

MEDICAL SCIENCES

THE USE OF ORTHODONTIC IMPLANTS IN THE TREATMENT OF ANOMALIES OF THE DENTOFACIAL SYSTEM

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Abstract

The development of modern orthodontics is due to the introduction of the latest technologies and treatment methods. Reducing the time of orthodontic treatment and obtaining more predictable treatment results using implants is a new direction in orthodontics. Currently, implants are used in orthodontics as devices for an alternative fixed support in the orthodontic treatment of dentofacial anomalies.

Keywords: dentofacial anomalies, orthodontic treatment, temporary implants.

The popularity of implants in orthodontic treatment is due to: 1. high efficiency, 2. reduced treatment time, 3. minimal risk for the patient, 4. more predictable treatment results without patient cooperation, 5. minimal costs, 6. ease of the surgical procedure, 7. expanded indications and possibilities for orthodontic treatment. Implants in orthodontics are used in two versions: 8. permanent implants are installed in the area of missing teeth for orthopedic replacement, with the installation of a bonding base for braces, and used during orthodontic treatment; 9. temporary implants, used only for the period of orthodontic treatment. Currently, they are widely used in orthodontics. The main condition for the use of implants in orthodontics is osseointegration. Clinical and experimental studies have shown that osseointegrated implants maintain a stable position under orthodontic loads and can be successfully used in orthodontic treatment [4]. In orthodontic treatment, a temporary implant plays the role of a stable support for the movement of teeth and does not change its position under the influence of load, unlike abutment teeth. Implants larger than 2 mm are called mini-implants, and those smaller than 2 mm are called micro-implants. Temporary implants in orthodontics, as a rule, do not require a preliminary incision; they are installed through soft tissue; they can be installed in the area of the attached gum. They are threaded and made primarily of titanium or its alloys, and also have a rough surface to enhance the degree of osseointegration. Indications for the use of implants in orthodontic treatment are anomalies in the position of the teeth, dentition and bite in the sagittal, vertical and transversal plane. The main applications are: 1. Retraction of the anterior group of teeth or canines separately. 2. Closing the gaps. 3. Distalization of molars. 4. Mesial displacement of molars. 5. Intrusion of chewing teeth and the entire dentition. 6. Intermaxillary fixation of dentition and jaws. 7. Movement of individual teeth in three planes. There are two ways to stabilize teeth with implants: direct and indirect. With the indirect method, a transpalatal arch fixed to the implant creates a connection between the teeth, which are necessary for fixation and

stabilization of the support. With the direct method, a system of forces operates between the moved teeth and the implant itself [9]. One of the main conditions for successful orthodontic treatment of distal occlusion (class II) is the correct choice of support. The use of a fixed stabilizing support in the form of temporary implants is an incorrect choice. Orthodontic treatment of distal occlusion without removal of premolars involves distal movement of the upper arch, mesial movement of the lower arch, or a combination of their movement. Many treatment methods and orthodontic appliances have been proposed for the distalization of upper molars. For example, a facebow (extraoral support), a Wilson molar distalizer, various intraoral removable distalization devices, the use of which in orthodontic practice requires special deontological relationships between the patient and the orthodontist [5, 6]. This makes it possible to clearly follow the regime of wearing the devices and all the doctor's recommendations for their use. In other cases, the orthodontist may use other distalizing devices, the use of which is possible without the cooperation of the patient, such as the Herbst apparatus, Jasper jumper, Churro jumper, Saif springs and others [2]. However, adaptation of patients to these devices is complex, lengthy and not always feasible. In addition to the facebow, all of the above-mentioned appliances have undesirable associated reciprocal effects, such as mesial movement of the mandibular teeth, mesial inclination of the molars, vertical advancement of the premolars (extrusion), and proclination of the maxillary and mandibular incisors. Most intraoral appliances usually provide temporary distalization of molars. Practice shows that after completion of orthodontic treatment using intraoral distalizers, minimal distal movement of the molars occurs, and in long-term follow-up, some authors note a complete restoration of the position of the molars to their original location [1, 3, 7, 8]. Studies of the stability of treatment results using orthodontic implants in long-term follow-up have shown consistent positive treatment results. These studies formed the basis for the use of temporary im-

plants in the orthodontic treatment of dentofacial anomalies [7, 9]. The purpose of our study was to increase the effectiveness of orthodontic treatment of dentofacial anomalies using temporary orthodontic microimplants. The subjects of the study were 18 patients with distal occlusion (class II, subclass - 9 (50%), subclass II - 9 (50%)) aged 30 - 36 years, using temporary orthodontic microimplants. All patients underwent a comprehensive examination, including a clinical examination of the oral mucosa, periodontal tissue, teeth, dentition and jaws; biometric study of diagnostic jaw models; X-ray and photographic examination; and drawing up a comprehensive treatment plan. The first stage of orthodontic treatment was orthodontic leveling of the dentition and straightening of the teeth using a multibonding system (bracket system) (Fig. 1). At this stage of treatment, rotation of teeth in the horizontal and vertical planes was excluded, and the same level of position of the cutting edges of the incisors and chewing surfaces of premolars and molars was achieved. The second stage was the correction of the curve of Spee, the shape of the dentition, closing the gaps between the teeth, while achieving a normal ratio of molars and canines according to class I. At this stage of treatment, temporary orthodontic implants were installed, which were included in orthodontic treatment as a direct stabilizing support element.

At the final stage, the final normalization of occlusion was carried out in three planes and multiple fissure-tubercle contacts between the teeth were achieved. The surgical procedure for installing an orthodontic implant consisted of successive stages: 1. Anesthesia of the implant insertion site with infiltration anesthesia with a small dose of anesthetic, since with complete anesthesia the patient could not inform the doctor about the pain reaction due to touching the tooth root during installation (Fig. 2). 2. Osteotomy was performed with a special drill at low speed with cooling (Fig. 3). 3. The sterile implant was removed from the cannula and fixed using a special instrument (Fig. 4, 5). 4. The implant was inserted into the hole and fixed in the bone tissue

(Fig. 6). This was done slowly, manually or using mechanical means. Next, the patient's reaction was observed, focusing on the resistance of the bone tissue (Fig. 7). 5. After implant placement, intraoral radiographs were taken to monitor the position of the implant. The use of temporary orthodontic implants in patients with distal occlusion confirmed good tolerability of the surgical procedure for installing a microimplant, rapid adaptation on average in the first 1 - 3 days after fixation of the implant, the absence of adverse reactions and a reduction in the time of orthodontic treatment (Fig. 8 - 10). It should be noted that the use of this method ensures high stability of the implant position, which makes it possible to expand the indications and possibilities of orthodontic treatment in adults, and it is easier to predict the final results of treatment. As an example, we present a clinical case (Fig. 1-10). The results of further treatment measures will be presented in subsequent publications.

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