Factors of Non-Specific Protection of Oral Fluid in High School Children with Dental Anomalies

S.Sh. Olimov, J. N. Bakaev, Badriddinov B. B, U. A. Yunusova

Bukhara State Medical Institute Named After Abu Ali Ibn Sino

Abstract:

The article presents a comparative analysis of the factors of non-specific protection of oral fluid in children of high school age. The author determined the percentage of lymphocytes, monocytes, rod - and segmented neutrophils. These indicators were closely interrelated with the parameters of the oral microbiocenosis of sick children with dental anomalies.

Key words: Dental and maxillary anomalies, factors of nonspecific protection, microbiocenosis, immunoglobulins.

When analyzing the features of local immunological factors of the oral cavity during prosthetics with orthopedic structures, it was found that local immunity is important for elucidating the complex mechanisms of the influence of prostheses and prosthetic materials on the state of oral tissues. The importance of saliva and gingival fluid in maintaining the structural homeostasis of the oral cavity, which contained immunoglobulins, cytolytic T-lymphocytes, polymorphonuclear neutrophils, which play a major role in maintaining and providing local immune protection, was substantiated. Also, the components of saliva and gingival fluid were TNF-α, according to the content of which it was possible to judge the presence of inflammation of the SOPR in the process of adaptation to orthopedic structures [Danilina T. F. et al., 2012]. The dynamics of these indicators served as one of the criteria for the quality of orthopedic treatment.

The study of immunological parameters of oral fluid in children with chronic catarrhal gingivitis living in contaminated areas with fluoride and iodine deficiency in the Lviv region was carried out by Malko N. V., Bezvushka E. V. [2017]. In 12-year-old children, the number of white blood cells in the oral fluid was 1.3 times higher compared to the control, and there was also an increase in the level of IL-6 by 27.1% and a decrease in the level of IL-4 by 21.59%. At the age of 15, there was a further increase in the level of white blood cells, which was 1.2 times higher than the control indicators, also characterized by an increase in IL-6 by 26.41% and a decrease in IL-4 by 28.53%.

Taking into account the above, we set the task of a comparative study of the factors of non-specific protection of oral fluid in children of high school age.

Material and methods of research. To fulfill the set research goal, we examined 210 healthy and 81 sick children with dental and maxillofacial anomalies of the senior school age of 12-18 years. All the children were educated in secondary schools of the city of Bukhara. The analysis of the age and sex composition of the surveyed showed that according to these parameters, the surveyed are close to each other, and the groups are representative.

To determine the lysozyme in saliva, the study was carried out using the methods proposed by Kagramanova K. A. and Ermolyeva Z. V. [1966], modified by Bektimirov A.M.-T. and Adylov Sh.K. [1987]. To do this, 1 ml of a suspension of a daily S. aureus culture containing 1 billion/ml of microbe was added to a test tube with dissolved saliva. After incubation, the content of lysozyme

was determined in test tubes.

The level of lactoferrin was determined on a two-site solid-phase ELISA using a test system manufactured by Vector Best (Russia).The analysis was carried out in 2 stages: at the 1st stage, calibration samples with a known concentration of lactoferrin, as well as the studied samples were incubated in the wells of a stripped tablet with highly specific antibodies to lactoferrin immobilized on the surface of the wells; at the 2nd stage, lactoferrin bound to antibodies in the wells was treated with a conjugate of antibodies to lactoferrin with horseradish peroxidase. After removing the excess conjugate, a substrate mixture for peroxidase containing hydrogen peroxide o-phenylenediamine was introduced into the wells and the "Antigen-lactoferrin-conjugate"complex was detected. In this case, o-phenylenediamine is oxidized to form a dye, the intensity of which is proportional to the concentration of lactoferrin in the analyzed sample. The enzymatic reaction was stopped by adding a stop reagent, and the color intensity was measured on a photometer for ELISA at a length of 492 nm.

Statistical processing of the material was carried out by traditional methods of variational statistics. The obtained results were processed by statistical methods generally accepted for biomedical research according to Student and Fisher.

The results of the study and their discussion. It is proved that 1 million white blood cells enter the saliva every minute, 90% of which are polymorphonuclear neutrophils. With the development of a purulent-inflammatory process, they actively destroy pathogens, contributing to the recovery of SOPR. Taking this into account, we determined the percentage of lymphocytes, monocytes, rod-and segmented neutrophils (Table 1).

Table 1

Comparative indicators of non-specific protection factors in healthy children of high school age, M±m

Age of children	Lymphocytes, %	Monocytes, %	Neutrophils, %	
			Stick-nuclear	Sigmento-nuclear
12-14 years old, n=105	1,3±0,1	2,6±0,1	2,7±0,1	93,7±0,2
15-18 years old, n=105	1,4±0,1	2,8±0,1	3,0±0,2	93,2±0,3

It was found that there were practically no significant differences in the percentage of lymphocytes among both age groups-1.3±0.1% and 1.4±0.1%, respectively (P0. 05). According to the content of monocytes, different forms of neutrophils, there were also no significant differences between these age groups of children (P0, 05).

The same parameters were determined in healthy and children with dental and maxillary anomalies and diseases of the oral mucosa of the same age (Table 2).

The obtained results show that the parameters of lymphocytes and monocytes in children with dental and maxillary anomalies and diseases of the oral mucosa were significantly reduced in relation to the data of healthy children - 1.0±0.1% and 1.3±0.1%, respectively; 2.0±0.1% and 2.7±0.1% ($P<0.05$).

The parameters of rod-shaped neutrophils, on the contrary, were increased in children with dental and maxillary anomalies and diseases of the oral mucosa compared to the data of healthy children - 3.8±0.4% and 2.9±0.4%. These differences are a consequence of the development of diseases of the oral mucosa in children, which led to a decrease in the activity of these cells in the oral cavity.

Table 2

Indicators of factors of nonspecific protection in healthy and children with dental and maxillofacial anomalies and diseases of the oral mucosa of high school age, M±m

Group of children	Lymphocytes, %	Monocytes, %	Neutrophils, %	
			Stick-nuclear	Sigmento-nuclear
Healthy children, n=210	1,3±0,1	2,7±0,1	2,9±0,2	93,5±0,2
children with dental and maxillofacial anomalies and diseases of the oral mucosa, n=81	1,0±0,1	2,0±0,2	3,8±0,4	92,3±0,4

These indicators were closely interrelated with the parameters of the microbiocenosis of the oral cavity of children with dental and maxillary anomalies and diseases of the oral mucosa, since patients noted dysbiotic phenomena in this biotope, which were accompanied by an imbalance in the detectability of cells of nonspecific resistance of the oral cavity of children.

Thus, it was found that there are practically no inter - age differences between the age groups of healthy children in the percentage of cells of nonspecific resistance - lymphocytes, monocytes, rod- and segmented neutrophils. However, in children with dental and maxillary anomalies and diseases of the oral mucosa of the same age, there was a significant decrease in the percentage of lymphocytes and monocytes, as well as an increase in the level of rod-shaped neutrophils. This imbalance of changes is a consequence of the development of a pathological process in the oral mucosa in children, which may be an additional criterion for diagnosing this condition.

The secretions secreted by the oral mucosa wash away microorganisms from the surface of the mucous membranes, the surface of the teeth, in addition, they have a bactericidal and bacteriostatic effect due to the content of lysozyme, secretory immunoglobulin A (sIgA) and other factors of local immunity.

Factors of local immunity of the oral cavity also include IgM, IgG, IgA and sIgA, which are detected in saliva and are important for assessing the degree of the inflammatory process. In addition, IgE is also synthesized in the oral mucosa, an increase in the content of which is a direct proof of the presence of an allergic process in the oral cavity.

As is known, immunolobulins (antibodies) are specific proteins synthesized by the human immune system (B-lymphocytes) against various antigens entering the human body from outside [Gorkunova A. R., et al., 2015].

The results obtained show that there are some differences in the content of oral fluid immunoglobulins between the age groups of the examined children (Table 3).

Table 3

Comparative parameters of factors of nonspecific resistance of oral fluid in healthy children of high school age

Indicators	Age of healthy children	
	12-14 years old, n=105	15-18 years old, n=105
IgA, g/l	1,43±0,12	1,51±0,16
IgM, g/l	1,21±0,10	1,30±0,14
IgG, g/l	14,79±0,46	15,92±0,74
sIgA, g/l	4,58±0,27	4,87±0,42

Lymphocytes, mcg/l	4,11±0,53	4,90±0,61
Lactoferrin, ng / ml	1977,35±16,18	1995,16±19,07

Thus, IgA was detected 1.1 times more significantly in children aged 15-18 years compared to the data of children aged 12-14 years-1.51±0.16 g/l and 1.43±0.12 g/l, respectively (P<0.05). Almost the same trend of changes was observed in the level of IgM (1.30±0.14 g/l and 1.21±0.10 g/l, respectively, a difference of 1.1 times, P<0.05) and IgG (15.92±0.74 g/l and 14.79±0.46 g/l, respectively, a difference of 1.1 times, P<0.05) in the oral fluid.

Secretory IgA (sIgA) is one of the main factors of local immunity of human mucous membranes. sIgA occurs on the surface of the mucous membranes of the intestines, upper respiratory tract, genitals, as part of tears, saliva, breast milk and other human biological fluids [Krainov S. V., et al., 2015].

In our studies, the sIgA content was 1.1 times higher in healthy children aged 15-18 years compared to the data of healthy children aged 12-14 years-4.87±0.42 g/l and 4.58±0.27 g/l, respectively. Although the indicators do not significantly differ from each other (P0, 05), but the data are worthy of attention.

Lysozyme belongs to the group of mucolytic enzymes, it is thermally stable, the molecular weight is 14.6 kDa. The mechanism of action of lysozyme consists in the hydrolysis of bonds between N-acetylmuramylic acid and N-acetylglucosamine located in the polysaccharide chains of the peptidoglycan layer of the bacterial cell wall, which leads to a change in its permeability, accompanied by the diffusion of cellular contents into the environment and cell death. Since peptidoglycan makes up a large part of the cell wall (90-95%) of gram-positive microorganisms, unlike gram-negative bacteria (5-10%), the bactericidal effect of lysozyme is mainly manifested in them. Lysozyme occurs in warm-blooded, cold-blooded animals, as well as in some animals. In humans, it occurs in white blood cells, brain, tear, saliva, amniotic fluid, skeletal muscles. Lysozyme is synthesized by macrophages and crypts of the mucous membrane of epithelial cells (Paneta cells). It is known that the bactericidal effectiveness of lysozyme is more pronounced against gram-positive cocci than gram-negative bacteria. In this regard, these microorganisms are the first to die under the action of the lysozyme of the oral fluid. This indicates that the content of lysozyme in the oral fluid of the examined patients is of great importance.

The results obtained show that there were no significant differences in the content of lysozyme in the oral fluid of healthy children of senior school age, although the difference between the age groups is significant-respectively, in children 12-14 years old, 4.11±0.53 mcg/l, in children 15-18 years old, 4.90±0.61 mcg/l.

It was revealed that lactoferrin is one of the components of the body's immune system, participates in the system of non-specific humoral immunity, regulates the functions of immunocompetent cells and is a protein of the acute phase of inflammation. Lactoferrin is a glycoprotein containing iron, produced by glandular cells. One of its main properties is its bactericidal activity, which is believed to be associated with the utilization of iron necessary for the normal functioning of a bacterial cell. Lactoferrin binding to the cell surface does not occur in the presence of sIgA.

In our studies, the lactoferrin content was 1977.35±16.18 ng/ml in healthy children, and 1995.16±19.07 ng/ml in healthy children aged 15-18 years (P0.05).

Thus, the comparative parameters of the factors of nonspecific resistance of oral fluid in healthy children of high school age showed that the content of IgG, IdA, IdM, sIgA, lysozyme and lactoferrin showed no age differences between healthy children of high school age.

The next stage of the research was a comparative study of factors of nonspecific resistance in healthy

and children with dental and maxillary anomalies and diseases of the oral mucosa, the results of which are shown in Table 4.

It was found that the content of immunoglobulins of three main classes (IgA, IgM, IgG) in the oral fluid in children with dental and maxillary anomalies and diseases of the oral mucosa changed in different directions. Thus, if the content of IgA and IdM in the oral fluid in children with dental-maxillofacial anomalies and diseases of the oral mucosa was reduced by 1.4 times, respectively (1.47±0.14 g/l versus 1.06±0.07 g/l, P<0.05) and 1.3 times (1.26±0.12 g/l versus 0.98±0.06 g/l, P<0.05), then the IgG content was increased by 1.3 times in children with dental-maxillofacial anomalies and diseases of the oral mucosa in relation to the data healthy children (15.36±0.60 g/l versus 19.34±0.72 g/l, P<0.05).

Table 4.

Comparative study of factors of nonspecific resistance in healthy and children with dental and maxillofacial anomalies and diseases of the oral mucosa

Indicators	Healthy children	children with dental and maxillofacial anomalies and diseases of the oral mucosa
IgA, g/l	1,47±0,14	1,06±0,07
IgM, g/l	1,26±0,12	0,98±0,06
IgG, g/l	15,36±0,60	19,34±0,72
sIgA, g/l	4,73±0,35	2,08±0,41
Lymphocytes, mcg/l	4,51±0,57	3,15±0,28
Lactoferrin, ng / ml	1986,26±27,63	1065,89±19,25

We note that the sIgA of oral fluid also tended to decrease in children with dental and maxillary anomalies and diseases of the oral mucosa in relation to healthy peers (respectively, 2.08±0.41 g/l versus 4.73±0.35 g/l). The revealed 2.3-fold decrease in this indicator in the examined children with dental and maxillary anomalies and diseases of the oral mucosa indicates the presence of tension in the local immunity of the oral cavity, associated not only with a verified diagnosis of diseases of the oral mucosa, but also with dysbiosis of this biotope in the examined children.

The above judgment shows that the basis for the beginning of the pathological process in the oral mucosa is not only the presence of a pathogenic agent, but also a violation of the balance between indigenous and facultative representatives of normal microflora (dysbiosis), as well as a decrease in the activity of local immunity factors of the oral cavity (secondary immunodeficiency).

Almost the same trend of changes also concerned the content of lysozyme in the oral fluid of the examined healthy and children with dental-maxillofacial anomalies and diseases of the oral mucosa in a comparative analysis. If the parameters of healthy patients averaged 4.51±0.57 micrograms/l, then the parameters of children with dental and maxillary anomalies and diseases of the oral mucosa were 1.4 times significantly less – on average 3.15±0.28 micrograms/l (P<0.05).

According to the lactoferrin content in the oral fluid of the examined patients, there was almost the same trend of changes (respectively, 1986.26±27.63 ng / ml versus 1065.89±19.25 ng/ml, P<0.001), with the only difference that the intensity of the decrease was more significant (a decrease of 1.9 times).

Conclusions. Thus, a comparative study of the content of local immunity factors found that in children with dental and maxillofacial anomalies and diseases of the oral mucosa of primary school age, these indicators change in different directions, if IgG increases in children with dental and maxillofacial anomalies and diseases of the oral mucosa, then IdA and IdM were reduced in relation to the parameters of their healthy peers. Other parameters (sIgA, lysozyme

and lactoferrin) were also reduced compared to the control values (healthy children).

This situation, apparently, is associated with the compensatory and adaptive capabilities of the factors of the immune system, the mutual complement of the factors of local immunity of the oral cavity. If one indicator of the immune system decreases, then this deficit is compensated by an increase in another indicator and creates an immunological balance, ensuring the full functioning of local immunity. This established relationship confirms and coincides with the" theory of immunological mobiles " of Academician of the Academy of Sciences of the Russian Federation Petrov R. V. [1990].

Establishing the relationship between the development of diseases in children of high school age with dental and maxillofacial anomalies and diseases of the oral mucosa with changes in the microbiocenosis of their oral cavity and the development of an imbalance of local immunity indicators allows us to supplement the pathogenetic aspects of diseases of the oral mucosa, to develop scientifically based early diagnosis, optimal treatment methods and prevention of this pathological process in children. This helps to reduce morbidity, avoid complications and improve the quality of life of sick children with diseases of the oral mucosa.

Used literature

1. Avetisyan L. A., Martynova N. A., Mikhailova L. S., Bakieva K. M. The prevalence of major dental diseases in children with combined general somatic pathology / / Bulletin of medical Internet conferences. - 2014. - Volume 4. - No. 12. - P. 1363-1364.
2. Antonov A. A., Strelnikova, N. In. Indicators of immunity of the oral cavity in children Khabarovsk Krai // Visnyk problem Balog - medicine – Poltava, 2016 - VIP. 4, Volume 1 (133). - P. 351-354.
3. Zh. N. Bakaev. Doimiy tishlarning chikishi vakting yzgarishi natizhasida tish-zhag tizim anomalialarining etiopathogenesis, zamonaviy endashuv.(Adabietlar sharyi) "Tibbietda yangi kun", 4 (32) 2020, pp. 119-123.
4. Babiy I. L., Kalashnikova U. A. Allergic lesions and changes in the oral mucosa in various diseases of organs and systems in children. Part III / / Child's health. - 2010. - №2 (23). - Pp. 97-99.
5. Bavykina T. Yu. Efremova O. A. Oral cavity-a mirror of diseases of internal organs//Scientific bulletin of the Belgorod State University. Series: Medicine. Pharmacy. - 2011. - No. 10. - T. 14. - P. 236-238.
6. Basov A. A., Akopov, V. A., Lapina N. In. Indicators of enzyme link of the antioxidant system in the oral fluid of periodontal disease and coronary heart disease with normal and impaired carbohydrate metabolism // Modern problems of science and education. - 2013. - No. 5. - p. 312-315.
7. Bendas V. V., Hopko N. V., Biletska O. V. Retrospective analysis of sensitive species of C. albicans strains to antimicotics in the Chernivetsky region / / Klinichna ta experimental pathology. - Chernivtsi, - 2011. - Vol. 10. - No. 4. - pp. 127-128.
8. Budkova T. S. Retention of teeth, plan and prognosis of treatment / T. S. Budkova, I. Yu. Zhigurt, F. Ya. Khoroshilkina / / New in dentistry. - 1997. - No. 1 (special issue). - pp. 46-53.
9. Biryukov A. S., Davidyan O. M., Kazekina O. Yu., Kosyreva T. F., Kuzetsov V. D., Safroshkina V. V. Interrelation of the influence of oral diseases on the quality of life in schoolchildren //

Collection of scientific theses and articles "Health and education in the XXI century". - 2010. - No. 4. - Vol. 12. - p. 443.

10. Vakushina E. A. Improving the effectiveness of methods of diagnosis and treatment of patients with retinated teeth / E. A. Vakushina, M. O. Desyatnikova / / New in the theory and practice of dentistry: sb.nauch. works'. - Stavropol, 2003. - pp. 34-36.
11. Bykov I. M., Basov A. A., Akopov, V. A., Giza E. V., Degtyarev, E. A., Kokkonen A. S., Gorkunova A. R., Soumis M. M., L. V. Akopova prospects for the use of oral fluid in clinical practice for non-invasive laboratory diagnostics in medical and dental pathology // Kuban scientific medical Bulletin. – 2013. – № 6 (141). – P. 45-49.
12. Volchek, D. A. Modern methods of examination of patients with impacted canines of the upper jaw / D. A. Volchek // Orthodontics. - 2006. - No. 1. - pp. 24-26.
13. Volkova M. N., Chernyavsky Yu. P., Sakharuk N. A., Elenskaya Yu. R. Diseases of the oral mucosa: an educational and methodological manual. - Vitebsk: VSMU, 2016. - 236 p.
14. Gafforov S. A., Bakaev Zh. N. Features of the relationship of diseases of the oral mucosa with somatic pathology //Bulletin of the TMA. - Tashkent, 2019. - No. 3. - pp. 20-24.
15. Gafforov S. A., Bakaev Zh. N. Ogiz byshligi shillik kavati kasalliklari-pathologist aspectlari va prevention asoslari // Stomatologiya. - Tashkent, 2019. - №4 (77). - Pp. 75-80.
16. Gorkunova A. R., Sovmiz M. M., Bykova N. I., Eremina T. V., Khvostova T. S., Samoylik N. I. Changes in the indicators of immune protection in the oral fluid in chronic generalized periodontitis / / International Journal of Applied and Fundamental Research. - Moscow, 2015. - No. 3. - pp. 567-570.
17. Davydov B. N., Samoukina A.M., Mikhailova E. S., Gavrilova O. A., Alekseeva Yu. A. Variants of the oral fluid microflora in practically healthy children and adolescents. - Dentistry. 2017. - No. 1. - p. 56-59.
18. Danilina T. F., Zhidovinov A.V., Poroshin A.V., Khvostov S. N., Mayboroda A. Yu. Diagnostic possibilities of oral cavity galvanosis in patients with metal orthopedic structures / / Modern high-tech technologies. - 2012. - No. 2. - p. 49-51.
19. Isamulaeva A. Z. Pathogenetic mechanisms for improving the effectiveness of treatment of oral diseases in children with bronchial asthma. Abstract of the dissertation... for the degree of Candidate of medical Sciences-Voronezh, 2011. - 20 p.
20. Isamulaeva A. Z., Danilina T. F., Bashkina O. A., Sergienko D. F. Dental status and indicators of the cytokine spectrum in the secret of the oral cavity in children with bronchial asthma / / Astrakhan Medical Journal. - Astrakhan, 2010. - No. 4. - pp. 33-37.
21. Krainov S. V., Mikhalchenko V. F., Yakovlev A. T. On the place of immunomodulatory therapy in the complex treatment of chronic generalized periodontitis in the elderly // Modern problems of science and education. - 2015. - No. 6. - p. 252-254.
22. Kozlitina Yu. A. Chugaeva U. Yu. Admakin O. I. Features of local immunity of the oral cavity in children with rheumatic diseases / / Saratov Scientific and Medical Journal. - Saratov, 2011. - Vol. 7. - No. 1.- (appendix). - p
23. 25. 300-301. 23. Kuzmina E. M., Turyanskaya M. V. Dynamics of dental morbidity in 12-year-old children of the Krasnodar Territory for 10 years / / Dental. forum. – 2009. – №1(37). - P. 33-36.24. Machti I. I. Periodontal aspect in the treatment of retention of upper jaw incisors / I. I. Machti / / Quintessence. - 1991. - No. 5/6. - p. 335 -340.

24. Latysheva S. V. Modern aspects of the pathogenesis and diagnosis of oral candidiasis // Modern dentistry. - Minsk, 2007. - No. 1. - pp. 57-61. 25

25. . Malko N. V., Bezvushka E. V. Dynamics of immunological parameters of oral fluid in children with chronic catarrhal gingivitis living in contaminated areas with fluoride and iodine deficiency. Dentistry. - 2017. - No. 2. - p. 51-54

26. Naumova V. N., Turkina S. V., Maslak E. E. Interrelation of dental and somatic diseases: literature review / / Volgograd Scientific and medical Journal. - 2016. - № 2 (50). - P. 25-27.

27. Nedoseko V. B., Chesnokova M. G., Chepurkova O. A., Komleva A. S. The prevalence of fungal flora and features of microbiocenosis in persons with intact periodontal disease and with chronic inflammatory periodontal diseases // Periodontics. - 2009. - No. 1. - pp. 60-65.

28. Nurova Sh. N. Surunkali tonsillitis va surunkali bronchitis bilan kasallangan bolalarda tish-zhag anomalialarini tashislash, prophylaxis va davolashga mazhmuaviy endashuv / / Autoref. Doctor of Philosophy (PhD). - Bukhara, 2019. - 46 p.

29. Olimov S. S. The significance of saliva metabolic parameters in the development of dental anomalies in children with metabolic syndrome. / / "Stomatik kasalliklarni davolashda va prophylaxisidagi dolzarb muammolar" Ilmiy amaliy konferentsiyasi. Bukhoro. 2016. - 33bet.

30. Olimov S. Sh., Gafforov S. A. Bolalarda tish-zhag tizimi nuksonlari va somatic kasalliklar horasida boglikning ilmiy asoslari. (adabietlar sharиi).// Magazine. Stomatologiya. - 2019y No. 1.60-65 bet.

31. Olimov S. Sh., Saidov A. A., Gaffarov S. A., Khozhimetov A. A. Maktab eshdagi bolalarda hepatobiliary tizimning tish-zhag nuksonlari pathogenezidagi aaмamiyati. / / Journal Doctor akhborotnomasi. Samarkand. 2019-No. 2. - 35-39 bet.

32. Olimov S. S. Evaluation of the effectiveness of preventive measures in the orthodontic treatment of children with dental deformities./ / Shuv-uslubiy kyllanma. SHZR SSV tomonidan 13.11.08 tasdiklangan. Tashkent. 2019. - 21 b.

33. Persin L. S. Types of dental anomalies and their classification / L. S. Persin. - M.: MGMSU, 2006 – - 27c.

34. Sakharuk N. A. Microbial flora of the oral cavity in norm and pathology. Morphology of fungi of the genus Candida / / Vestnik VSMU. - 2008. - Volume 7. - No. 2. - p. 3-13.

35. Kharitonova M. P., Khalilaeva E. V., Yuryeva L. I. Features of the structure of the incidence of the oral mucosa in residents of the Sverdlovsk region / / Maestro of dentistry. – 2012. – № 2 (46). – P. 44-47.

36. Tsvetkova-Aksamit L. A., Arutyunov S. D., Petrova L. V. Diseases of the oral and lip mucosa. - Moscow: MEDpress inform, 2009. - 208 p.

37. Bakaev Zh.N.,Olimov S.Sh. New views on diagnostic methods for the formation of retention of the upper permanent

38. canines(literature review) / International Journal of Integrated Education // 2020, - Vol 4. - P. 129-135.

39. J.N. Bakaev, S. Sh. Olimov. Modern approaches to diagnosis, etiology and pathogenesis of the upper permanent canine retention formation (literature Review) / European Journal of Molecular & Clinical Medicine // Volume 07, Issue 03, 2020. - P. 3815 -3830.

40. Dodson T.B. Role of computerized tomography in management of impacted mandibular

third molars / T.B. Dodson // NY State Dent J. - 2005. - Vol. 71, №6. - P. 32-35.

41. Fays F. Use of anterior teeth measurements in determing occlusal vertical dimension / F. Fays, A. Eslami, G.N. Driser // J. Prosmet. Dent. - 1987. - Vol. 58.-P. 317-321.
42. Heurich T. Digital volume tomographya nextension to the diagnostic procedures available for application before surgical removal of third molars / T. Heurich, C. Ziegler, H. Stevelinget al. // Mund Kiefer Gesichtschir. - 2002. - Vol. 6, № 6. - P. 427-432.
43. Merrifield L.L. Differential diagnostic analysis system / L.L. Merrifield, H.A. Klontz; J.L. Vaden // Am. J. OrthodDentofacialOrthop. - 1994. - Vol. 106, № 6. - P. 641-648.
44. Mupparapu M. Patterns of intra-osseous transmigration and ectopic eruption of mandibular canines: review of literature and report of nine additional cases /M. Mupparapu // DentomaxillofacRadiol. - 2002. - Vol. 31, № 6. - P. 35560.
45. Stivaros N. Radiographic factors affecting the management of impacted upper permanent canines / N. Stivaros, N.A. Mandall // J. Orthod. - 2000.-Vol. 27, №2.-P. 157-169.
46. Yamamoto K. Diagnostic value of tuned-aperture computed tomography versus conventional dentoalveolar imaging in assessment of impacted teeth / K. Yamamoto, Y. Hayakawa, Y. Kousuge et al. // Oral Surg Oral Med Oral Pathol Oral RadiolEndod. - 2003. - Vol. 95, № 1. - P. 109.