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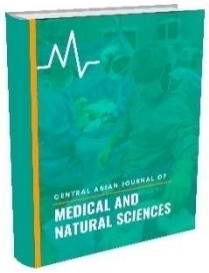

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Efficacy of Swiss Energy Calcivit in Dental Implant Planning in Persons with Secondary Adentia Who Have Previously Had a Coronavirus Infection

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Abstract: COVID-19 is caused by a novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The pulmonary consequences are now fairly well known; little is known about the effects of COVID-19 infection on bone. However, there is a clear link between COVID-19 infection and bone lesions in terms of immune impairment and inflammatory cytokine storm. Many inflammatory cytokines activated by the cytokine storm associated with COVID-19 infection play a well-known role in osteoclastogenesis and low bone mineral density. In addition, hypocalcaemia is common in patients with COVID-19.

The success of dental implantation is determined by a differentiated approach, taking into account the clinical picture of the overall body disease, as well as the rational choice of treatment.

Keywords: Calcivit Swiss energy, Hounsfield unit, dental implantation, bone density.

Introduction. In the scientific literature of the recent decade there have been given some methods to estimate the medical effectiveness of the treatment with the use of dental implants: clinical, clinical-statistical, clinical-radiological, functional [Nechaeva N.K., 2010; Chen X. et al., 2008; Wadhwani C.P. et al., 2012]. Currently, the following criteria were expanded: no mobility of single implants; no radiological peri-implant changes; average bone loss of less than 0.2 mm a year after surgery; no pain, infection, neuropathy, paresthesia or damage to the nerve channels; aesthetic satisfaction with the rehabilitation, 85% of success after 5 years and 80% after 10 years. [Mirgazizov M.Z., 2005; Nikolsky V.Y., Fedyaev I.M., 2005; 2007; Tolmachev V.E. et al., 2006; Faria J.C. et al., 2012; Ravindran S. et al., 2013]. In general statistical analysis of long-term implant outcomes, the reference point is 1 year after implantation, thus many studies do not take into account the results of the surgical phase of treatment. Therefore, not in all cases the cumulative statistical indicator of the effectiveness of implantation corresponds to the level of "survival rate" of the implants [Perova M.D., 2005; Dohan Ehrenfest D.M., Rutkowski J.L., 2012]. Bone remodeling is a continuous complex process aimed at the elimination of micro-damage and renewal of the bone matrix. The key link in the regulation of this process is the RANK/RANKL/OPG system, which ensures the balance of osteoblast activity. The harmful effects of oxidative stress on bone metabolism have recently been attracting a lot of attention. Excessive free radicals inhibit the adhesion of osteoblasts, which impairs bone homeostasis. In particular, hypoxemia in COVID-19 can induce Ca 2+ formation, a metabolic disturbance leading to osteocyte damage.

Objective: to study the clinical effectiveness of Swiss energy Calcivit in the planning of dental implants in persons with secondary adentia who had previously had coronavirus infection of the jaw in the planning of dental implants in persons with secondary adentia who had previously had coronavirus infection.

Materials and methods of the study:

To address the aims and objectives of the study, we examined 100 and treated 77 patients who were operated on at the Department of Surgical Dentistry and Implantology, TGSI over the period 2018 to 2022.

1. Methodology for the surgical phase of endosseous implantation.

The open implant technique involves only one surgical procedure in which implants are placed that communicate with the oral cavity, i.e. with the gingival margin shapers installed during surgery.

The two-stage technique, as the name suggests, is done in two stages. In the first stage, the implants are placed in the alveolar bone, closed with a screw cap and the wound is sutured tightly. After osseointegration is completed (3-6 months), the skeleton is skeletonised, the cover screw is removed from the implant, the gingival margin shaper is placed, and then the head (abutment), which serves as a support for the orthopaedic structure.

According to the international literature, there is no significant difference in the use of these two techniques.

In this study, we preferred the open implant technique because it has a number of undeniable advantages. As patients with cardiovascular disease are at risk, we considered it advisable to limit the number of surgical interventions. In addition, it was possible to monitor the dynamics of osseointegration not only with the help of radiological techniques, but also by measuring the mobility of the installed implants using a Periotest, Siemens device.

In the course of the surgery, we used standard surgical techniques.

Under infiltration and/or conduction anesthesia, a linear incision was made along the ridge of the alveolar process. The mucosal-periosteal flaps were peeled off with a raspator and the alveolar bone was skeletonised. The flaps were fixed. Далее шаровидным бором намечались места введения имплантатов. Implant beds were formed using drills of different diameters (from smaller to larger), using external and internal cooling with physiological sodium chloride solution (0.89%). Implants were placed into the formed beds, transportation elements were removed and gingival margin shapers were placed into the implants.

At the final stage, the flaps were placed in place, the wound edges were adapted and sutures were applied.

As a rule, Vicryl 4.0 synthetic suture material was used. The average resorption time of the material was 28 days, but, in accordance with generally accepted standards, the sutures were removed after a complete healing of the mucosa on day 7-10.

2. Pharmacological management of the surgical stage of intraosseous implantation.Complex medicamental therapy aimed to prevent complications development was planned on the basis of the generally accepted recommendations and taking into account individual condition of each patient.

The complex scheme of conservative therapy at the preoperative stage includes the use of the following groups of medicines:

Vitamin-mineral complex "Calcevit" Swees energy and anticoagulants (Clexane)

Fig.1. Vitamin-mineral complex "Calcivit" Swiss energy plus.

Vitamin D3 5 µg 50%Витамин К2 37,5 мкг 31%

Calcium 200 mg 20%

Zinc 5 mg 33%

Copper 1 mg 100%

Manganese 2 mg 100%

Boron 50 mg 2.5%

Standard conservative treatment in the postoperative phase included the use of the following groups of drugs:

Antimicrobials (Augmentin 375 units/ 3 times a day, in the presence of intolerance to antibiotics related to p-lactams, lincomycin 0.5 mg/ 3 times a day was used). At the same time, to prevent the development of intestinal microflora imbalance, Linex (a combined preparation containing lyophilized lactic acid bacteria culture) was prescribed - 2 capsules / 3 times a day.

- Desensitizing drugs. (Telfast 120 mg / once a day).
- Non-steroidal anti-inflammatory drugs (OCI (ketoprofen lysine salt 80 mg) or ibuprofen 400 mg).
- Antiseptic rinses (Chlorhexidine Bigluconate 0.1% solution for no more than 60 seconds / morning and evening).

As a rule, the drugs included in the anti-inflammatory therapy were limited to 5-7 days.

Individual drug regimens were also adjusted together with a virologist to compensate for associated cardiovascular diseases.

The control group consisted of practically healthy patients without a background disease, whose laboratory and functional examination revealed no general medical pathology, but who had dental defects; there were 30 patients. Bone density was assessed based on the numerical values of the Hounsfield scale, which are conventional units. Bone density can be differentiated according to the Hounsfield scale as follows: presence of more than 850 units in the area under study is interpreted as dense bone; values from 350 to 850 indicate the presence of fewer trabeculae, which gives grounds for characterizing it as loose bone; values less than 350 units on the Hounsfield scale are interpreted as local osteoporosis.

Results of the study and discussion

About 100 patients were examined and treated, including men and women.

and women. The patients were divided into 2 groups:

The main group included 30 patients, whose treatment was based on minimally invasive dental implantation techniques proposed by us and pharmacological correction in the form of vitamin complex and anticoagulant-celecans;

The control group included 25 patients who were treated using standard approaches; the implant bed was formed using standard drills and milling machines.

In the main group, incisions were made using microscalpels (MB 67, Hu-Friedy and SM 69, Swann-Morton), the implant bed was prepared using piezosurgical nozzles using the PIEZON MASTER SURGERY device (EMS, Switzerland), nozzles for implant bed formation MB 1, MB 2, MB 3 and MB 4. Resolon stitches № 6 and 7 (№ 881430, RESORBA) were applied.

The comparative analysis showed that in the main group of patients whose implants were implanted using our suggested approach, the rejection rate of the implants was significantly lower ($p<0,05$), that is 1.08%, while in the control group the rate was 2.57% (Fig.2). Thus, the use of our proposed technology makes it possible to reduce the rejection rate by 2.5 times.

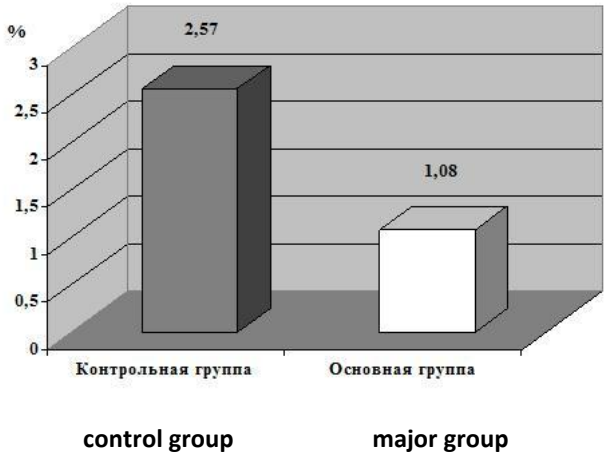

Fig.2. Implant rejection rate (%)

Continuous clinical and radiological monitoring of the patient, as well as monitoring the dynamics of the implant stability index, as one of the main criteria of his/her clinical well-being, is an important component of postoperative rehabilitation measures.

The results of the evaluation of the pathological symptom of pain showed a similar distribution of indicator values (Fig. 3). Thus, 56.1% more than half of the patients in the main group reported the absence of pain, while in the control group there were only 2 (2.6%) such patients. It should be noted that among the patients in the comparison group, 30,3% and 38,2% of the patients, respectively, rated the pain as 2 and 3. In the main follow-up group, which used the new approach for treatment, the figures were significantly ($p<0,05$) lower, the pain sensation being evaluated as 2 points by only 3,7 % of the patients and as 3 points by only 2,4 % of the patients,

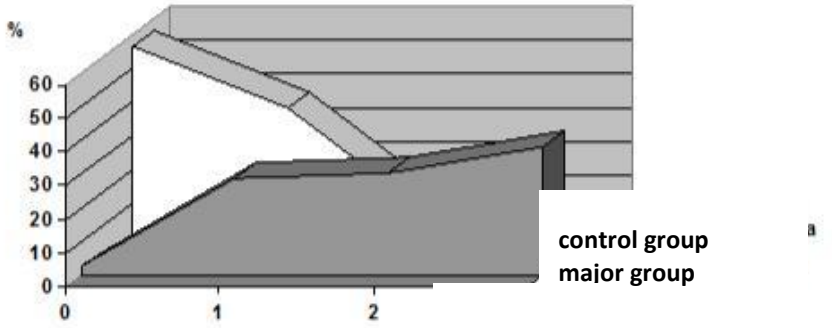

Fig.3 Distribution of patients by severity of pain after implantation

Subjective odour scores of 86.6% of patients in the observation group were not found to be significantly different between the groups, while the proportion of patients in the control group was 71.0% (Figure 4). An odour score of 3 was given by 6.6% of patients in the control group, while a score of 2 was given by 13.2% of patients.

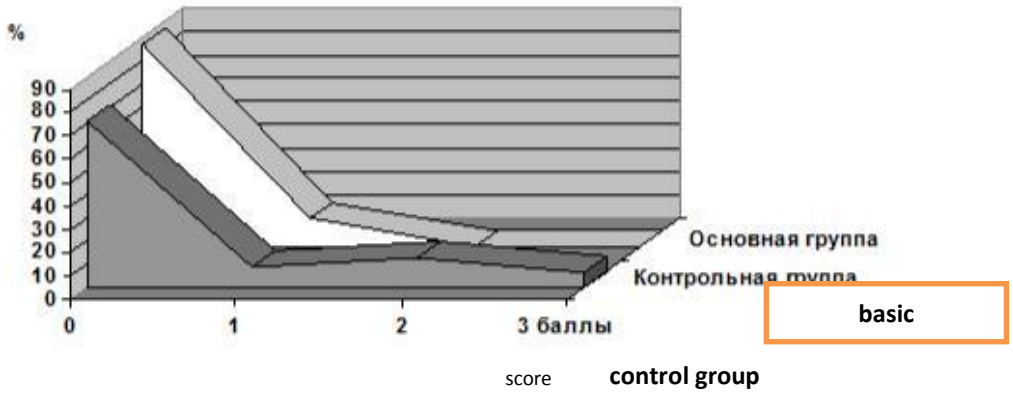

Fig. 4. Distribution of patients according to "bad smell" after implantation

Phonetic impairment in the control group was expressed in 24.0% of patients: 17.4% of patients scored 2 and 6.6% scored 3. No "phonetic impairment" was detected in our main group (Fig. 5). The number of patients with a score of 1 was similar across patient groups, ranging from 13.2% to 13.4%.

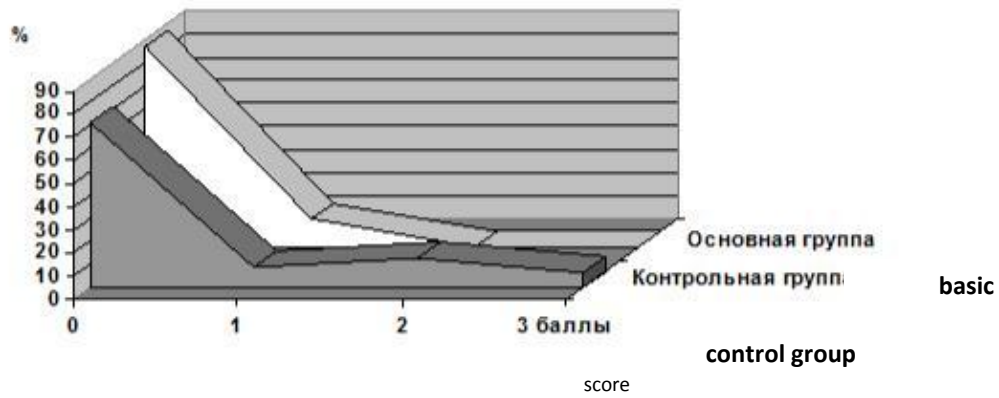

Figure 5. Distribution of patients according to "phonetics disorders".

The assessment of the chewing disturbance symptom showed that the proportion of patients with no chewing disturbance did not differ during the first week after implantation, being 40.8% and 37.2% in the control and main groups respectively (Fig. 6). However, the main group had a significantly higher ($p<0.05$) proportion of patients with a mastication dysfunction score of 1, with 57.3 %, while the control group had 42.1 %.

The proportion of patients scored 2 (11.8%) and 3 (5.3%) for this indication was higher in the comparison and control group. In the main group, these scores were only 2.4%, with no significant difference detected.

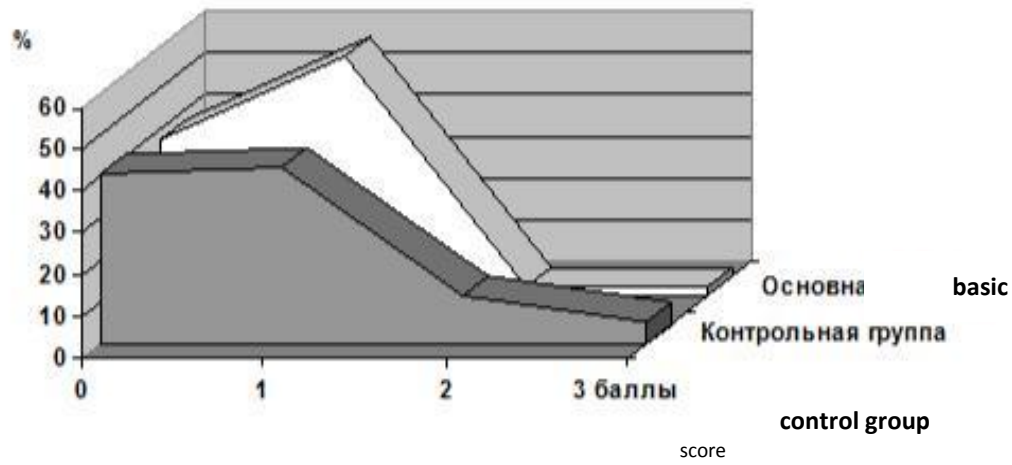

Fig.6 Distribution of patients by severity of mastication disorders after implantation

Thus, the studies observed during the first 7 days after implantation showed that the use of our proposed new approach to implantation significantly reduces the frequency of local pathological manifestations (oedema, bleeding) and functional changes (phonetics and mastication disorders).

Conclusions:

1. The proportion of those who were completely satisfied with the treatment in the main group was 41.4 % and was significantly ($p<0.05$) higher than in the control group (13.5 %). The results confirmed a higher level of satisfaction among the patients who underwent implantation with our proposed approach with the pharmacological support of Calcivit Swiss energy plus and anticoagulant Clexane.

2. the following regularities were revealed while comparing ISQ values of all groups under study. The stability of the implants set into the bone tissue with the density of D1, D2, D3 and D4, used in the investigation, after 6 months, reached the figures (61,5±3,75- 82±0,0 units), which testified to favourable clinical result of the performed surgery.

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