

Clinical and microbiological analysis of adaptation to removable laminar prostheses in patients with chronic kidney insufficiency who are treated with hemodialysis.

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**Abstract.** Clinical and microbiological assessment of the effect of local use of the antiseptic drug Eludril to increase the effectiveness of orthopedic treatment and adaptation to removable laminar dentures in patients with chronic renal failure receiving hemodialysis.

**Keywords.** CKI, Eludril, dental status

### **Introduction.**

The relevance of problem. The prevalence of kidney insufficiency throughout the world is growing, that is recognized in some regions, including the Republic of Uzbekistan [1,4,6,7]. This leads to significant health problems for some population groups.

Currently, treatment of patients with chronic kidney insufficiency (CKI) is one of the main problems in modern dentistry [3,5]. Development of atrophic processes and pathosis in the oral cavity in patients with CKI further aggravates their adaptation to orthopedic interventions in the oral cavity. Thus, orthopedic treatment may not always be effective in such patients [6]. To reduce the incidence of complications when using full or partial removable laminar prostheses, it is necessary to take into account characteristics of local bacteriological state of the oral cavity during the adaptation period, since these data are likely to be high in patients with chronic kidney insufficiency. Therefore, this can lead to prolonged adaptation of prostheses in this patient population and exacerbation of complications [6].

Local use and application of antiseptics in orthopedic practice is undoubtedly a very promising area. This is due to the fact that it contributes to a change in the properties of humoral and cellular factors of inflammation and microbiocenosis when using laminar prostheses [6].

The study of Eludril effect on bacteriological parameters of the oral cavity from the point of view of using new drugs when using orthopedic laminar prostheses is of particular interest in patients with chronic kidney insufficiency receiving hemodialysis.

**Purpose of work.** Clinical and microbiological assessment of the effect of local use of the antiseptic drug Eludril to increase the effectiveness of orthopedic treatment and adaptation to removable laminar dentures in patients with chronic renal failure receiving hemodialysis.

**Materials and research methods.** The study was conducted in 48 patients who visited orthopedic dental clinic of the Tashkent State Dental Institute who received hemodialysis therapy during the study, and in 20 healthy individuals who were not

diagnosed with kidney disease. Patients were diagnosed with chronic kidney insufficiency based on clinical and laboratory standards by nephrologists. The antiseptic drug ELUDRIL was tested in patients to normalize the function of the oral mucosa, prevent inflammatory processes, prevent dysbiotic changes and quickly adapt the applied prostheses in the oral cavity during prosthetics. Patients were divided into the following groups according to orthopedic treatment;

- The first group included 23 patients with chronic kidney insufficiency (control group) receiving hemodialysis and conventional treatment;
- The second group included 25 patients with chronic kidney insufficiency (index group) who received hemodialysis and used ELUDRIL;

Patients in the index group were recommended to rinse the oral cavity and treat a removable laminar denture with prepared diluted ELUDRIL solution (according to instructions) with boiled or distilled water, after meals and at bedtime, 3-4 times a day.

The dental status and bacteriological composition of the oral cavity during treatment were studied in dynamics (preliminary examination, 15 days, 30 days later).

The results obtained and their discussion. In patients with chronic kidney insufficiency receiving hemodialysis and seeking orthopedic care, irregular changes in the oral microbiocenosis were observed, regardless of age. These changes were mainly associated with a decrease in the constant microflora of the autochthon of the oral cavity due to an increase in the number of control groups of bacteria known as allogons and transits that are not associated with biocenosis.

In patients with chronic renal failure receiving hemodialysis, the main manifestation of dysbiotic changes in the oral cavity is prosthetic stomatitis. The main cause of stomatitis in this group of patients is the terminal phase of chronic renal failure, because at this stage hemodialysis does not completely exclude uremic toxins from the body.

It follows from this, table 1.

The state of the oral microbiocenosis during adaptation to orthopedic prosthetics in patients with chronic kidney insufficiency receiving hemodialysis, and the antiseptic therapy "ELUDRIL" (mg-mg/ml) in dynamics.

No	Types of microorganisms	Control group	Preliminary indicators	15 days later	30 days later
1	<i>Bacteroidis sp.</i>	4,85±0,15	4,91±0,12	4,28±0,11*••	4,97±0,2
			4,82±0,13	4,03±0,10**••	3,89±0,14**••↓↓
2	<i>Prevotella sp.</i>	2,07±00	5,30±0,06* *	4,45±0,12**••	4,93±0,10**••◊
			5,31±0,07* *	4,38±0,11**••	3,20±0,15**••◊◊↓ ↓
3	<i>Peptostreptococcus sp.</i>	5,13±0,04	5,48±0,13*	5,14±0,10•	5,15±0,15•
			5,31±0,10	4,73±0,16*↓↓	3,60±0,20**••◊◊↓ ↓
4	<i>Fusobacterium.s</i>	2,97±0,3	3,83±0,04*	3,94±0,23•	3,84±0,25*

	<i>p.</i>	1	3,89±0,16*	3,85±0,21*	3,61±0,29
5	<i>Lactobacillus sp.</i>	5,53±0,14	3,33±0,17*	3,09±0,10**	3,67±0,22**°
			3,42±0,23*	3,17±0,08**	3,83±0,18**°°
6	<i>Veillonella sp.</i>	5,80±0,13	5,28±0,11*	4,80±0,11**•	4,94±0,16**
			5,24±0,09*	4,25±0,14**••↓	3,42±0,14**°°↓↓
7	<i>Str.solivaris</i>	5,73±0,14	4,22±0,13*	4,47±0,16**	4,61±0,17**
			4,02±0,28*	3,93±0,26**	4,94±0,22**
8	<i>Str.mitis</i> ↓↓↑↑	4,21±0,15	3,84±0,09*	3,79±0,13*	3,81±0,14*
			3,81±0,13*	3,32±0,18**	3,69±0,13*
9	<i>Str.mutans</i>	4,58±0,27	5,31±0,13*	4,62±0,17••	4,91±0,19
			5,39±0,34	4,60±0,15•	3,85±0,14↓↓
10	<i>Str. pyogens.</i>	3,16±0,18	5,21±0,15*	4,61±0,18**•	4,37±0,15**••
			5,19±0,20*	4,33±0,15**••	2,06±0,02••°°↓↓
11	<i>Enterococcus sp.</i>	2,45±0,02	4,20±0,16*	4,17±0,27	4,30±0,29
			4,01±0,26*	3,67±0,20**	3,19±0,19*•↓
12	<i>S. epidermidis</i>	3,65±0,19	3,80±0,14	3,41±0,17	3,13±0,21
			3,77±0,11	3,58±0,17	3,0±0,15*••°
13	<i>S. aureus</i>	2,33±0,18	5,02±0,18*	4,59±0,13**	4,33±0,17*
			5,48±0,11*	3,34±0,16**••↓	1,38±0,03••°°↓↓
14	<i>Dipteroids</i>	3,15±0,09	3,11±0,21	3,26±0,27	3,35±0,30
			3,48±0,01*	3,25±0,16	3,93±0,12**°°
15	<i>Candida sp.</i>	2,04±0,04	5,14±0,17*	4,86±0,19**	4,84±0,23**
			5,35±0,13*	3,58±0,12**••↓	2,33±0,14••°°↓↓
16	<i>Actinomyces sp.</i>	2,86±0,02	3,90±0,12*	3,94±0,05**	3,93±0,11**
			3,79±0,10*	3,18±0,12**••↓	2.46±00•• °°↓↓
17	<i>E. coli</i>	2,03±0,03	4,08±0,25*	3,79±0,12**	3,65±0,44**

			4,50±0,31* *	3,82±0,26**	2,10±0,24**••◦ ↓
18	<i>Proteus sp.</i>	0	4,22±0,14* *	3,76±0,11**•	3,24±0,17**••◦
			4,13±0,24* *	3,79±0,19**	2,09±0,03*••◦◦ ↓↓
19	<i>Klebsiella sp.</i>	2,01±0,05	3,62±0,19* *	3,34±0,15**	3,41±0,13**
			3,59±0,19* *	3,50±0,15**••	2,42±0,18** ↓↓

Note: in the photo it is a traditional treatment; - Eludril is an anesthetic treatment, in dynamics. Reliability of indicators of the control group (\*\* - P <0.001; \* - P <0.05); relative to the baseline (•• - P <0.001; • - P <0.05); The exponent ◦◦ P <0.001; ◦ - P <0.05 compared with the 15-day reading; allowable interval between the control and index group (↓↓ -P <0.001; ↓ - P <0.05);

As a result, hygiene and dental indicators in the oral cavity may deteriorate [2]. In addition, our findings are based on literary sources indicating that this group of patients had impaired local immune systems. It was found that these disorders are directly related to the imbalance in the local immune system, with the dysbiotic manifestations of the mt-flora and the duration of the disease [8].

An analysis of bacteriological research showed that changes in the quantity and quality of the constant and unstable microflora of the oral cavity were found in patients of both groups at an early stage of adaptation (15 days). The rates of these persistent anaerobic bacteria (*Bacteroidis sp.*, *Peptostreptococcus sp.*, *Veillonella sp.*) were significantly lower than the results of the initial study (P <0.001; P <0.05), including inconstant anaerobic bacteria (*Prevotella sp.*) The same applies and to *Fusobacterium.sp.* (Table 1). It should be noted that treatment of patients in both groups for 15 days did not have a significant (P> 0.05) effect on the content of lactobacilli and their level of exposure (table 1), and there were no significant differences in the rates of persistent anaerobic bacteria (with the exception of *Peptostreptococcus sp.*), within 15 days of treatment, their number was significantly lower (P <0.001) than in the control group (table 1, Fig. 1).

In patients with chronic kidney insufficiency receiving hemodialysis, both conventional treatment and treatment with ELUDRIL selectively influenced the removal and quantification of aerobic and facultative bacteria in the oral cavity during the period of adaptation of the prosthesis (15 days). Traditional methods of treatment did not affect the performance of autoanthropic cocci (*Str.solivaris*; *Str.mitis*; *S. epidermidis*) in the oral cavity. Reliably, there was a significant decrease in the quantitative indicators of the riogenes of opportunistic *Str.mutans* and pathogenic *Str. pyogens* (P <0.001; P <0.05). This also applies to representatives of the intestinal group of the species *Proteus sp.* However, during the 15 days of usual treatment in the biocenosis of the oral cavity of this group of patients, profound changes were observed in the type of dysbiotic. Examples of these changes were

pathogenic streptococci, staphylococci, fungi, and intestinal bacteria from representatives of aerobic and facultative biotopes of unstable anaerobic bacteria (*Prevotella* sp., *Fusobacterium* sp.), More stable, higher than the healthy control group ( $P < 0.001$ ). In addition, it was found that the biotope's biotope was moderately (Table 1, Diagram 1) less stable ( $P < 0.001$ ) than the healthy control group biotope (*Lactobacillus* sp. *Str.solivaris*). It was found that, in the treatment of orthopedic patients using removable laminar prostheses using the Eludril antiseptic (15 days), the number of grams (+) of pathogenic streptococci, staphylococci, candida fungi and actinomycetes in the oral cavity was significantly more reliable than the results of preliminary examination of patients ( $P < 0.05$ ;  $P < 0.001$ , respectively) (table 1, chart 2). In the intestinal bacterial group, a decrease in both quantitative and extraction indices was observed compared with the initial control, but they were not statistically significant ( $P > 0.05$ ). Alternatively, there were still dysbiotic changes in the patients' oral cavity.

When comparing the bacteriological parameters obtained in both treatment methods used within 15 days of adaptation to orthopedic prostheses, we obtained the following results (Table 1). According to the results, it was found that the positive difference in the treatment with ELUDRIL was 21.1%, that is, 19 types of bacterial allergens (*Peptostreptococcus* sp., *S. aureus*, *Candida* sp., *Actinomyces* sp.). During the 15 days of treatment, there was a significant ( $P < 0.001$ ) decrease in the dynamics of treatment with "ELUDRIL" compared with conventional treatment.

Within 30 days of adaptation, quantitative and qualitative characteristics of the offspring of anaerobic bacteria *Bacteroides* sp. and *Peptostreptococcus* sp. were restored using conventional treatment and did not differ significantly ( $P > 0.05$ ) from the healthy control group, including *Lactobacillus* sp., *Veillonella* sp., it was found that it is significantly lower ( $p < 0.001$ ) than in the healthy control group. The imbalance between autokton and anaerobes persists (Table 1, Diagram 1).

During the 30 days of traditional treatment, there were no positive changes in the aerobic and optional flora of the oral biocenosis, which means a disproportionality between the bacteria that are constantly present in the biocenosis, permanent or transit bacteria, and an increase in the number of common and pathogenic bacteria.

Diagram 2. The effect of the dynamics of orthopedic treatment on the rate of elimination of pathogenic cocci in patients with chronic kidney insufficiency during adaptation: A-conventional treatment; B - Treatment with Eludril (Indicators obtained from isolated patients).

By the 30th day of the examination, positive changes were observed in the oral biocenosis of the main group of patients treated with ELUDRIL in dynamics. Anaerobic *Lactobacillus* sp. found in 13 of 23 patients (56.5%) by 30 days, and *Str.solivaris*, represented by facultative indigenous cocci, was isolated from physiological oral solution in 14 patients (66.7%). We observed a significant increase in these indicators compared with the baseline survey (4.7 and 2.3), the results of a 15-day study (2.3 and 2.7) and the control group (2.7; 1.2) (Table 1 and Diag. 13). At the same time, there was a tendency toward a decrease in the degree and quantitative

determination of conditionally pathogenic and pathogenic bacteria in the oral cavity of this group of patients. By day 30, *Prevotella* sp. was found in 4 patients, which was 19%. This was 2.5 times lower than the baseline survey, and 2.8 times lower than in the first control group. In the dynamics of the antiseptic drug treatment "Eludril", a significant decrease in the incidence of gram-positive pathogenic cocci was noted, especially in their quantitative parameters (Table 1). As can be seen from the diagram, in the dynamics of treatment with the antiseptic drug Eludril, representatives of the causative agent Gram (+) coccus *Str. pyogens.* and *S. Aureus* significantly decreased compared with the baseline testing, the results of 15 days and quantitative indicators of the first control group ( $P < 0.001$ ). Similar results were found in the quantitative indicators of fungi and actinomycetes of the gastrointestinal tract and (table 1).

Diagram 3. Microflora in the oral cavity in dynamics during the traditional treatment and use of the antiseptic drug Eludril used in prosthetics and adaptation to it of patients with chronic kidney insufficiency.

The use of the antiseptic Eludril, which has a bactericidal effect on the pathogen, opportunistic microorganisms and fungi, and its use in the postoperative denture in patients with chronic kidney insufficiency had a positive effect on the adaptation of patients to the prosthesis.

Hemodialysis patients with chronic renal failure had prosthetic stomatitis in 16 of 23 patients with chronic kidney insufficiency (69%) in the control group during the usual treatment and treatment with ELUDRIL, compared with 5 of 25 patients with antiseptic "ELUDRIL" prosthetic stomatitis developed in 20% during adaptation to dentures. The use of the antiseptic drug Eludril during adaptation to orthopedic prostheses in patients with chronic kidney insufficiency receiving hemodialysis also had a positive effect on the duration of adaptation of patients to the prosthesis. In 5 patients receiving traditional therapy, the period of adaptation to the prosthesis averaged 10–13 (21.7%) days, in 7 - after 18-21 days (30.4%), and in 13 patients the process lasted 25–27 (56.5%) days. In the main group, these indicators were as follows: 13 out of 25 patients with orthopedic prostheses spent on average 10–13 (52%) days; this process lasted for 20-25 (20%) days. Thus, the results obtained indicate that the use of the antiseptic ELUDRIL when adapting orthopedic prostheses for patients with chronic kidney insufficiency was different from traditional orthopedic treatment methods. Studies have shown that the antiseptic "ELUDRIL" containing chlorhexidine 0.10%, chlorobutanol 0.5% attacks and alcohol at a concentration of 42.8% - has a strong bactericidal effect on fungi and bacteria in the oral cavity. It also had a positive effect on the dysbiotic process in the oral cavity caused by the underlying disease of patients with chronic kidney insufficiency. The antibacterial effect of the antiseptic ELUDRIL was higher in the index group compared with the control group. Antiseptic Eludril has a bactericidal effect on pathogenic microorganisms in the oral cavity of patients with chronic renal failure of the main group of patients and significantly reduces the incidence of prosthetic

stomatitis compared with the control group (49.5%). This also led to an average (5–9 days) reduction in the period of adaptation of patients to dentures.

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