

EPIDEMIOLOGY OF TEETH HARD TISSUES ABRASION DEPENDING ON GENDER AND AGE, INFLUENCE OF CLIMATOGRAPHICAL FACTORS

MAMAZHAKYP UULU ZHANYBAI

Department of Surgical Dentistry and Pediatric Dentistry, Osh State University, Osh, Kyrgyz Republic. E-mail: amantur.zhanybaiuulu@gmail.com

PAKYROV ZHENISHBEK

Department of Surgical Dentistry and Pediatric Dentistry, Osh State University, Osh, Kyrgyz Republic.

ESHIEV ABDYRAKHMAN

Department of Oral and Maxillofacial Surgery, Osh interregional unified clinical hospital Osh, Kyrgyz Republic. E-mail: eshiev-abdyrakhman@rambler.ru

ABDYKAIYMOV ADANBEK

Department of Surgical Dentistry and Pediatric Dentistry, Osh State University, Osh, Kyrgyz Republic.

MINBAEV ZAMIRBEK

Department of Surgical Dentistry and Pediatric Dentistry, Osh State University, Osh, Kyrgyz Republic.

ERMEKOV ERTABYLDY

Department of Surgical Dentistry and Pediatric Dentistry, Osh State University, Osh, Kyrgyz Republic.

Abstract

This article reflects the results of prevalence in teeth hard tissue abrasion dependence on sex and age of patients, as well as a comparative analysis on the environment ecological features influence, such as high, middle and low mountains. Teeth condition of patients living in different altitudes above sea level was studied. The influence of environment physical and chemical factors has been studied. Various classifications of the abrasion degree have been used as teeth morphological inferiority, occupational hazards. Their morphological inferiority, teeth overload, and occupational hazards, abrasion of teeth hard tissues in rural and urban areas including forms of pathological abrasion. Results showed that prolonged exposure to harmful conditions, climatic and geographical factors increases dental morbidity development level, in particular pathological abrasion.

Keywords: pathological abrasion, teeth restoration, environmental factors, gender and age dependence, working conditions, place of residence, teeth examination, elimination methods.

1. INTRODUCTION

The pathology of hard dental tissues in its prevalence occupies one of the first places among the main dental diseases [1, p. 19; 2, p. 460; 13, p.28]. The most common reasons for the development of abrasion of hard tissues are functional insufficiency of hard tissues of teeth, their morphological inferiority, overload of teeth, chemical exposure, occupational hazards [3, p.340; 14, p.277].

Dentists pay a lot of attention to this problem [4, p. 21; 5, p. 213; 6, p.52] and other researchers have invested a lot of work in this area of dentistry. Enamel is the hardest tissue in the human body. Under the tooth, enamel is soft dentin; in the lower half of the root, dentin is harder. The erosion of tooth enamel in some areas is a consequence of mechanical influences, which worsens with age [7, p.140; 8, p.7; 9, p.21].

The clinical manifestations and causes of development, the conditions that contribute to and influence the course of pathological changes in the hard tissues of the teeth are very diverse. So, early childhood with bowel disease and salmonella infection can be the cause of enamel hypoplasia. It has been established that children who have had severe respiratory diseases are more likely to develop enamel hypoplasia than those who have not had respiratory diseases.

A number of authors [10, p.10] note that even low concentrations of sugars in saliva with a high glucose clearance time can lead patients to a steady decrease in pH and subsequent enamel demineralization, which can be enhanced under the influence of common food acids. Teeth with a weakened structure of the surface layer are easily amenable to mechanical abrasion when using toothpastes, even with low abrasiveness [11, p.57; 15, p.281].

The process of physiological and pathological abrasion of teeth is significantly influenced by the type of bite. Depending on the occlusion, an increase or decrease in the abrasion of hard tissues of the teeth is revealed, in contrast to the orthognathic occlusion, in which abrasion of teeth is rare. It is important to note the following point that in the upper and lower jaws, the degree and nature of tooth abrasion depends on the shape of the bite. An important identified aspect of the antagonist teeth abrasion is orthopedic dentures in the oral cavity. The abrasion of hard dental tissues influenced by various environmental factors [14, p.52].

Consequently, the analysis of literature data on the influence of the form of bite on the characteristics of the abrasion of various groups of teeth is contradictory, which may indicate different approaches to assessing the abrasion of hard tissues of the teeth, the use of various classifications of the degree of their abrasion and confirms the need for anatomical and clinical studies of this dental problem in the sexual and age aspects.

Research purpose: Evaluation of epidemiological, gender and age characteristics, as well as environmental risk factors in the dental hard tissues abrasion development in residents of the southern region of Kyrgyzstan.

2. RESEARCH MATERIALS AND METHODS

Several departments conducted a clinical study. The first part of the prevalence in teeth hard tissues abrasion dependence on gender and age was examined in 1552 patients.

Secondly, the development of abrasion of hard tissues of teeth was studied in connection with environmental factors in 500 patients, of which 300 patients were climatic and geographical and natural factors, 200 patients were urban and rural

residents. In each group of patients, complaints were analyzed, an objective examination of the oral cavity and an assessment of the abrasion of hard dental tissues were carried out. In order to identify the issues raised, they paid attention; gender, age, place of residence, occupational hazards.

We found out the presence of hereditary diseases, concomitant diseases, bad habits. The clinical form of abrasion, the presence and nature of the pathological process of hard dental tissues were determined. A total of 2052 patients were studied.

For the study, the following methods were used: a map for assessing the dental status, diagnosing the abrasion of hard tissues of the teeth, methods for assessing the state of the dentoalveolar system. Statistical data processing was carried out using a personal computer using MS Office 2000, MS Excel 2000, S-Plus 2000, Statistica 5.5 programs.

3. RESULTS AND DISCUSSION

The dependence of the prevalence of abrasion of hard tissues of the teeth on the sex and age of the examined. When examining 1552 patients, our study revealed the following forms of abrasion of hard dental tissues: localized form was 943 (60.8%) patients, generalized abrasion was diagnosed in 589 (38%), horizontal was 992 (64.0%) , vertical occurred in 56 patients, which is only (3.6%) and mixed was noted in 484 (31.2%) patients in 1.2% of patients no pathology was detected.

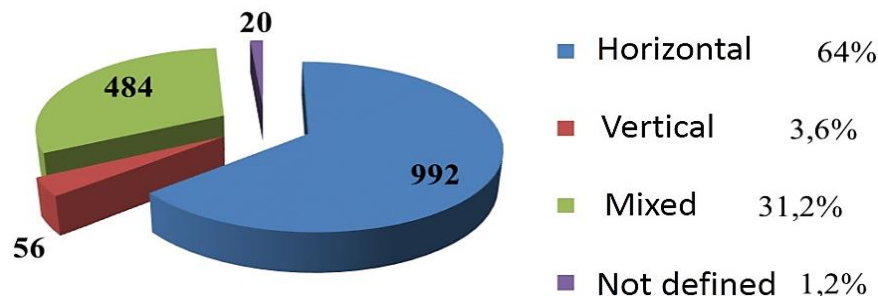


Fig.1: Forms of teeth hard tissues abrasion.

In the course of the study, in 652 examined male patients, a localized form of abrasion of hard dental tissues occurs slightly less frequently (60.9%) than in women (63.6%). At the same time, changes did not reach significance ($p > 0.05$). Generalized abrasion in men was observed more often as 39.1%, compared with women 36.4%.

As a result, in men as in women, the localized form of abrasion was more common than the generalized form. The study results showed that teeth hard tissue horizontal loss form in half female occurred in 58.2% of cases, the vertical form abrasion was 13.7%, and the mixed form was detected in 28.1% of cases. In women, the form of vertical abrasion was 14.4% less than the mixed one, as for the male half of the studied patients, the horizontal form of abrasion was more common in 52.2% of cases than the vertical form, which was 16.0% and the mixed form 31.8 %.

Data obtained from analysis and comparing study results of abrasion classified forms showed that vertical abrasion was observed in 15.8% less than mixed form of tooth abrasion. In men, the teeth hard tissue abrasion within the enamel and dentin so-called transitional abrasion occurred in 35.7% of cases, in women it was significantly less (22.9%) ($p < 0.05$).

Pathological abrasion (within the dentin) in men occurred in 8.5% of cases, in women it was observed in 6.1% of cases, while the differences did not reach statistical significance ($p > 0.05$). The absence of physiological abrasion in men was 1.8% cases and 0.9% the absence of this pathology was observed in women.

Based on the data obtained in the research, it was found that in the half of studied male, physiological abrasion of teeth was more common than the transitional one by 23.5%, and the pathological abrasion was 49.1% less common than the physiological form of abrasion, the transitional form of abrasion was 28.1% less than the physiological. The pathological form of hard tissues abrasion was 65.9% less common than the physiological one, and the transitional form was more common than the pathological form in 18.7% of cases.

The results of studies and observations have shown that generalized and localized forms of abrasion do not depend on gender, they are equally common in both men and women. At the same time, the horizontal form of tooth hard tissues abrasion was recorded as significantly higher in women, and the mixed form prevailed in men ($p > 0.05$). At the same time, a localized form of tooth abrasion at 18 to 30 years old occurs in 70.4% of cases.

At age from 31 to 40 years, the incidence in patients was much less and amounted to 59.5% of cases, at the age from 41 to 50 years, teeth hard tissues abrasion occurred in 49.2% of cases. At 51 years of age and older, localized abrasion was detected in 45.6% of patients. Significant differences were noted in the age groups from 18 to 40 years ($p < 0.05$).

It was observed that at a young age, localized form of teeth hard tissues abrasion was more common than at an older age. The prevalence of generalized tooth abrasion in the age group from 18 to 30 years was observed in 29.6% of cases. At the age from 31 to 40 years it was 40.5% of cases, and in age from 41 to 50 years of age was 50.8%. At 51 years and older, abrasion occurred in 53.5% of cases. As a result, there are significant differences between 18 and 40 years old ($p < 0.05$).

At the age from 18 to 30 years, a mixed form of teeth hard tissues loss spread in 17.0% of patients. In the group of patients aged from 31 to 40 years 25.9% of those examined, aged from 41 to 50 years abrasion was observed in 31.6% of cases, in patients aged from 51 years and older abrasion was revealed in 48.9% of cases. We clearly determined that with mixed and horizontal forms, the differences are significant ($p < 0.05$).

According to examination results of 1552 patients, a localized form of teeth hard tissues loss was observed in 60.8% of patients, a generalized form was found in 38% of examined patients. The horizontal form was observed in 64.0% of patients, and the vertical loss of teeth hard tissues was much less common and amounted to 3.6% of cases, and a mixed form was observed 31.2%.

The physiological form of tooth wear was detected in 63.3% of the examined, the transitional form was determined in 28.5%, and the pathological form in 6.5% of cases was not observed in 1.2% of all examined patients.

During examination of half female, the horizontal form was detected in 58.2% of cases, the mixed form of loss occurred in 28.1%, and the vertical form of loss was determined in 13.7% of cases. In men, horizontal loss occurred in 52.2% of cases, mixed abrasion was found in 31.8% of cases, the vertical form of loss was diagnosed in 16% of the subjects. Also, in the male sex, within the dentin and enamel, the transitional loss of hard tissues of the teeth occurred in 35.7% of cases, in the female sex it was definitely less, only 22.9% of cases, this is reliable ($p < 0.05$).

Thus, based on the study results, we have established the dependence of teeth hard tissues abrasion on the age and sex of patients. It has been proven that the percentage of physiological abrasion decreases with age, while the transitional and pathological abrasion of hard dental tissues increases.

Influence of teeth hard tissue abrasion on environmental factors and its development.

Our research activities were carried out based on the treatment and prevention of various forms of ownership in the southern region of the Kyrgyz Republic. From 300 researched patients, 100 observed living in the Alai district highlands Sarytash village and in the Chon-Alai district. Another 100 were selected from the mid-mountain level from the cities of Uzgen and Nookat (Eskinookat), 100 patients were selected from the low mountains living in the Aravan village, from Kara-Suu city and from the village Naiman of the Nookat region.

All examined persons, taking into account climatic and geographical and natural factors such as location above sea level, we examined separately: low-mountainous terrain up to 1000 meters, middle mountains from 1000 to 2000 meters, high-mountainous terrain from 2000 meters and above. In contrast to the location, the frequency of loss of hard tissues of the teeth has differences. The highest rate of horizontal decline was found in the highlands, the frequency of its occurrence was up to 78.3%, significant differences were shown by the results of the study in the middle mountains, the result of which was 71.9% of cases.

The horizontal form of abrasion in low-mountainous areas was 62.0% of cases. 66.2% of cases from the total percentage of the studied patients was the loss of horizontal hard tissue. The vertical type of hard tissues, loss among all the examined people, manifested itself much less frequently (4.4%) in lowlands, this value was 1.5%, in the

studied people living in the middle mountains was 2.1%, and in highlands this percentage was 8.9% of cases. In the low-mountainous area of the southern Kyrgyzstan region, the frequency of occurrence of a mixed form of teeth hard tissue damage was more common in 36.5% of cases. The hard tissues loss mixed form was in 26.0% of cases, and in highlands this percentage was 12.8% of cases.

The mixed form of teeth hard tissue loss from the total number of those studied was 29.6%. In contrast to the localized form of teeth hard tissues loss, the generalized form is much less common. In highlands, the frequency of occurrence was 28.1% of cases, a higher rate was found in residents of the middle mountains as 71.5%, and in residents of low mountains was 67.7% of cases. Including 55.7% of all subjects were with localized tooth wear.

In highlands, the most common form of tooth abrasion was generalized and was found in 71.9% of cases. In the lowlands, this value was 32.3%, while in the middle mountains it reached 28.5% of cases. Generalized loss was detected in 44.2% of all examined cases. The physiological loss of the occlusal surface within the teeth enamel among population of the low-mountain area was 77.1% of cases, in low-mountain area occurred in 62.6% of cases. Among highlands population this value was 39.1% of cases. In general, in the southern region of Kyrgyzstan, the physiological loss of teeth hard tissues amounted to 59.6% in observed cases.

The transitional form of the decrease in the occlusal surface was more registered in highlands 48.3% of cases, less was detected in middle mountains and amounted to 31.3% of cases, and in the low mountains was found in 20.1% of cases. In the total number, the transitional form of loss was detected in 33.2% of cases. The pathological loss of tooth enamel occlusal surface amounted to 9.3% in total, definitely more often in the highlands; less was detected in middle mountains 6.1%. In low-mountainous areas, pathological loss was detected in 2.8% of cases. And in total, pathological loss of tooth hard tissues was detected in 6.0% of cases from the entire study group. Correlation distribution of teeth hard tissues abrasion depending on place of residence is shown in Table 1.

Table 1: Correlation distribution of teeth hard tissues abrasion depending on place of residence.

Abrasion form	Lowlands, in %	Middlelands, in %	Highlands, in %
Localized	67.7	71.5	28.1
Generalized	32.3	28.5	71.9
Horizontal	62.0	71.9	78.3
Vertical	1.5	2.1	8.9
Mixed	36.5	26.0	12.8
Physiological	77.1	62.6	42.4
Transitional	20.1	31.3	48.3
Pathological	2.8	6.1	9.3

P - reliability in relation to groups.

To conduct a study comparing the teeth hard tissue loss among urban and rural population, 100 people were selected from each study group. Among them, 100 were surveyed from the Osh, Ozgon and Karasuu cities. The rest of the observed were from the villages of Naiman, Uch-Korgon, Gulche. Most often, the horizontal form of decline was detected in urban subjects was 87.5%, in rural areas it was slightly less than 83.8% of cases from the total number of subjects. The vertical loss of teeth occlusal surface in the townspeople was detected in 3.1% of cases, in the rural population it was 16.8%, respectively 9.9% of all cases of observation.

Among the rural population, horizontal form of teeth occlusal surface decrease was revealed relatively less than in the urban group of the studied, which amounted to 62.1% and 80.1%, respectively. In general, the localized form was diagnosed in 71.1% of all examined patients. Basically, the horizontal form of teeth hard tissue loss was detected among the village population was 37.9% of cases, while in urban areas this value was 19.9%. From the total number, the generalized form of teeth occlusal surface loss was registered in 28.9% of cases.

Cases of lack of physiological abrasion among urban areas were noted in 1.3%, and in rural areas in 1.6% of cases. The difference did not reach significance. As a result of assessing the abrasion prevalence, localized form is most common in the middle mountains. The generalized form of abrasion observed most of all among the inhabitants of the highlands. From all three forms of abrasion, the horizontal form was most frequently identified in the highlands. The mixed form of abrasion has a high percentage in the middle mountains, less in the highlands. There were significant differences when comparing the physiological and transitional forms of abrasion with each other.

CONCLUSION

Pathological abrasion is more often observed in the high mountains, which is more higher than in the low mountains. Comparison results of teeth hard tissue abrasion in rural and urban areas showed the presence of clear patterns. It was found that localized abrasion was diagnosed among the urban population, and generalized in rural areas ($p < 0.01$). The horizontal form of abrasion is detected much more often in the urban population ($p < 0.01$), while the mixed form was diagnosed less often in the urban population. Distinctive features of abrasion scale were also pronounced. The urban population was often diagnosed with physiological abrasion, and the transitional form was more common in the rural population, and the difference between them in pathological abrasion was less pronounced.

In addition, according to our study results, the generalized form of abrasion was more common in rural areas and accounted for 37.9% of cases, against 19.9% in urban areas. In highlands population, a generalized form is more often noted, in the middle mountains a mixed one, and in the lowlands mainly a transitional form of abrasion was observed.

References:

1. Kalamkarov HA, Klinika patologicheskoy stirayemosti tverdykh tkaney zubov V kn: Ortopedicheskoye lecheniye patologicheskoy stirayemosti tverdykh tkaney zubov [Clinic of pathological abrasion of hard tissues of teeth]. In the book: "Orthopedic treatment of pathological abrasion of hard tissues of teeth." Moscow 1984;19.
2. Trezubov VN., Shcherbakov AS., Mishnev LM, Ortopedicheskaya stomatologiya [Orthopedic dentistry]. Faculty course. St. Petersburg: Folio 2005;460.
3. Rogozhnikov GI, Loginov VA, Astashina NB, Restavratsiya tverdykh tkaney zubov vkladkami [Restoration of hard tissues of teeth with tabs]. Moscow: Medical book Nizhnyi Novgorod: Publishing house of NGMA 2002;340.
4. Garazh IS, Lecheniye patologicheskoy stirayemosti zubov s ispol'zovaniyem gidroksiapatitov i ftorsoderzhashchikh preparatov [Treatment of pathological abrasion of teeth using hydroxyapatites and fluorine-containing drugs]: Dissertation cand. medical sciences Stavropol Medical academic -1. Stavropol, 2004;21.
5. Seubelmann MB, Razrabotka i otsenka effektivnosti primeneniya dentinnykh i emalevykh bondingovykh sistem pri lechenii kariyesa i yego oslozhneniy, ikh vliyaniye na tverdye tkani zuba [Development and evaluation of the effectiveness of the use of dentin and enamel bonding systems in the treatment of caries and its complications, their effect on the hard tissues of the tooth] Dissertation doctor. medical sciences Voronezh, 2005;213.
6. Gaivoronsky IV, Dubova AA, Ponomarev MA, Kharakteristika stirayemosti zubov i osobennosti ikh restavratsii u vzroslogo cheloveka [Characteristics of tooth abrasion and features of their restoration in an adult] Medicine XXI century. 2006; 4(5);52.
7. Koretskaya IV, Izmeneniye obmena veshchestv v emali zuba pri ispol'zovanii razlichnykh kompozitnykh materialov i bondingovykh sistem v protsesse lecheniya kariyesa, pul'pita, periodontita [Changes in metabolism in tooth enamel when using various composite materials and bonding systems in the treatment of caries, pulpitis, periodontitis] Dissertation. cand. medical sciences. Voronezh, 2000;140.
8. Borovsky EV, Ruzuddinov S, Maksimovskaya LN, Remizov SM, Smirnova TA, Soderzhaniye kal'tsiya, fosfora v zubakh, krovi, slyune i mikrotverdost' emali, dentina u rabochikh fosfornogo proizvodstva [The content of calcium, phosphorus in teeth, blood, saliva and the microhardness of enamel, dentin in workers of phosphorus production] Dentistry, 1987;3,7.
9. Kozel OA, Kruglik OA, Povyshennoye stiraniye tverdykh tkaney zubov [Increased abrasion of hard tissues of teeth] Modern dentistry 2008;2, 21.
10. Leontiev VK, Zdorovyye zuby i kachestvo zhizni [Healthy teeth and quality of life] Dentistry. 2000;5,10.
11. Ulitovsky SB, Gigiyena polosti rta v ortodontii i ortopedicheskoy stomatologii [Oral hygiene in orthodontics and orthopedic dentistry] Moscow: Medical book; Nizhny Novgorod: Publishing house of NGMA 2003;57.
12. Bartlett DV, [The role of erosion in tooth wear: aetiology, prevention and management] International Dental Journal. 2005;55,277.
13. Lussi A, [Dental erosion: from diagnosis to therapy] Monogr. oral sci. Basel, Karger, 2006;Vol. 20. 28.

14. Demarco FF, Meireles SS, Sarmiento HR, Dantas RV, Botero T, Tarquinio SB. Erosion and abrasion on dental structures undergoing at-home bleaching. *ClinCosmetInvestig Dent.* 2011 Jul 18; 3:45-52.
15. Sakibaev K, Kozuev K, Atabaev I, Alimbekova A, Argynbaeva A. Somatotypological Indicators of Physical Development in Residents of Kyrgyzstan. *Iran J War Public Health* 2022; 14 (3):279-285
URL: <http://ijwph.ir/article-1-1180-en.html>