

# Study of the Orofacial Myofunctional Disorders in the Dental System and Malocclusion in Children

*Jumaev Miraziz Maxmud ugli*

*Bukhara State Medical Institute named after Abu Ali Ibn Sino*

**Abstract:** The article investigates main concepts of orofacial myofunctional disorders and malocclusion. There have been descriptions of associations between malocclusion and orofacial myofunctional disorders (OMD), however the precise nature of these associations is still unknown. Further clarification is required because these disorders are highly prevalent in children. This study aimed to investigate the relationship between childhood malocclusions and OMD (bruxism, abnormal swallowing, caudal resting tongue posture, and biting habits). The purpose of this study was to explore the connection between occlusal issues and orofacial myofunctional disorders in primary and mixed dentition. We also aimed to determine the causes of malocclusions and how the number of information sources used by parents on child oral health could influence these associations.

**Keywords:** malocclusion, orofacial myofunctional disorders (OMD), myofunctional therapy.

**Introduction:** Malocclusion is a prevalent dental issue. It occurs when the upper and lower teeth fail to align properly when the mouth is closed. This condition often arises due to overcrowding of teeth, where the teeth are too large for the available space in the mouth, or due to teeth being crooked. Additionally, malocclusion can occur when there is a misalignment between the upper and lower jaws. Orthodontic treatment, such as braces, is commonly used to address malocclusion. In more severe cases, surgical intervention may be necessary.[1]

When there is an abnormal lip, jaw, or tongue position during speech, swallowing, or rest, it is known as an orofacial myofunctional disease (OMD). Orofacial myofunctional disorders can be following, may occur with one type or combination of some: abnormal thumb, finger, lip, and tongue sucking habits, appropriate mouth-open lips-open resting posture, a forward interdental rest posture of the tongue, a forward rest position of the tongue against the maxillary incisors, a lateral, posterior interdental tongue rest posture problem, an inappropriate thrusting of the tongue during speaking.[2]

Myofunctional therapy, also known as muscle-function therapy, is aimed at treating oral myofunctional disorders (OMD). OMD is a broad term that encompasses abnormal oral resting positions, oral functions like "tongue thrust" or lingual horizontal swallowing, chewing differences, and oral habits including thumb/finger sucking or tongue sucking.[3] Patients with OMD engage in a series of exercises and activities to enhance oral function, establish proper resting positions, learn new swallowing and chewing techniques, and eliminate harmful oral habits.[4]

Incorrectly developing jaws and crowded teeth affect three out of every four children. As early as age four, these issues are apparent. As vital as your child's health and education are, so too is their proper growth and development. The years between two and five are when children develop the fastest. 70% of child's facial and jaw development happens during this time. Underdeveloped faces and crowded teeth are the unfortunate result of the majority of children not experiencing proper facial and jaw development.[5] Current studies have demonstrated that crowded teeth, misaligned jaw development, and other orthodontic issues are not brought on by large teeth in small jaws or by genetics. The true causes are incorrect myofunctional habits such as reverse swallowing, thumb sucking, tongue thrusting, and mouth breathing. Incorrect jaw development is also influenced by allergies, asthma, and an open mouth posture. It's likely that incorrect dental and facial development resulted from one or more of these myofunctional issues that most of us experienced as children. Since research indicates

that the lips and tongue influence tooth position, treating and correcting these poor myofunctional habits is crucial.[6][7]

Malocclusion refers to the improper alignment of the upper and lower jaws when they come together.[8] This condition is often accompanied by facial skeletal abnormalities, which can affect various functions of the mouth and face, such as the positioning of bones, teeth, and muscles. As a result, activities like chewing, speaking, swallowing, and breathing may be affected in order to adapt to the dental and facial environment. The causes of dental and skeletal malocclusion can be either inherited or acquired, and are frequently associated with developmental abnormalities.[9]

Dr. Edward Angle, a renowned medical doctor and dentist, developed a widely accepted system for describing dental occlusion. He believed that mouth breathing is one of the primary factors contributing to malocclusion.[10] Mouth breathing and poor oral habits are considered risk factors for malocclusion because they can disrupt the normal growth and function of the mouth during development. Mouth breathing is particularly linked to occlusal issues, regardless of whether there is a genetic predisposition. While oral habits are generally less significant in relation to malocclusion, they may play a role if there are other contributing factors present.[11]

OMD evaluations require a comprehensive approach that encompasses various orofacial functions and involves multiple disciplines. Oral health professionals play a crucial role in identifying the need for referral and initiating appropriate care for individuals with OMD. This is particularly important in the context of orthodontic needs, temporomandibular joint disorder, and sleep-disordered breathing, where oral myofunctional therapy is an integral part of the multidisciplinary treatment approach.[13] To accurately assess the presence of OMDs, a chairside clinical evaluation is conducted. During this assessment, it is essential for patients to remain unaware of being evaluated, as this allows them to exhibit their natural orofacial functions. For instance, patients who habitually keep their mouth open may consciously close it during the assessment if they are aware of being observed. The chairside assessment involves both extraoral observations and intraoral findings. To obtain accurate extraoral observations, clinicians should ensure that the patient's lips are relaxed and not pursed or straining to close. [14]

Additionally, clinicians should pay attention to the position of the tongue and listen for any unclear or "slushy" sounds when the patient speaks. During the intraoral assessment, clinicians should take note of factors such as malocclusion, ankyloglossia, current or past oral habits, and the shape of the palate. It is important to recognize that even if malocclusion appears to have been corrected through orthodontic treatment, signs observed during the extraoral assessment may indicate a potential relapse. By conducting a thorough chairside assessment, oral health professionals can effectively identify potential OMDs and make appropriate referrals for further evaluation and treatment.[15]

Oral Habits	Orofacial Effects
Use of Pacifiers	<ul style="list-style-type: none"> <li>• Anterior open bite</li> <li>• Posterior crossbite</li> <li>• Oral ulcers in the posterior third of the palate</li> <li>• Candidiasis</li> </ul>
Thumb and Finger Sucking	<ul style="list-style-type: none"> <li>• Vestibularization of the upper anterior teeth</li> <li>• Lingualization of the lower incisors</li> <li>• Premaxillary protrusion</li> <li>• Anterior open bite</li> <li>• Posterior crossbite</li> <li>• Clockwise rotation of the occlusal plane</li> <li>• Clockwise rotation of the mandible</li> <li>• Lip incompetence</li> <li>• Tongue thrusting</li> <li>• Narrowing of the arches lateroposterior</li> <li>• High vaulted palate</li> </ul>
Fingernail Biting	<ul style="list-style-type: none"> <li>• Dental abrasion, dental erosion</li> <li>• Dental misalignment</li> </ul>
Lip Interposition (Wedging) or Sucking	<ul style="list-style-type: none"> <li>• Upper alveolodental protrusion</li> <li>• Retro-inclination of the lower incisors</li> <li>• Lip incompetence (lips do not come into contact)</li> <li>• Deep bite</li> <li>• Mandibular retrognathism</li> <li>• Occlusion of the lower incisors on the palatine mucosa</li> <li>• Hyper tone of the mentalis (golf ball chin)</li> </ul>
Pencil Chewing	<ul style="list-style-type: none"> <li>• Shifting the masticatory load on the premaxilla</li> <li>• Alteration on the correct skeletal growth</li> <li>• Dentoalveolar open bite</li> <li>• Dentoalveolar malposition</li> <li>• Dental abrasions</li> <li>• Gingival damage</li> </ul>

**Figure 1. Oral habits and their orofacial effects**

There have been associations between certain oral habits in infants and medical conditions, such as acute otitis media and early cessation of breastfeeding. However, beyond infancy, there is little evidence of a connection between oral habits and general health. Nonetheless, persistent habits can have significant effects on the structures of the mouth and face (Figure 2) [16]

Non-nutritive sucking behaviors, which are initially adaptive and rewarding, can become learned habits. These habits are typically present without any psychological abnormalities. However, prolonged thumb or pacifier sucking beyond the preschool years may indicate some psychological disturbance. The severity of deformities caused by non-nutritive habits is influenced by the frequency, duration, and intensity of the habit. Lip sucking, on the other hand, can be a habit that involves the lips and mouth or may be related to stress or psychological problems. Figure 3 illustrates the frequency and distribution of orofacial myofunctional disorders in a group of 129 children aged 5 to 9 years with functional malocclusions, who were evaluated at the Department of Pediatric Dentistry, University of Buenos Aires.[17]



Figure 2.

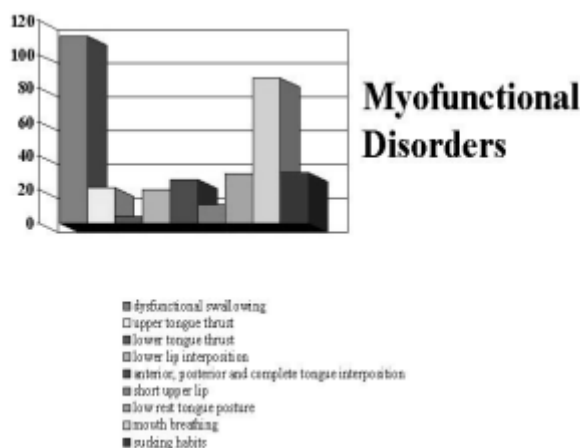


Figure 3.

Orofacial myofunctional therapy (OMT) is designed to enhance facial proprioception, improve muscle tone, and optimize orofacial movement according to Homem et al. (2014). It is widely acknowledged that infants may exhibit orofacial myofunctional disorders (OMD) like ankyloglossia, however, the approach to treating these infants and toddlers differs from that of older patients or typically developing children. Factors such as voluntary control, ability to follow instructions, and self-monitoring play a crucial role in determining the appropriate treatment plan to address the clinical symptoms associated with an OMD.[18]

Oral myofunctional therapy (OMT) differs significantly from pediatric oral motor/feeding therapy in various aspects.

- OMT is characterized by an active approach that necessitates the voluntary execution of a motor plan by the client, involving activities like practicing lingual positioning for isolated swallows as highlighted by Merkel-Walsh (2018c) and Boshart (2017).
- Another key distinction lies in the requirement for the patient to comprehend the rationale behind the program and actively engage in achieving their goals, as emphasized by Holtzman (2018). This level of understanding and commitment may not be feasible for infants or toddlers participating in an OMT program.
- OMT is fundamentally grounded in addressing abnormal oral structures, tone, resting posture, habits, and swallowing patterns, as outlined by the Association of Orofacial Myology and Therapy (AOMT, 2018).
- While early signs of orofacial myofunctional disorders (OMD) can be identified in young children, the commencement of OMT interventions varies widely in the literature, ranging from as early as 4 years to as late as 8 years of age according to Holtzman (2018). Alternative treatment options are available for younger age groups.
- The OMD treatment team may encompass various professionals such as pediatricians, physicians, speech-language pathologists (SLPs), Registered Dental Hygienists (RDHs), Certified Orofacial

Myologists® (COM®), dentists, orthodontists, allergists, otolaryngologists, breathing specialists, sleep specialists, bodyworkers, and oral maxillofacial surgeons.

- Furthermore, OMT involves repetitive exercises focusing on phonemes, articulation drills, and oral placements of lingual alveolar and palatal phonemes to ensure both accurate acoustics and correct phonetic placements, as highlighted by Merkel-Walsh and Overland (2018).
- Lastly, OMT targets and addresses oral habits such as thumb sucking and mouth breathing through specialized programs like Sandra Holtzman's online "Unplugging the Thumb" and Pam Marshalla's book "How to Stop Thumbsucking (and Other Oral Habits): Practical Solutions for Home and Therapy" (2001) with a positive approach.[19]

The treatment of orofacial myofunctional disorders (OMDs) in infants and young children necessitates a collaborative approach involving various professionals (Billings et al., 2018). While speech-language pathologists (SLPs) and registered dental hygienists (RDHs) have the capacity to provide orofacial myofunctional therapy (OMT), the involvement of a multidisciplinary team is crucial. For instance, the American Dental Association recommends that infants undergo early oral screenings at around one year of age, enabling the early detection and treatment of OMDs. Occupational and physical therapists, who possess expertise in feeding disorders, fine and gross motor skills, and sensory-motor integration, may identify children with developmental disabilities and provide early intervention. Figure 4 presents several examples of pediatric OMD teams, highlighting the importance of a collaborative approach in addressing these disorders.[20]

OMD Infant and Toddler Team Pre-feeding, Oral Motor and Feeding Therapies, Bodywork and Medical Team	OMD Pediatric Team Orofacial Myofunctional and Feeding Therapies, Bodywork and Medical Team
<ul style="list-style-type: none"> <li>• Allergist</li> <li>• Body worker – osteopath, chiropractor, licensed massage therapist, physical therapist, occupational therapist</li> <li>• CranioSacral therapist</li> <li>• Dentist</li> <li>• Early Interventionists</li> <li>• Feeding specialist (OT/SLP)</li> <li>• Lactation consultant (IBCLC)</li> <li>• Nutritionist</li> <li>• Occupational therapist</li> <li>• Oromaxillofacial surgeon</li> <li>• Osteopathic medical physician</li> <li>• Otolaryngologist</li> <li>• Pediatrician</li> <li>• Physical therapist</li> <li>• Registered Dental Hygienist</li> <li>• Respiratory Therapist</li> <li>• Speech-Language Pathologist</li> </ul>	<ul style="list-style-type: none"> <li>• Allergist</li> <li>• Body worker – osteopath, chiropractor, licensed massage therapist, physical therapist, occupational therapist</li> <li>• Certified Orofacial Myologist™</li> <li>• CranioSacral therapist</li> <li>• Dentist</li> <li>• Educational Professionals</li> <li>• Feeding specialist (OT/SLP)</li> <li>• Nutritionist</li> <li>• Occupational Therapist</li> <li>• Oromaxillofacial surgeon</li> <li>• Osteopathic medical physician</li> <li>• Orthodontist</li> <li>• Otolaryngologist</li> <li>• Pediatric dentist</li> <li>• Pediatrician</li> <li>• Psychologist/Neuropsychologist</li> <li>• Registered Dental Hygienist</li> <li>• Respiratory Therapist</li> <li>• Speech-Language Pathologist</li> </ul>

**Figure 4 Potential Members of Pediatric OMD Teams**

**Conclusion:** OMDs and chronic oral dysfunction have the potential to cause dental malocclusion and craniofacial dysmorphism. It is crucial to comprehend the underlying pathologies that contribute to malocclusion in order to achieve long-term facial stability. Orofacial myofunctional therapy aims to establish optimal functional relationships between the orofacial muscle complex, temporomandibular joint, myofascial connective tissues, and associated neurological systems. This, in turn, creates a balanced, stable, and pain-free homeostatic environment. Early detection of OMDs and malocclusion by oral health professionals is essential in supporting this objective, as a thorough assessment and



accurate diagnosis are prerequisites for effective treatment. A limited number of articles were of high quality, despite the abundance of literature on OMD, AD, and malocclusion. This systematic review revealed a frequent co-occurrence of AD and nonphysiological swallowing with an anterior open bite (AOB). Additionally, malocclusion was found to be associated with apico-alveolar AD. Conversely, there was no apparent correlation between biting habits and malocclusions. As for other habits such as bruxism and a low tongue position at rest, there was insufficient evidence to support a similar relationship. Further longitudinal research of superior quality is necessary to gain a deeper understanding of the interplay between OMD, AD, and malocclusions.

### Reference:

1. Assaf DDC, Knorst JK, Busanello-Stella AR, et al. Association between malocclusion, tongue position and speech distortion in mixed-dentition schoolchildren: an epidemiological study. *J Appl Oral Sci.* 2021;29:20201005.
2. Becht MP, Mah J, Martin C, et al. Evaluation of masseter muscle morphology in different types of malocclusions using cone beam computed tomography. *Int Orthod.* 2014;12:32–48.
3. Elad D, Kozlovsky P, Blum O, et al. Biomechanics of milk extraction during breast-feeding. *Proc Natl Acad Sci U S A.* 2014;111:5230–5235.
4. Farrell C, Darcy M. The history of myofunctional orthodontics. Available at: [myoresearch.com/storage/app/media/history-of-myofunctional-orthodontics-part-I-0518.pdf](http://myoresearch.com/storage/app/media/history-of-myofunctional-orthodontics-part-I-0518.pdf). Accessed June 6, 2022.
5. Grandi D. The “interdisciplinary orofacial examination protocol for children and adolescents”: a resource for the interdisciplinary assessment of the stomatognathic system. *International Journal of Orofacial Myology and Myofunctional Therapy.* 2012;38:15 稿.
6. Grippaudo C, Paolantonio EG, Antonini G, Saulle R, La Torre G, Deli R. Association between oral habits, mouth breathing and malocclusion. *Acta Otorhinolaryngol Ital.* 2016;36:386–394.
7. Guillemineault C, Huseni S, Lo L. A frequent phenotype for paediatric sleep apnoea: short lingual frenulum. *ERJ Open Research.* 2016;2:00043–2016.
8. Hong P, Lago D, Seargeant J, Pellman L, Magit AE, Pransky SM. Defining ankyloglossia: a case series of anterior and posterior tongue ties. *Int J Pediatr Otorhinolaryngol.* 2010;74:1003–1006.
9. Hsu HY, Yamachuchi K. Decreased chewing activity during mouth breathing. *J Oral Rehabil.* 2012;39:559–567.
10. Huang Y, Quo S, Berkowski J, Guillemineault C. Short lingual frenulum and obstructive sleep apnea in children. *Int J Pediatr Res.* 2015;1:003.
11. Jumaev M. M., Saidov A. A. Modern Approaches to the Prevention of Dental Anomalies *JOURNAL OF INTELLECTUAL PROPERTY AND HUMAN RIGHTS PUBLISHED UNDER AN EXCLUSIVE LICENSE BY OPEN ACCESS JOURNALS* Volume: 02 Issue: 04 | April–2023 ISSN: 2720-6882 <http://journals.academiczone.net/index.php/jiphr> Modern Approaches to the Prevention of Dental Anomalies,- P.27-31
12. Jumaev M. M., Saidov A. A. Prevention of Dental Anomalies. *Interdisciplinary Conference of Young Scholars in Social Sciences Hosted from USA, 8th-February, -P.115-116*
13. Jumaev Miraziz Mahmud ugli The Significance of Pathohistological Study for Determining the Amount of Surgical Intervention for Various Tumors *CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES* Volume: 04 Issue: 06 | Nov-Dec 2023 ISSN: 2660-4159 <http://cajms.centralasianstudies.org> P.165-167
14. Lombardo G, Vena F, Negri P, et al. Worldwide prevalence of malocclusion in the different stages of dentition: a systematic review and meta-analysis. *Eur J Paediatr Dent.* 2020;21:115–122.

15. MacAvoy SK, Jack HC, Kieser J, Farella M. Effect of occlusal vertical dimension on swallowing patterns and perioral electromyographic activity. *J Oral Rehabil.* 2016;43:481–487.
16. Nigmatova I. M., Nigmatov R. N., Inogamova F. K. Differentiated orthodontic and speech therapy treatment to eliminate pronunciation disorders in children with dentoalveolar anomalies //Scientific and practical journal” Stomatologiya. – 2018. – No. 2. – С. 71.
17. Pires SC, Giugliani ER, Caramez da Silva F. Influence of the duration of breastfeeding on quality of muscle function during mastication in preschoolers: a cohort study. *BMC Public Health.* 2012;12:934.
18. Нормуродова М., Куранбаева Д., Нигматов Р. Лечение аномалии прикуса с нарушением речи у детей с помощью миогимнастики и массажа мышц лица //Актуальные проблемы стоматологии и челюстно-лицевой хирургии. – 2022. – Т. 1. – No. 02. – С. 70-71.9.
19. Персин Л.С., Елизарова В.М., Дьякова С.В. Стоматология детского возраста. – М.: Медицина, 2003.8. Рузиев Ш., Нигматов Р. Хербст аппарати ва унинг модификацияларини ортодонтия амалиётида колланилиши // Акт. пробл. стоматол. и челюстно-лицевой хир. – 2021. – Т. 1, No01. – С. 35-36.9.
20. Рузметова И. М., Нигматов Р., Шомухамедова Ф. А. Изучение аномалии зубочелюстной системы и профилактика вторичных деформации зубной дуги у детей в период сменного прикуса //Вестник КГМА им. ИК Ахунбаева. – 2015. – No. 4. – С. 50-55.10.
21. Рузметова И., Нигматова Р. Анализ ортопантограммы при вторичных деформациях зубного ряда у детей сменного прикуса // Stomatologiya. – 2017. – Т. 1, No4 (69). – С. 56-58. НЕТ ССЫЛОК
22. Юлдашев О. Т., Нигматов Р. Н. Особенности состояния твердых и мягких тканей полости рта у больных эпилепсией. //Сб.науч.практ.конф. с междун. участием Актуальные проблемы стоматологии».- 2019/3/30. – С. 129-132.11.
23. Олимова А. З., Шодиев У. М. Репродуктив Ёшдаги эркакларда бепуштлик сабаблари: Бухоро тумани эпидемиологияси //Scientific progress. – 2021. – Т. 2. – №. 7. – С. 499-502.
24. Zokirovna O. A., Abdurasulovich S. B. Ovarian Diseases in Age of Reproductive Women: Dermoid Cyst //IJTIMOIY FANLARDA INNOVASIYA ONLAYN ILMIY JURNALI. – 2021. – Т. 1. – №. 6. – С. 154-161.
25. Olimova A. Z. ECHINOCOCCOSIS OF LIVER OF THREE MONTHLY WHITE RAT //Scientific progress. – 2022. – Т. 3. – №. 3. – С. 462-466.
26. Олимова А. З. Морфологические и морфометрические особенности печени белых беспородных трех месячных крыс после тяжелой черепно-мозговой травмы вызванной экспериментальным путём //BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIY JURNALI. – 2021. – Т. 1. – №. 6. – С. 557-563.
27. Oglu M. Z. M., Zokirovna O. A. МОРФОЛОГИЧЕСКИЕ И МОРФОМЕТРИЧЕСКИЕ ПАРАМЕТРЫ ПЕЧЕНИ БЕЛЫХ БЕСПОРОДНЫХ КРЫС, ПЕРЕНЕСШИХ ЭКСПЕРИМЕНТАЛЬНУЮ ЧЕРЕПНО-МОЗГОВУЮ ТРАВМУ ПОСЛЕ МЕДИКАМЕНТОЗНОЙ КОРРЕКЦИИ //JOURNAL OF BIOMEDICINE AND PRACTICE. – 2023. – Т. 8. – №. 1.
28. Олимова А. З., Турдиев М. Р. БУХОРО ШАХРИДА МЕЪДА ВА ЁН ИККИ БАРМОҚЛИ ИЧАК ЯРАСИ УЧРАШ ЭПИДЕМИОЛОГИЯСИ //Oriental renaissance: Innovative, educational, natural and social sciences. – 2022. – Т. 2. – №. 4. – С. 642-647.
29. Zokirovna O. A. Modern Concepts of Idiopathic Pulmonary Fibrosis //American Journal of Pediatric Medicine and Health Sciences. – 2023. – Т. 1. – №. 3. – С. 97-101.

30. Zokirovna O. A. Pathology of Precancerous Conditions of the Ovaries //American Journal of Pediatric Medicine and Health Sciences. – 2023. – Т. 1. – №. 3. – С. 93-96.
31. Зокировна, Олимова Азиза и Тешаев Шухрат Джумаевич. «Морфологические аспекты печени белых беспородных крыс после тяжелой черепно-мозговой травмы, вызванной экспериментально в виде дорожно-транспортного происшествия». *Scholastic: Journal of Natural and Medical Education* 2.2 (2023): 59-62.
32. Zokirovna O. A. Comparative characteristics of the morphological parameters of the liver at different periods of traumatic brain injury //Euro-Asia Conferences. – 2021. – С. 139-142.
33. Zokirovna O. A. Macroand microscopic structure of the liver of threemonthly white rats //Academic research in educational sciences. – 2021. – Т. 2. – №. 9. – С. 309-312.
34. Олимова А. З. Частота Встречаемости Миомы Матки У Женщин В Репродуктивном Возрасте //BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIIY JURNALI. – 2021. – Т. 1. – №. 6. – С. 551-556.
35. Zokirovna O. A., Abdurasulovich S. B. Ovarian Diseases in Age of Reproductive Women: Dermoid Cyst //IJTIMOIY FANLARDA INNOVASIYA ONLAYN ILMIIY JURNALI. – 2021. – Т. 1. – №. 6. – С. 154-161.
36. Zokirovna O. A. Cytological screening of cervical diseases: pap test research in the bukhara regional diagnostic center for the period 2015-2019. – 2022.
37. Zokirovna O. A., PREVALENCE R. M. M. EPIDEMIOLOGY OF CANCER OF THE ORAL CAVITY AND THROAT IN THE BUKHARA REGION //Web of Scientist: International Scientific Research Journal. – 2022. – Т. 3. – №. 11. – С. 545-550.
38. Olimova A. Z. The frequency of occurrence of my uterus in women of reproductive age //JOURNAL OF ADVANCED RESEARCH AND STABILITY (JARS). – 2021. – Т. 1. – №. 06. – С. 551-556.
39. Olimova Aziza Zokirovna. (2023). MODERN PRINCIPLES OF THE EFFECT OF HEMODIALYSIS THERAPY ON HEART RATE. *International Journal of Integrative and Modern Medicine*, 1(1), 80–85.  
Retrieved from <http://medicaljournals.eu/index.php/IJIMM/article/view/28>
40. Olimova Aziza Zokirovna. (2023). PATHOMORPHOLOGICAL CHARACTERISTICS OF THE EPIDIDYMIS UNDER IRRADIATION. *International Journal of Integrative and Modern Medicine*, 1(1), 96–100. Retrieved from <http://medicaljournals.eu/index.php/IJIMM/article/view/31>
41. Olimova Aziza Zokirovna. (2023). THE INCIDENCE OF CANCER OF THE ORAL CAVITY AND PHARYNX IN THE BUKHARA REGION. *International Journal of Integrative and Modern Medicine*, 1(1), 86–89. Retrieved from <http://medicaljournals.eu/index.php/IJIMM/article/view/29>
42. Olimova Aziza Zokirovna. (2023). INFLUENCE OF ALCOHOL INTOXICATION ON THE HEART TISSUE OF RATS IN THE EXPERIMENT. *International Journal of Integrative and Modern Medicine*, 1(1), 90–95.  
Retrieved from <http://medicaljournals.eu/index.php/IJIMM/article/view/30>
43. Olimova Aziza Zokirovna. (2023). Modern Aspects of the Etiology of Gastric Ulcer and Its Complications. *American Journal of Pediatric Medicine and Health Sciences* (2993-2149), 1(3), 163–166. Retrieved from <http://grnjournal.us/index.php/AJPMHS/article/view/208>
44. Zokirovna O. A., Jumaevich T. S. Morphological Aspects of the Liver of White Outbred Rats After Severe Traumatic Brain Injury Caused Experimentally in the Form of a Road Accident //Scholastic: Journal of Natural and Medical Education. – 2023. – Т. 2. – №. 2. – С. 59-62.



45. Aziza Zokirovna Olimova GASTRIC ULCER AND ITS COMPLICATIONS // Scientific progress. 2022. №3. URL: <https://cyberleninka.ru/article/n/gastric-ulcer-and-its-complications> (дата обращения: 28.09.2023).
46. Olimova Aziza Zokirovna. (2022). TECHNIQUE FOR CUTTING BIOPSY AND SURGICAL MATERIAL IN THE PRACTICE OF PATHOLOGICAL ANATOMY AND FORENSIC MEDICINE. *Web of Scientist: International Scientific Research Journal*, 3(7), 116–120. <https://doi.org/10.17605/OSF.IO/PSQ59>
47. Zhumayevich N. F., Zokirovna O. A. PATHOMORPHOLOGY OF GASTRIC CANCER //BARQARORLIK VA YETAKCHI TADQIQOTLAR ONLAYN ILMIY JURNALI. – 2022. – С. 330-333.
48. Zokirovna O. A. Epidemiological and Etiological Data of Morphogenesis and Pathomorphology of Congenital Heart Diseases in Children //American Journal of Pediatric Medicine and Health Sciences. – 2023. – Т. 1. – №. 4. – С. 88-91.