then every 3-4 months, in case of persistent remission - 2-3 times a year. During the examination the colour, structure and consistency of the gingiva, presence of hyperaemia, edema and exudate are evaluated. If necessary, light probing is performed, mobility, denture fixation, presence of dental deposits are also evaluated (hygiene indices, if necessary periodontal indices: bleeding index, inflammatory process prevalence index). Radiographs are taken to check the bone level.
2. Normally, bone loss should be between 1-1.5 mm in the first year after surgery and then slow down to 0.2 mm each subsequent year.

USED LITERATURE:

1. Bezverkhov Y.N. New medical method of combating inflammatory complications in dental implantology // New technologies in physiotherapy. - M., 2002. - C.49-51.
2. Bolotonova M.N., Orlov A.A., Potemkin A.V. Correction of autoimmune conditions in order to eliminate pathological links that prevent physiological osteogenesis// Stomatology .2010. P.31-32.
3. Braun A., Krause F., Hahn G. Subjective pain sensations in periodontal treatment with the Vector system // Clin. stomatol. - 2002. - №4. - C. 25-31.
4. Braermeister K.D. Microbiological diagnostics of periodontal diseases // New in stomatology. - 2003. - №7. - C. 62-64.
5. Gerasimovich I.S. Application of high technologies as a basis for effective quality management of periodontological care // Clin. stomatol. - 2003. -№1. - C. 72-76.