ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA
VOL. LIX, N 2, 178 SECTIO D 2004

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Removable dentures and relations between their construction, adaptation and functionality role and influence on dysgeusia

A large foreign body inserted into the oral cavity, e.g. complete denture, both lower and upper, might cause a temporary or constant dysarthia and dysgeusia. They might be reduced and even completely eliminated by proper dentures construction.

Toothless patients, soon after the full dentures insertion into their oral cavities, complain about problems with correct pronunciation. These disturbances, even dysarthia, are a serious problem for people for whom oral abilities are very important, i.e. for lectors, actors, teachers, politicians and many others. In the majority of cases these disorders pass away after a long or short adaptation period. On the part of the patient, dysarthia remains in spite of overcoming the problems with mastication and getting accustomed to the foreign body presence in the oral cavity. In these cases having problems with normal articulation might result from construction faults, e.g. too thick denture base, incorrect denture base modelling, wrong teeth placement, lowering or excessive height occlusion (6, 8).

Despite that the denture as a foreign formation should compose an integral part of stomatognathic system in the manner which would not bring about the disturbance both in the single element function and the entire system. Elements of stomatognathic system are as follows: teeth and their arches, paradontium tissues, muscles, blood vessels, nerves, osseous system, temporomandibular joints. All the mentioned parts are connected with each other in such a way that a local injury of a single unit may influence the integrity of the system (8).

The first condition of use of the complete dentures should be their right retention and stabilization on their base foundation. The size, shape, and placement of full denture need to be adjusted to the oral cavity in the way which stabilizes on forces acting on these just used dentures. To gain that effect, the denture should be composed into the space termed neutral zone by Fisher. The potential space for the denture, called neutral zone, arises after extraction of all teeth and further on, after subsequent alveolar atrophy. It is limited with a jaw and a soft palate upside and with mandible, oral cavity floor downside, with a tongue from inside, lips and cheeks from outside. Forces of the tongue acting in the described area, are balanced by the ones acting from inside and released by cheeks and lips. Dentures maintenance position depends on its stabilization and retention as well as support on its basis.

DENTURES AND PRONUNCIATION

To construct such full denture, which does not cause the dysarthia, crucially important is good knowledge of phonetics basics. The phonemes are created by closing or shaping of an air stream. It causes appearance of speech components as follow such as vowels and consonants. The agents, which

have influence on shaping of varied air stream, are: lips, cheeks, teeth, alveolar processes, soft and hard palate as well as vocal folds.

The vowels are produced, when the air flows freely without disturbing through diverse resonation space: larynx, throat, nasal cavity and oral cavity. This diversity lies in configuration of lips, jaws, tongue position, which changes the sound of vowels.

In the course of production of consonants, the air stream is restrained or narrowed. Sounds are generated, when the narrowing or restraining of the air stream is created by the contact between teeth, alveolar processes, palate as well as other vocal organs. They are particularly susceptible to difficulties completed in the aftermath of loss of the teeth or else inserting the dental prosthetic restoration to the oral cavity. The tongue is one of the organs, which is mostly with ease and quickly adopted to the capricious conditions, but it needs accurate conditions to operate. In the case of the dental prosthesis introducing, indispensable is eliminating the obstacles and supplying adequate space when it proceeds.

The oral cavity in the stomatognathic system has a role of a speech resonator. Proper articulation depends both on the tongue flexibility and the capacity of the oral cavity. Inappropriate denture construction diminishes its capacity, as well as tongue flexibility upsets correct pronunciation. The most frequent reason of these disturbances is a thick upper denture palate base and lack of sufficient space for the root of the tongue in the corpus of the lower denture. Moreover, the thickness and teeth arrangement takes principal part, e.g. enlarging of the teeth width by 1 mm from the tongue side diminishes the space for the tongue by about 100 mm^3 (2, 7).

VOWELS PRONUNCIATION

In the course of pronouncing words, the ending part of the tongue is situated on the oral cavity floor and contacts or tightly sticks to the lingual surface of the lower frontal teeth. The lower complete denture, pieces of which are located in this area of the oral cavity, should not reduce the space for the tongue. Practical treatment consists in such modelling the corpus of the denture so as the tongue tip has a space to freely position when it operates as the articulation organ, in addition stabilizing the artificial dentition on its floor with stressing it. It can be examined during denture controlling by the dentist with the supplementary suggestion of vowels pronunciation exercises (3, 6, 7).

CONSONANT PRONUNCIATION

As we know from practice, dysarthia mainly emerges as the consequence of failed consonants pronunciation, likewise with the large influence from denture side. The consonants articulation requires the contact with various anatomical parts situated in the oral cavity, on account they have been arranged accordingly by its contact area. The labial consonants production necessitates the contact between the lips. The articulation might be disturbed when the height of teeth has been diminished as well as excessively arranged frontally, which might originate the lips contact problems. However, insufficient support of lips with the teeth and the denture base might be the source of failed consonants articulation, especially of "p" and "b".

By checking up and adjusting teeth arrangement, the prosthodontist faces the question, what is more important? Good aesthetic look or proper working, otherwise right phonetic functionality. This problem involves the compromise, as usually. Checking of the wax model denture, which ought to have right maintenance at its base (e.g. by the use of an adhesive means), apart from exterior appearance involves the phonetic tests.

It is demanded by interactions between teeth and lips to generate the labiodental consonants. The incisive margin of upper incisor position might have an influence on correct vocalization of these consonants. They are usually protected against any deformations by carefully trace down on the frontal

occlusion line. The users of the complete dentures might experience a number of troubles with the suitable vocalization of the labiodental consonants. For the aesthetic reasons or more frequently in accordance with a patient's wish, the anterior teeth, in particular the upper ones, are placed with distances between incisors, mainly the central ones. As the outcome of the incisors location, there might occur a phenomenon called rustling speech. It would be better to check these undesirable phonetic upshots appearances previous to finishing the work, i.e. at the wax denture model stage. To pronounce these consonants requires the stroke between the upper incisors and the tip of the tongue. It might be perturbed by the excessive distance between the upper and lower incisors as well as by the excessively raised height of the occlusion. Important for the approved articulation should be naturally preserved anatomic shape of the upper incisors, i.e., neither extremely flat nor thickened.

The proper elocution of glossall consonants involves connecting of the tongue and the palate. The tongue contracting might be brought about by the shape or thickness changes of the palatal plate basis of the upper denture, which reduce the width near premolars, also deforming the sounds, which is caused by the strokes between the lateral edges and the surfaces of the upper lateral teeth. An extreme thickening of the denture base on the palatal anterior is a particularly frequent phenomenon, which occurs in quotidian practice. The 1 mm thick denture base has not negative influence on these consonants production but its enormously thickened base almost always has the one. It should be recommended to build a thin metallic palatal base-plate by reconstruction of palatal wrinkles in very susceptible dysarthiac patients. The sounds are released by nose in the case of some difficulties on mouth outlet of the air stream throughout nasal consonants articulation. The pronouncing complications are started by the changes on the width and the height of the dental arches on the denture.

The earlier given information could be useful in everyday practice by making easier the complete dentures manufacture, respecting phonetics.

THE INITIATING MECHANISM OF THE HYPOGEUSIA THROUGH THE COMPLETE DENTURE USE

The hypogeusia has been repeatedly observed as the symptom in the course of the complete denture adaptation stage. Hence it tends to be perceived as a transient or a persistent dysgeusia. It might be portrayed (contrary to the dysgeusia caused by disease process) by its appearance as soon as the denture is inserted into the oral cavity and is regressed after its removing .

According to the literature it could be assumed that the gustatory receptors are rather situated on the surface of the tongue than on the hard palate. The activity of the gustatory bulb should not be excluded by the presence of the full denture. Therefore, there are many authors who have concluded that the hypogeusia caused by the use of these dentures had been founded as the complex phenomenon related to the side-effect of the upper denture being there, i.e. mainly to the switching out of hot, cold and tactile receptors on the hard palate, as well as to improper food mastication on the surface of the tongue and also its insufficient crumbling.

The following agents, which have occurred in the complete denture construction, are responsible for the hypogeusia: lowering of the central occlusion, stricture of the dental arches, excessive thickness and inadequate modelling of the denture bases from lingual side, wrong adherence and maintenance of the prosthesis, inappropriate occlusion on the opposing teeth.

As it was mentioned, hypogeusia is principally prompted by the decreasing of the lingual space capacity, likewise, by the incorrect structure of the upper and lower denture. It is worth to remark that in the cases such as these mentioned earlier, besides hypogeusia, there might be observed dysaphia and dysthermaesthesia. They might be often manifested by burns of the posterocavital membrane due to hot meal eating as well as difficulties with perception of small foreign bodies in the food, which may frequently cause the choking.

Then the patients complain of a considerable impairment of the tongue flexibility, its slide on a smooth surface of the palatal basis as well as its pushing backward. This latter symptom takes place due to an excessive thickness of the bases in the lingual region plus of the arches of the anterior teeth diminution at the dentures. These uncomfortable sensations might be prevented by the modelling of the teeth palatal surfaces fully and also of the palatal wrinkles individually. The denture modelling in this manner protects against the slide of the tongue and it facilitates mastication on its ending and its borders.

With reference to the role of the tongue in the creation of the taste sensation we must add that the limitation of the degree of lingual flexibility freedom creates difficulties with food translocation, its solution in the saliva. It also mutilates mastication on its surface. There are difficulties with self--cleaning a fur from the tongue.

The reduction of the capacity of the lingual space is so much significant that it exceeds an adaptation capability of the tongue, it reaches the permanent hypogeusia. An additional element disturbing in its freely movements and even in the receiving of the sensory stimulus is wrong adherence and maintenance of the prosthesis. Also insufficient mastication is avoided by the defective in occlusion manoeuvred dentures, which is one of the conditions in the suitable creation of the taste sensation.

The next agent, which is involved in the dysgeusia, is the abnormal salivation (either hypo- or hypersalivation). Depending on whether it is hyposalivation or hypersalivation, the water-soluble nutrition substances may reach an incompatible concentration, which may be have an effect on the degree of the taste sensation. Furthermore, the hyposalivation is connected with the appearance of the fur and troubles with its cleaning. The deterioration of the just taste stimulation conditions may be determined by all these previously mentioned factors.

CONCLUSIONS

The main role in the mechanism of occurrence of hypogeusia has the limitation of the tongue flexibility, especially of its tip, due to the use of the complete dentures, which provokes difficulties with the accurate course of physiological activity, as well as makes impossible the balancing of the tongue due to cryaesthesia, heat sensibility and tactile sense, which are blocked on the palate (1, 4, 5).

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SUMMARY

A large foreign body inserted into oral cavity, e.g. complete denture, both lower and upper, might cause a temporary or constant dysarthia and dysgeusia. These might be reduced and even completely eliminated by proper dentures construction. Problems with normal articulation might result from construction faults, e.g. too thick denture base, incorrect denture base modelling, wrong teeth placement, lowering or excessive height occlusion. The hypogeusia has been repeatedly observed as the symptom in the course of the complete denture adaptation stage, as well as might keep further. The main role in the mechanism of occurrence of hypogeusia has the limitation of the lingual flexibility, especially of its tip, throughout the use of the complete denture. It provokes difficulties with the accurate course of its physiological activity as well as makes impossible the balancing with the tongue of the cryaesthesia, heath sensibility and tactile sense, which are blocked on the palate.

Protezy ruchome – współzależność pomiędzy ich konstrukcją a adaptacją i funkcjonalnością oraz wpływ na obniżenie wrażliwości smakowej

Wprowadzenie do jamy ustnej ciała obcego o dużej objętości, jaką stanowi proteza całkowita górna i dolna, może powodować okresowe lub stałe zaburzenia mowy oraz obniżenie wrażliwości smakowej. Można je ograniczyć lub całkowicie wyeliminować przez odpowiednią konstrukcję protez. Kłopoty z prawidłową wymową mogą wynikać z błędów konstrukcyjnych, jak zbyt gruba, nieprawidłowo wymodelowana płyta protezy, złe ustawienie zębów, obniżenie lub nadmierne zwiększenie wysokości zwarcia. Obniżenie wrażliwości smakowej jest objawem niejednokrotnie obserwowanym w okresie adaptacji do protez płytowych, ale może także utrzymywać się przez cały czas ich użytkowania. Główną rolę w mechanizmie powstawania obniżonej wrażliwości smakowej przy używaniu protez płytowych odgrywa ograniczenie ruchomości języka, zwłaszcza jego końca. Utrudniają one bowiem językowi prawidłowy przebieg czynności fizjologicznych, uniemożliwiają wyrównanie przez język czynności zablokowanych na podniebieniu receptorów ciepła, zimna i dotyku.