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Substantiation of proposed tires – kappa for the treatment of the violations of functional occlusion

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Abstract

In this article is given the process of complex orthopedic treatment of patients with medium and large dental defects complicated by secondary deformities, which includes the use of the proposed occlusal tire – kappa.

Keywords: tire – kappa, temporomandibular joint, functional occlusion, dental defects.

1. Introduction

Currently, the actual problem of Prosthetic Dentistry is the question of treatment of violations of functional occlusion at partial defects of dentition, which help to prevent dentoalveolar deformations and development of disorders of the temporomandibular joint and masticatory muscles. The most common methods of treatment of patients with medium and large dentition defects is the use of partial of removable dentures and their combination with non-removable aesthetic designs. It was proposed a number of designs occlusive tires for treating patients with saved dental series and functional disorders of the temporomandibular joint, but they are rarely enforced and require a long period of treatment. Known stability tire ("Michigan"), which made in the form of plastic base for the upper jaw, which has a flat occlusal surface and overlaps the chewing surface of the lateral teeth and palate surfaces of the front teeth and the part of vestibular surfaces of all teeth [1]. Also known, "between jaw (intermandibular) dental tire-kappa" containing a plastic base and between the jaw occlusal gasket for simultaneous rigid fixation of both jaws in a constructive bite [2]. However, a negative factor, characteristic for this type of tires is awkwardness of jaw-plastic base that is defined geometric shapes sizes basis, which leads to speech disorders during adaptation and aesthetic appearance and displacement of the teeth of the lower or upper jaw. One of the types of tires is a tire-kappa for the treatment of functional occlusion, that contains plastic base in the form of interocclusal support and gasket received (formed) by imprint saved teeth located next to the dentition defect. However, plastic base, in the form of interocclusal support covers the alveolar process to transitional fold and contacts with mucous membranes by installing it in the area of the missing tooth, and occlusions at the gaskets which serves in the form of rigid curved split-fixing plate (thickness 2 – 3 mm) makes it difficult to establish jaws [2]. However, the tire-kappa has the disadvantage that caused by the influence of plastic base on the mucous membrane of the mouth, that leads to allergic and toxic complications. At the same time, the presence of occlusal gaskets in the form of hard curved plate makes it difficult to stabilize the situation of articular heads, that is not always possible to reliably provide the setting of upper and lower jaws in a predetermined position.

The aim of research.

The aim is to create an improved tire – kappa suitable for the treatment of functional occlusion by design changes and choose the necessary gaskets, which will ensure acceleration of the processes of adaptation of patients to removable dentures.

2. Materials and Methods

We examined 32 patients with dentition defects, which was conducted the orthopedic treatment and subsequent prosthetics dentures clasp among which in 18 is not used tire -kappa (1A group) and 14 patients (1B group) applied the proposed tire – kappa. Examination of patients, the diagnosis of partial loss of teeth and tooth-jaw types of deformations were carried out by standard methods. With the help of complex articulation "Cadiax Compact" (Amann-Girrbach) was conducted the recording of movements of the joint head of lower jaw in the

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Sagittal, transversal and vertical planes [3]. For an objective evaluation of the probability of received results of research were used variational and statistical method of analysis of received results on a personal computer using packets of applied statistical programs "Microsoft Excel – 2010" and "Statistica – 6,0".

3. Results and Discussion

The proposed tire – kappa for the treatment of functional occlusion (Ukraine patent № 32692), which contains a plastic base and occlusal pad, is characterized in that plastic base was designed as interocclusal support, which covers the alveolar process of transition to the fold with the possibility of contact with the mucous membrane by installing the support in the area of the missing tooth, in addition, occlusal pad was designed as a curved plate thickness 2 – 3 mm, the ends of the split – fixing which was formed by the print saved teeth [4]. Also, we have designed, substantiated and implemented the construction of improved tires-kappa (Ukraine patent №51443), which is suitable for the treatment of functional occlusion, by constructing elastic pads which will ensure acceleration processes of adaptation of the patients for removable prosthetic appliances [5]. Tire – kappa for the treatment of functional occlusion is made under the scheme: fingerprints obtained from the upper and lower jaws; models are cast from plaster; determine the position of the upper jaw using facial arc; is determined the position of the lower jaw with the help of Sliding Guide; is obtained condylogramma of temporomandibular joint, lift height of bite for 2 – 3 mm; tire – kappa is modeled using wax, modeling base is held to the transitional fold in the area of the missing tooth, and saved teeth are overlapped on 2/3; conduct replacement of wax baseline plastics; packaging and polymerization of elastic plastic, hot polymerization, processing and testing in the mouth, followed by correction or packaging and polymerization of elastic plastics of cold polymerization in the mouth; carry out grinding and polishing of tire – kappa.

Indications for use of the proposed structure of the tire – kappa is the presence of dysfunction of the temporomandibular joint, dysfunction of masticatory muscles, combined with medium and large dental defects, bruxism, the need to gradually raise the height of the bite. The proposed tire – kappa for the treatment of functional occlusion allows to provide acceleration of the process of adaptation to patients with removable prosthetic appliances, due to reduction of correction of the tire and the prevention of injury of the mucous membrane of prosthetic bed.

Analyzing the results we found that patients with medium and large dentition defects the biomechanical parameters in all fields are significantly reduced in comparison with norm. In the group of patients who was used partial dentures, but did not use tire – kappa the biomechanical parameters of movements TMJ to treatment were significantly lower than the norm and made in the vertical plane $7,2\pm 0,11$ mm and $7,6\pm 0,23$ mm for right and left joints, in protrusion movements respectively $5,8\pm 0,17$ mm and $6,2\pm 0,21$ mm and transversal movements at $5,7\pm 0,14$ mm and $6,0\pm 0,21$ mm. After 6 months of treatment of orthopedic patients with the help of partial removable prosthetic appliances the magnitude of protrusion movements of the mandible was significantly increased ($p<0.05$) to $7,2\pm 0,21$ mm and $6,9\pm 0,19$ mm in the right and left respectively TMJ. In this case also the magnitude of movements of the joint head increased in the vertical plane, according to $7,9\pm 0,23$ mm and $8,1\pm 0,19$ mm and during the movement of the lower jaw to the left and to the right $6,9\pm 0,26$

mm and $7,3\pm 0,14$ mm respectively ($p<0.05$). In the 1B group of patients that orthopedic treatment was carried out using partial dentures and tire – kappa the biomechanical parameters of movements of TMJ to treatment, as in previous patient groups were significantly lower ($p<0.05$) from the norm. In particular, by the protrusion movements of the lower jaw they were $5,8\pm 0,29$ mm and $6,2\pm 0,44$ mm for right and left TMJ, by the vertical movements $7,3\pm 0,45$ mm and $7,8\pm 0,36$ mm, by the transversal respectively $6,1\pm 0,38$ mm and $5,8\pm 0,51$ mm. After applying the tire – kappa during 6 – 8 weeks of complex treatment these indicators significantly increased by displacement of the lower jaw in the sagittal plane to $7,4\pm 0,27$ mm and $7,8\pm 0,25$ mm respectively for the right and left TMJ ($p<0.05$). After 6 months after prosthetic treatment of the patients with the help of partial dentures using tire – kappa the magnitude of protrusion movements of the mandible was significantly increased ($p<0.05$) compared with the previous period and amounted to $7,9\pm 0,18$ mm for right TMJ and $8,3\pm 0,3$ mm for the left TMJ. In the vertical plane the biomechanical parameters also significantly increased in comparison with indicators before treatment and after applying our proposed tire-kappa were respectively for the right and left TMJ $8,5\pm 0,34$ mm and $8,7\pm 0,3$ mm. These indicators 6 months after prosthetic of patients remained at the achieved level and amounted to $8,8\pm 0,36$ mm and $8,9\pm 0,23$ mm respectively for the right and left TMJ. In the transversal movements of the lower jaw in patients of 1B group of the studied parameters after using tire – kappa significantly increased to $8,0\pm 0,26$ mm and $7,6\pm 0,48$ mm, respectively ($p<0.05$). After 6 months after prosthetic treatment group 1B should be noted stabilization of these indicators at the level of $8,2\pm 0,2$ mm and $7,9\pm 0,41$ mm respectively for the right and left TMJ and they are significantly better than indicators by average movements at the lower jaw before the treatment.

4. Conclusions

In patients with medium and large dentition defects was found a combination of secondary tooth-jaw deformities with functional disorders of the TMJ, which are dominated the syndrome of pain dysfunction and displacement of the joint disc. Comprehensive orthopedic treatment of such patients with medium and large dental defects complicated by secondary deformities should include the use of the proposed design occlusal tire – kappa, which allows to stabilize the position of joint head of the lower jaw, to prevent the progression of deformities and diseases TMJ. Based on the analysis of data condylography was proved advantages of application of the proposed complex treatment that includes the use of the proposed tire – kappa and partial dentures prosthesis. In the analysis of condylogrammas was established significant improvement ($p<0.05$) of quantitative biomechanical parameters of the temporomandibular joint in patients 6 months after the application of the proposed tire – kappa in comparison with a group of patients who tire – kappa has not been used.

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