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MORPHOLOGICAL FEATURES OF COMPONENT ELEMENTS OF PHYSIOLOGICAL AND PATHOLOGICAL BITES

Review article

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Abstract

Aesthetic and mechanical functions are performed thanks to a properly formed bite. However, even performing a mechanical function does not always contribute to aesthetics, as vice versa. Our work highlights the main points in the formation of pathological bites, as well as reveals the relationship of the upper and lower jaw with each other, as well as the morphological features of the lower jaw, depending on a particular bite. Among the physiological bites, we took into account orthognathic, prognathic, direct and biprognatic. Among the pathological ones, deep, open, mesial, distal and cross were taken into account. The dependence of the bite on the type of the cerebral part of the head, the shape of the head of the mandible and the features of the articular surface as a whole were compared, and changes in the bite in the absence of teeth were also studied.

Keywords: bite, lower jaw, teeth.

МОРФОЛОГИЧЕСКИЕ ОСОБЕННОСТИ СОСТАВНЫХ ЭЛЕМЕНТОВ ФИЗИОЛОГИЧЕСКИХ И ПАТОЛОГИЧЕСКИХ ПРИКУСОВ

Обзор

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Аннотация

Эстетическая и механическая функции выполняются благодаря правильно сформированному прикусу. Однако даже выполнение механической функции не всегда способствует эстетике, как и наоборот. В нашей работе освещены основные моменты в формировании патологических прикусов, а так же раскрыты взаимоотношения верхней и нижней челюсти друг с другом, а так же морфологические особенности нижней челюсти в зависимости от того или иного прикуса. Среди физиологических прикусов мы учитывали ортогнатический, прогнатический, прямой и бипрогнатический. Среди патологических учитывали глубокий, открытый, мезиальный, дистальный и перекрестный. Сравнивали зависимость прикуса от типа мозгового отдела головы, форму головки нижней челюсти и особенности суставной поверхности в целом, а также изучали изменения прикусов при отсутствии зубов.

Ключевые слова: прикус, нижняя челюсть, зубы.

Introduction

The main function of the oral cavity is the mechanical and chemical processing of food. The mechanical function is carried out thanks to the teeth. The closure of the upper and lower rows of teeth is called a bite.

The bite provides not only digestive function, but also cosmetic, taking part in the formation of the shape of the facial section of the head. Also, do not forget that the shape of the bite can change the topographic location of the maxillary and mandibular neurovascular bundle, which must be taken into account when blockades are performed.

Main part

Before taking into account the peculiarities of the relationship with pathological bites, you need to pay attention to physiological bites. Physiological bite – the relationship in the upper and lower dentition, providing adequate performance of

the basic functions, which include chewing and speech formation. With this bite, the chewing surface of the premolars and antagonist molars closes, which ensures chewing. The canines and incisors overlap each other, providing tearing of food [1].

In modern medicine, the correct bite includes [2]:

· orthognathic bite, reference, where the lower row of teeth extends beyond the upper by about a third;

· prognathic bite, in which the lower jaw is advanced forward with central occlusion;

· a direct bite, where incisors and fangs meet with the opposite, without overlapping each other;

· biprognathic bite, where, when closed, both the upper and lower incisors are inclined towards the vestibule of the mouth.

. There is a correlation between the type of cerebral Dep at the head and kind of bite. So, in mesokephals in 62-63% there is an orthognathic bite, in 21-22% – a direct bite, in 12-14% – a prognathic bite. In dolihokefalov at 56-58% recorded level bite, at 32-34% – orthognathic bite, at 4-5% - prognathic and in 2-3% – biprognaticheky bite. With the brachycephalic type of the cranium, about 60% of people have a prognathic bite, while 33-34% have an orthognathic bite, 2% have a direct and biprognathic bite. Among giperbrahikefalov 71% was observed orthognathic occlusion, 25% – direct and at 5% – prognathic and biprognatichesky bite. It can be noted that the orthognathic occlusion is more common in mesokephals, in dolichokephals it is a direct occlusion, and in brachycephals it is a prognathic occlusion [3].

There is a relationship between the type of physiological bite and the articular surfaces of the temporomandibular joint. The sagittal diameter of the head of the lower jaw differs with a biprognotic and prognostic bite by 0.3-0.5 mm from the orthognathic and direct, the transverse diameter of the head with a direct bite is 19.5-20.0 mm, with orthognathic – 20.3-20.7 mm, with prognathic and biprognatic – 23.5-24.0mm. Anterior – posterior size of the mandibular fossa is different in the range of 0.2-0.5 mm of medium and all bites. The greatest depth of the mandibular fossa is observed with an orthognathic bite (8.7-9.1 mm), while in others it is 8.0-8.3 mm. The height of the articular tubercle with orthognathic and prognathic bites is 13.5–13.9 mm, with direct and bipognathic bites 11.9–12.4 mm. The shape of the head of the lower jaw n was observed as follows: oval in 58.2%, cone-shaped in 6.9%, bean-shaped in 33.8%. The shape of the head depended on the depth of the mandibular fossa: the deeper the fossa, the more elongated the head.

But, despite the importance of the physiological bite, people with pathological types of closure of teeth are increasingly found. Pathological bites begin to form in childhood and depend on a number of factors [4]:

· features of fetal development and factors affecting them;

· heredity, since dental pathologies can be multifactorial;

· disturbances in the work of the respiratory, nervous, endocrine and cardiovascular systems.

One of the main roles in the development of the pathology of occlusion is occupied by diseases of the ENT organs.

Pathological bites include:

· deep, where there is overlapping of the lower incisors by the upper ones by more than a third;

· open, where the distance between the dental surfaces increases with complete occlusion;

· mesial, this bite is similar to prognathic, but the distance between the dentition increases by more than 0.5 cm;

· distal bite, in which the lower jaw is significantly shifted back more than 0.5 cm relative to orthognathic closure;

· the cross bite is heavier and shows a mismatch in the closing of the upper and lower teeth in the transverse direction.

In the presence of a pathological bite, depending on its complexity, correction can be carried out using braces, plates or surgically. It is during surgical correction that it is necessary to identify the relationship of the dentition with other landmarks of the skull for the correct management of plastics and juxtaposition of the elements of the lower jaw [5].

There is evidence of a relationship between cephalometric parameters and the type of pathological bite in the sagittal, horizontal and vertical planes. In the sagittal plane, the following data are available:

· Mesots ephala: distal bite in 22.2-23.1%, mesial in 10.1-12%.

· Dolikhots efaly: distal bite in 56.6-57.4%, mesial in 2-3%.

· Brachycephalus: distal bite in 33-32%, mesial in 9.1-9.7%.

· Hyperbrachycephalic : distal bite in 27.4-28%, mesial in 1.5-2%.

In other cases, either other occlusion anomalies with respect to different planes, or physiological occlusion occurred [6].

When taking into account the vertical axis, values of this kind are observed:

· Mesocephalus: deep occlusion – 31.7-32.4%, open occlusion – 3.1-3.7%.

· Dolichocephals: deep occlusion – 48.8-50%, open occlusion – 0.5-0.9%.

· Brachycephalus: deep occlusion – 36.1-36.9%, open occlusion – 4.3-4.8%.

· Hyperbrachycephalus: deep occlusion – 33.4-34%, open occlusion – 2.2-2.7%.

So, we can say that with all malocclusion anomalies it is more often observed deep I occlusion and distal occlusion. Mesial and open bites are less common, but the frequency of their occurrence so depends on the type of brain skull. However, among dolichocephles, distal and deep bites are more common than with other turtles [7].

The literature contains data on the morphological features of teeth with a deep distal bite, which is combined with retrusion of the teeth. In 10% of cases, there is a mismatch in the closure between the canines of the upper and lower rows: the upper canine falls between the incisor and the canine of the lower jaw. With age, there is a decrease in the vertical size of the crown of teeth by 1.1-2.3 mm. It is dangerous to narrow the dentition by 1.3-2.6 mm with age in the lower jaw and 1.95-2.9 mm in the upper jaw. The apical base of molars and premolars of the upper jaw shrinks with age by 1.3–2.2%, in the lower jaw –4.8–5.1% relative to the normal bite [8], [9].

Analyzing data on the characteristics of the temporomandibular joint (sizes of the head of the lower jaw, depth of the fossa of the temporal bone, height of the articular tubercle and projection height of the articular tubercle), with malocclusion relative to normal with a reference orthognathic bite, a number of the following differences were revealed:

· with a deep bite, the sagittal diameter of the head of the lower jaw is reduced by 2.2-2.5 mm, the anterior – posterior size is 0.7-1.1 mm, the transverse size is 1.1-1.7 mm. At the same time, the depth of the mandibular fossa is increased by 2.1-2.6 mm, the height of the tubercle with projection height is reduced by an average of 0.5-0.7 mm.

· n ri open bite no significant differences were found: sagittal size reduced by 0,4-0,7mm transverse to 0,6-0,8mm, forward – back – by 1,1-1,5mm, pit depth is increased to 0, 4-0.9 mm, the height of the articular tubercle along with the projection height are not statistically significantly changed. The sagittal diameter of the head of the lower jaw with an open bite differs from the orthognathic by a decrease of 0.3-0.8 mm, the transverse diameter by 1.0-1.5 mm, the anterior – posterior size – 0.9-1.3 mm, the depth of the mandibular fossa reduced by 2.4-2.8 mm, the height of the articular tubercle is 3.1-3.6 mm lower than the norm, and the projection height of the tubercle is only 0.2-0.5 mm.

· with a distal bite, it was found that the sagittal and transverse diameters were reduced by 0.4-1.0 mm, the anterior - posterior size was increased by 2.0-2.4 mm, the depth of the mandibular fossa of the temporal bone was deeper than that with an orthognathic bite by 2.1- 2.4 mm, and the projection height and the height of the articular tubercle itself are lower by an average of 0.3-0.8 mm.

· with a cross bite, the parameters differ little from the orthognathic: the size of the head is on average 0.3-0.7 mm smaller, the depth of the maxillary fossa does not differ from orthognathia, or 0.2-0.3 mm less, the height and projection height of the articular tubercle in the range from 0.3 to 3.1 mm [10].

Considering the above data, it was found out:

· with a distal bite, the greatest immersion of the head of the lower jaw in the fossa of the temporal bone is observed;

· at deep bite a decrease sagittal size while increasing depths s temporal fossa.

The shape and dimensions of the constituent components temporomandibular lower echelyustnogo joint does not affect the number of teeth yl and their location, and types of occlusion, and which DWI w eniya next joint. Thus, in the distal bite, either sliding or rotational movements prevail. In the case of sliding, the load on the articular tubercles increases, which leads to a decrease in their projection of ionic and immediate height; during rotational movements, an increase in the load on the heads of the lower jaw is observed, as a result of which high articular tubercles are observed. Given these singularities Nosta, we can conclude with a deep bite observed benefit but the sliding motion in the joints, in the open – rotational, with mesial – gliding motion at the distal occlusion – gliding and cross-bite in the case of Incorporation of the extreme volatility of options – the rotational movement [11].

So, we can say that deep and distal bite is more often observed. Mesial and open bite are less common, but the frequency of their occurrence just depends on the structure of the cerebral skull. Among Dolichocephalians, distal and deep bites are more common than in other turtles.

Taking into account the above data, it was found out:

· with a distal bite, the greatest immersion of the head of the lower jaw into the fossa of the temporal bone is observed;

· with a deep bite, there is a decrease in the sagittal size with a simultaneous increase in the depth of the temporal bone fossa.

However, the shape and size of the components of the temporomandibular joint are affected not by the number of teeth or their location, and not by the types of bite, but by what movements the joint performs. Thus, with a distal bite, either sliding or rotational movements prevail [5]. In the case of sliding, the load on the articular tubercles increases, which leads to a decrease in their projection and immediate height; with rotational movements, there is an increase in the load on the heads of the lower jaw, resulting in high articular tubercles. So, with a deep bite, mainly sliding movements in the joints are observed, with an open one – rotational, with a mesial one – sliding movements, with a distal bite – sliding and with a cross bite, if extreme variations of variability are taken into account, rotational movements.

Conclusion

When analyzing the sources, regularities were revealed in the relationship between the upper and lower dentitions with the temporomandibular joints, with the forms of the brain of the head, as well as antagonist teeth. The changes in the constituent elements of the temporomandibular joints during the formation and pathological type of occlusion and the dependence on the type of movement in this joint were indicated. Not less important is the change in cephalometric parameters during the formation of a pathological or physiological bite. These features should be considered when performing maxillofacial plastic surgery, as well as when conducting nerve blockades in surgical practice.

Конфликт интересов

Не указан.

Рецензия

Все статьи проходят рецензирование. Но рецензент или автор статьи предпочли не публиковать рецензию к этой статье в открытом доступе. Рецензия может быть предоставлена компетентным органам по запросу.

Conflict of Interest

None declared.

Review

All articles are peer-reviewed. But the reviewer or the author of the article chose not to publish a review of this article in the public domain. The review can be provided to the competent authorities upon request.

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