Correction of the Tooth Alignment In Case of the Popov-Godon Phenomenon Using A Dental Implant With Immediate Loading (Clinical Case)

Dilanyan K. Mamikon1*, Eritsyan A. Karlen2

1. Dental Surgeon, Dental Orthopedist, Kommunarka Settlement, 17 Sosenskiy Stan str. Moscow, Russia.
2. Dental Surgeon, Dental Technician, Kommunarka Settlement, 17 Sosenskiy Stan str. Moscow, Russia.

*Corresponding Author: Dilanyan K. Mamikon

Abstract

This paper describes a clinical example with immediate loading on the dental implant with a temporary (cobalt-chromium alloy crown) that was mounted in the area of the secondary edentulism of tooth 24 with the Popov-Godon phenomenon of its antagonist – tooth 34 – with vertical malalignment and tilt towards the tongue. This pathology is part of the second form and second subgroup thereof. Treatment started with the mounting of a dental implant in the area of the secondary edentulism of tooth 24 with immediate loading on the dental implant, with a view to correcting the impaction of the antagonist tooth 34 into its usual alignment in a continuous dental arch. This work was done in clinical conditions. The patient was examined once every fortnight after the fixation of the temporary pontic. Spot X-ray of the dental implant and tooth 34 was conducted. The work lasted four months. Over the course of the work, all structures were produced once.

Keywords: Tooth Alignment, Popov-Godon Phenomenon, Dento-Alveolar Malalignment, Dental Implant, Dental Arches.

Introduction

The structural and mechanical properties of the mineralized coating stand out not only thanks to their quantitative parameters, but also the quality of their distribution and purposeful adaptive changeability. The movement of the tooth into the defect area in case of a loss of its antagonist is a functional and dynamic process that is accompanied by a rearrangement of the bone tissue alveolar process (spongiosa hypertrophy) [1,2].

Such rearrangement is accompanied by periodontium resorption [3] and hypertrophy of the periodontium ligament and its surrounding alveolar process, which can be regarded as a holistic alteration of the organ volume (hypertrophy). The functional state of the periodontium tissues is closely related to the state of the tooth [4,5].

Functionally, the tooth itself and its periodontal membrane are a single whole that ensures the breaking strength of the tooth. Therefore, the purpose of this work was to preserve the intactness of the antagonist tooth and to preserve and restore the functional and physiological properties of the tooth and the periodontium in the long run.

In this clinical case, the adjustment or correction of the alignment of the tooth was carried out in the presence of a healthy enamel organ (alveolar process, periodontium, marginal periodontium). In scientific literature, tooth protrusion in case of the loss of its antagonist is called the Popov-Godon phenomenon [6,7,8].

Such dento-alveolar malalignment complicates prosthetics with the preservation of the usual size of future artificial structures that fill the defects in the dental arch. The goal of this work was to preserve the intactness of tooth 34 and its periodontium.
Materials and Methods

In case of the Popov-Godon phenomenon, the primary task is to remove the deformation and then to replace the defects in the dental arches, which is achieved by applying orthodontic structures and therapeutic and orthopedic treatment methods (Fig. 1).

Patient N came to the dental clinic for prosthetics with a complaint regarding a missing tooth 24. After the examination of the oral cavity and X-rays (computed tomography and spot X-ray), the patient was diagnosed with tooth 24 edentia – deformation of the occlusal surface of the lower continuous dental arch. While tooth 24 was missing, the patient’s tooth 34 moved into the place of the secondary edentulism of tooth 24 with a significant reduction of the occlusal height. Spot X-ray showed that tooth 34 was intact.

Clinical and additional examination (spot X-ray, high-frequency and low-frequency CT scan) did not detect any pathology in the periodontium of tooth 34 or the alveolar process. A small wedge-shaped defect was detected on the facial surface of tooth 34. No artificial restorations were detected on the occlusal surface of tooth 34. The decision was made to conduct dental implantation in the area of the secondary edentulism of tooth 24. The conditions for dental implantation in the area of the secondary edentulism were acceptable; no significant atrophy of the soft and dental tissues of the alveolar process were found. The solution of “situational problems” with the use of a single structure gives good prospects for satisfactory dental prosthetics for the patient. In this clinical situation, there is a shortage of space for the future artificial crown in the area of the secondary edentulism.

The conditions for dental implantation in the area of the secondary edentulism were acceptable; no significant atrophy of the soft and dental tissues of the alveolar process were found. The solution of “situational problems” with the use of a single structure gives good prospects for satisfactory dental prosthetics for the patient. In this clinical situation, a dental implant 10 mm long and 4.0 mm in diameter (Osstsem, Russia) was mounted. A healing abutment 5.0 mm in diameter and 5.0 mm high was mounted immediately. In the medial and distal part, the gum was closed with apposition and retaining sutures, with a view to forming an interdental papilla. After one week, closed tray impression coping was carried out and models were molded to make the cobalt-chromium alloy crown with screw retention. The temporary crown had an occlusal surface. The contact points on the occlusal surface of the temporary crown were located on the glogtic and buccal sides of the vestibular cusp of tooth 34.

Relative to tooth 34, the dental implant was mounted vertically, along the vertical axis, thus ruling out the formation of sharp edges in the prosthetic part of the dental implantation. Total atrophy was not found in the osseous structure around the implant. Inflammatory reaction was not found in the surrounding soft tissues. The temporary crown was made out of a cobalt-chromium alloy and covered with an opaque layer of ceramic mass.

A temporary abutment (straight) and the Temp Bond retrievable temporary cement was used to fix the crown. The fixation of the temporary structure was followed by a separation of the occlusal surfaces of upper and lower jaw teeth. The separation size was 2-2.5 mm, which matched the occlusal surface separation size in the relative rest position of the jaws. The patient was examined once every fortnight using spot X-ray of the dental implant and tooth 34. No pathological changes in the periodontium or soft tissues near tooth 34 or the dental implant were detected during the examination period. No pathological movement was detected in the dental implant or tooth 34 throughout the entire treatment.

Figure 1: Defects in the dental arches
period. The interocclusal distance increased gradually; this was indicative of a steady and reversible process in the dento-alveolar part after changes caused by the Popov-Godon phenomenon.

**Results and Discussion**

Such a realignment of the dento-alveolar part rules out the use of excessive force with orthodontic structures, since it can have a negative effect on the periodontium of the antagonist tooth during its realignment into the original position. For patients, this means that they do not have to experience the discomfort of wearing orthopedic therapeutic plates. This also rules out dental tissue surgery (selective grinding), which could make the tooth sensitive to external irritants, and makes it so it is no longer necessary to cover such teeth with artificial crowns. It is worth noting that the forces that emerged and affected the dento-alveolar realignment were regulated by local organs (periodontium of tooth 34 and the alveolar process). The examination showed that tooth 34 returned to its original position without realigning any other teeth in the dentofacial system (Fig. 2-3).

![Figure 2: Tooth 34 returned to its original position](image1)

![Figure 3: Rehabilitation period](image2)
1-5 X-rays of the starting and finishing periods of treatment 6,7X-rays after one year of observation.

**Conclusion**

A dental implant 10 mm long and 4.0 mm in diameter was mounted during the surgery. The dental implant was mounted vertically. No pathological changes were detected during the examination period. No other teeth in the dent facial system were realigned as a result of the treatment and subsequent examination of the patient.

**References**


