



Etiology, Classification, Frequency of Bone Defects and Lower Jaw Deformation (Literature Review)

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ABSTRACT: In peacetime, non-firearms of the lower jaw are usually observed. They arise as a result of resection or disarticulation of the jaw (in connection with a benign or malignant tumor), its elongation in the elimination of underdevelopment, after suffering osteomyelitis or overly extensive and uneconomical sequestrectomy, after an accidental trauma, etc. [6,9]. Among the many reasons that lead to the occurrence of defects in this localization, oncological pathology takes the first place, with malignant tumors accounting for up to 16% of cases, benign ones - up to 42.9% [10, 11, 12]. Traumatic injuries, gunshot and non-gunshot wounds of the maxillofacial region, leading to defects of the lower jaw of various lengths, occur in 28.5% of cases [7].

Introduction: In peacetime, non-firearms of the lower jaw are usually observed. They arise as a result of resection or disarticulation of the jaw (in connection with a benign or malignant tumor), its lengthening when the underdevelopment is eliminated, after osteomyelitis or an overly extensive and uneconomical sequestrectomy, after an accidental injury, etc. [6,9]. Among the many causes that lead to the occurrence of defects in this localization, oncological pathology takes the first place, while malignant tumors account for up to 16% of cases, benign ones - up to 42.9% [10, 11, 12]. Traumatic injuries, gunshot and non-gunshot wounds of the maxillofacial region, leading to defects of the lower jaw of various lengths, occur in 28.5% of cases [7].

Among the deformities of the facial area of an acquired character, a very significant group is made up of various forms of underdevelopment of the lower jaw. The values of this group, according to Kh.A. Kalamkarova et al. (1981) is not determined by its quantitative representativeness, since such deformities account for no more than 15% of acquired changes and about 3-5% of all deformities of the lower jaw of different genesis. The authors note in this regard, sharp violations of socio-psychological adaptation, changes in the proportion of the face, gross violations of chewing, speech production, breathing and other functions, which determines the great social relevance of their effective rehabilitation.

Deformation of the jaws of endocrine genesis are described in the works of Kalamkarov Kh.A. et al. (1978), Belyakova Yu.A. (1983), where the authors characterize the deformities of the jaws as a whole in diagnosed pathologies of the endocrine glands. They note that the classic forms of endocrinopathies in patients are quite rare, and quantified erased species prevail, which, nevertheless, affect the shape, growth rates of all parts of the skeleton, including the skull.

In the study of patients with defects and deformities of the lower jaw branch, they pay great attention to generally accepted clinical methods: the study of complaints, life history and medical history, general examination of the patient, anthropometry of the face and models, X-ray and functional methods, i.e. [3,8]. Local factors and signs of jaw deformities are mainly studied. While the general factors leading to metabolic disorders remain unexplored. The clinical picture of a defect in the lower jaw depends on its localization and length, the presence of cicatricial joints between the fragments of the jaw, the presence of teeth on bone fragments and antagonistic teeth on the upper jaw, intact skin in adjacent areas, etc. [1,5].

In modern domestic and foreign literature, there is no unified classification of defects in the lower jaw [2,7]. The most widespread among foreign experts in the etiology of all deformities of the skull and maxillofacial area were the units of H.A. Kalamkarova et al. (1981).

A. Congenital deformities

1. Caused by the influence of teratogenic factors: clefts; discrania of a sharp type; craniostenosis, dysostosis, I-II branchial arch syndromes; dysplasia of the jaws; phakomatoses; congenital endocrine lesions.
2. Shown chromosomal diseases.

B. Acquired deformities.

1. Endocrine and metabolic;
2. Caused by functional changes;
3. Post-traumatic.
4. Caused by inflammatory and infectious agents.
5. Caused by radiation.

The classification, which indicates the localization of the pathology developed by V.F.Rudko, distinguishes the following types of defects in the lower jaw:

defects of the middle section of the body;
defects of the lateral parts of the body;
combined defects of the middle and lateral parts of the body;
branch and corner defects;
subtotal and total body defects;
lack of branches and body parts;
multiple defects.

B.L. Pavlov divides defects of the lower jaw into 3 classes and 8 subclasses:

Class I - end defects (with one free bone fragment);

Class II - defects along the jaw (with two free bone fragments);

Class III - double (bilateral) jaw defects (with three free bone fragments).

In grades I and II, the author identifies three subclasses: with preservation of the chin, with partial (up to the middle) loss of it and with complete loss; and in the III class - two subclasses: with and without preservation of the chin.

These classifications do not take into account the presence of teeth on the fragments of the jaw, scarring between the fragments, etc. Therefore, they cannot help the surgeon when choosing the method of forming the bed for the seedling, the method of intraoral fixation of the fragments after the operation, etc. In this regard, the classifications proposed by orthopedic dentists, who attach great importance to the presence of teeth on the fragments of the lower jaw, are advantageously distinguished, since the task of fixing jaw fragments is solved and rest is provided to the transplant in the postoperative period.

According to the classification of K. S. Yadrova, gunshot defects are divided into three groups:

with unstable displacement of fragments (without a shortened scar or with a slight shortening of it);

with persistent displacement of fragments (with a shortened scar);

improperly fused fractures with loss of bone substance of the lower jaw (with shortening of the jaw).

Each of these groups is divided, in turn, into the following subgroups:

a single defect in the anterior part of the body of the lower jaw;

a single defect of the lateral part of the body of the lower jaw;

a single defect of a branch or branch with a part of the body of the lower jaw;

double defect of the lower jaw.

This classification, which is close to the classification of V.F. Rudko, also does not reflect the presence or absence of teeth on the fragments of the jaw body.

It is simply impossible to draw up a comprehensive classification of mandibular defects that would be immense and convenient to apply in practice [10,17]. Therefore, the diagnosis should indicate only the main characterological features of the defect: its origin, localization and length (in centimeters or with orientation to the teeth). As for the rest of the features of the lower jaw defect, which appear in various classifications and are undoubtedly of great importance, they must be indicated, but not in the diagnosis, but when describing the local status: cicatricial convergence of fragments with each other, cicatricial contracture of a short fragment (branches jaw), the presence of an incomplete osteomyelitis process, the number and stability of teeth on each fragment and on the upper jaw (dental formula, detailed in the text), the presence of a skin defect in the body and branches of the jaw, scar deformations of tongue, vestibule and bottom of the oral cavity [11, 12]. Defects of the jaw resulting from gunshot injuries are often combined with scarring of the tongue and the bottom of the oral cavity, which makes speech very difficult. The surgeon should study well the state of soft tissues in the area of the mandibular defect in order to determine in advance whether they are sufficient to create a full-fledged graft bed [1,3]. The ends of the jaw fragments can be sharp or sawtooth sclerosed spines (with a bridge thrown between them, as it were). These spines are covered with rough scars, which can be difficult to separate from the bone without damaging the mucous membrane of the oral cavity. There is evidence that in a false joint of the lower jaw with a bone defect, a zone of newly formed bone beams is histologically determined, which are, as it were, a continuation of the old beams of the spongy layer. The neoplasm of these beams occurs in a metaplastic, and partly osteoblastic. This process is not sufficiently pronounced, therefore, the callus between even relatively closely spaced fragments stops in its development, which ultimately leads to non-union of fragments and the formation of the so-called "false" joint [6,16].

There are foreign classification schemes for the development of deformations, based on embryological, pathogenetic, morphological features, which, nevertheless, do not reflect the entire variety of jaw ratios. For our research, it seems more appropriate to use the working classification of jaw deformities. Proposed by V.M. Bezrukov (1981) and based on the classification of Kh.A.

Kalamkarov and the WHO International Classification. Thus, all studies are aimed at studying the types and local treatment of deformities, but the possibilities of preventing maxillofacial deformities with various causes and timing of damage to the growth zones of the lower jaw have not been sufficiently determined. Therefore, on the basis of the above, many issues of diagnosis, clinical picture and treatment of patients with these defects and deformities require further study in order to develop a unified modern system of their medical rehabilitation.

In the literature sources, there is enough information about the frequency of congenital and acquired defects and deformities of the lower jaws, the anatomical and functional characteristics of the maxillofacial region of patients. The most difficult for reasons and forms of development of jaw deformities are I-II branchial arch syndromes (hemifacial microsomia, otocraniosynostosis), which are one of the most common congenital malformations of the facial region [8]. Their frequency ranges from 0.02 to 4% [4,6]. Developmental disorders of the maxillomandibular jaw occur from 1: 3500 to 1: 5600 [2,4,9]. Studies by Grabb (1965) and Poswillo have established that the frequency of gill arch syndrome I-II is from 1: 3500 to 1: 5642 births. According to G.A. Kotova, patients with congenital malformations related to the I-II branchial arch syndromes account for 11% of all malformations of tissues and organs of the maxillofacial region. As a rule, these complex craniofacial deformities can be corrected only in the course of complex treatment with the involvement of a number of specialists.

The number of patients with lesions of the lower jaw osteomyelitis, tumors, as well as its traumatic injuries are from 12.4 to 64.1% according to the literature [7].

Defects and deformities of the lower jaw, lower micrognathia occur in 19.7-54.4% of patients after inflammatory diseases, injuries [9,13]. In such patients, in adolescence, the formation of the same type of combined deformity of the supporting and soft tissues is noted. In particular, deformity of the entire lower jaw, ankylosis of the temporomandibular joint, defects of the branch, condylar and coronary processes, asymmetric lower micrognathia, underdevelopment of the upper jaw, zygomatic bone and arch, as well as the temporal bone were noted. The asymmetry of the lower jaw was present in all three planes. The severity of the deformation depends on the age at which the disease was suffered and as most researchers mention in their publications [5,8]. It should be noted that jaw deformities are common and are multifactorial in etiology.

Conclusion. None of the existing classifications fully reveals the essence of the pathological process in the skeletal system as a whole. Therefore, the search for informative methods for diagnosing this pathology continues to attract the interest of a wide range of researchers.

Literature

1. Пачес А.Ю., Опухоли головы и шеи. Клиническое руководство. 2013 г.
2. Неробеев А.И. Восстановление тканей головы и шеи сложными артериализованными лоскутами. – М.: Медицина, 1988.- 267 с.
3. Вербо Е.В., Реконструкция лица реваскуляризованными аутооттрансплантатами. Медицина, 2008.
4. Вербо Е.В. Возможности применения реваскуляризованных аутооттрансплантатов при пластическом устранении комбинированных дефектов лица Дис. Док. Мед.наук. М, с.350.
5. Неробеев А.И., Перфильев С.А., Буцан С.Б., Сомова М.М.: Важные аспекты микрохирургической реконструкции средней зоны лица // Анналы пластической, реконструктивной и эстетической хирургии – 2008. С.37-41
6. Перфильев С.А., Буцан С.Б., Сомова М.М.: Одномоментное устранение сквозных дефектов средней зоны лица // Анналы пластической, реконструктивной и эстетической хирургии – 2008. С.38-40

7. Рабухина Н.А., Голубева Г.И., Перфильев С.А., Караян А.С., Кудинова Е.С., Бурсова Л.А., Карнаухова А.В.: Использование спиральной компьютерной томографии при лечении больных с дефектами и деформациями лицевых костей и мягких тканей // Журнал Стоматология. - №5. – 2007. – С. 44-50
8. Голубева Г.И., Перфильев С.А., Хохлачев С.А., Караян С.А., Бурсова Л.А.: Использование результатов спиральной компьютерной томографии при хирургическом устранении дефектов и деформаций челюстно-лицевой области // Алфавит стоматологии. – М., 2007. - №3. – с. 13-17
9. Хохлачев С.Б., Голубева Г.И.: Клинические аспекты трехмерного компьютерного моделирования ревааскуляризированной кости по формелицевого скелета // Анналы пластической, реконструктивной и эстетической хирургии. -2007.- №1. –С.24-33
10. Осипов Г.И., Сомова М.М.: Рациональный выбор ревааскуляризированного аутоотрансплантата при пластическом устранении комбинированных дефектов лица // Анналы пластической, реконструктивной и эстетической хирургии. -2006.- №4. –С.59-60
11. KE Shomurodov Comparative evaluation the anatomical and functional state of the Journal of research in health science, 2020
12. Малаховская В.И., Шургая Ц.М.: Рациональное применение ревааскуляризированного ребра в реконструкции челюстей // Анналы пластической, реконструктивной и эстетической хирургии. -2004.- №3. –С.28-39
13. Farwell D.G. Oromandibular reconstruction / D.G. Farwell, N.D. Futran // Facial Plast. Surg. 2019. - Vol. 16. - № 2. - P. 115 - 126.
14. Hurmerinta K. Vector control in lower jaw distraction osteogenesis using extra-oral multidirectional device / K. Hurmerinta, J. Hukki // J Cranio Maxillofac Surg.-2011.-Vol.29.-N.5.- p. 263-270.
15. Kamalova, M., & Khaidarov, N. (2021). ASSESSMENT OF QUALITY OF LIFE IN ISCHAEMIC STROKE PATIENTS. *Збірник наукових праць SCIENTIA*. вилучено із <https://ojs.ukrlogos.in.ua/index.php/scientia/article/view/10528>
16. Shokirov Sh.T., The technique of bimaxillary osteotomy with the help of intermediate kappasplints for the elimination of upper retrognathia in patients with congenital clefts of the upper lip and palate. The American Journal of Medical Sciences and Pharmaceutical Research 2.07 (2020): 81-93.
17. Shomurodov. K.E. Features of cytokine balance in gingival fluid at odontogenicphlegmon of maxillofacial area. // Doctor-aspirant 2010.-42 Vol.-No.5.1.-P.187-192;