



## **STUDY OF THE EFFECTIVENESS OF METHODS FOR REMOVING DENTAL DEPOSITS DURING PROFESSIONAL ORAL HYGIENE**

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### **ABSTRACT**

*Dental deposits, including plaque and calculus, are common issues that can lead to a host of oral health problems, including gum disease, tooth decay, and halitosis. Professional oral hygiene, which encompasses methods for the removal of these deposits, is essential in maintaining optimal oral health and preventing dental complications. Various techniques and instruments are employed by dental professionals to effectively remove these deposits, including scaling, polishing, and the use of ultrasonic devices. Understanding the effectiveness of these methods is crucial for improving dental hygiene practices and enhancing patient outcomes. This study aims to evaluate the effectiveness of various methods of removing dental deposits during professional oral hygiene, comparing traditional techniques with modern advancements in dental care.*

**Relevance.** Stomatologists mainly use sound and ultrasound equipment to remove mineralized dental deposits. The mechanism of action of sound squeezes is the vibration of the nozzle rod under the influence of compressed air. These nozzle oscillations are mainly elliptical. Currently, these devices are rarely used due to their low efficiency.

Recently, special attention has been paid to ultrasound devices due to their convenience for the doctor, low labor and time costs, and patient's convenience during use. Also, the diversity of design approaches for the working end of ultrasonic nozzles improves their access to difficult-to-treat areas of the oral cavity and periodontal pockets, which allows for a significant increase in cleaning efficiency.

The method of action of ultrasonic devices is simple. They convert electrical energy into the mechanical energy of oscillations of the working part of the end.

Currently, modern skateboards have a wide range of capabilities. Due to new developments, skeylers can interact with various equipment, as the ends have different types of connections. Naturally, the use of ultrasound provides the following advantages: quick and easy manipulation, irrigation of the wound surface with medicinal preparations [6].

But there seems to be another side to it. From literature data, it is known about the negative effects of ultrasound and manual root treatment in the treatment of periodontal diseases [5], damage to the surface of fillings, ceramic restorations, and titanium surfaces [1].



Also, a large force applied by the doctor while working with an ultrasound instrument can damage the surface of the tooth root enamel or the restoration structure, resulting in defects [7].

Soft dental plaque and a small amount of dental calculus can be removed using air-abrasive systems such as Air-Flow (EMS), polishes, and abrasive polishing strips [2]. In these apparatuses, a water-air-abrasive jet with the inclusion of abrasive powders, such as sodium bicarbonate or aluminum oxide, is used. At the same time, the particles of abrasive powders can have different shapes: spherical, elongated, pointed, rounded [4]. The main advantage of such systems is their safety for restoration structures during professional hygiene.

When treating tooth surfaces with an Air Flow apparatus and a polishing brush with abrasive paste, the Air Flow apparatus has a greater cleaning capability. In this case, mineralized dental deposits and pigmented coating are removed from the surface of the teeth using a sand-jet apparatus, with minimal time and labor costs for the dentist compared to brush cleaning. Using the AirFlow device, unlike the second method, pigmented deposits are removed from fissures and cracks on the surface of the tooth enamel. Many authors note significantly greater changes in the gums immediately after airflow hygiene treatment. The examination of treated teeth revealed no scratches or erosions on the surface of the tooth enamel after using Air Flow.

**Purpose:** to study the clinical effectiveness of using ultrasound and the air-abrasive system in conducting professional hygiene in patients.

## Materials and Methods

The clinical examination data were based on the results of examination, treatment, and subsequent observation of 80 patients aged 25 to 42 with the diagnosis: dental deposits, K 03.6. With the appearance of pigmented coating, patients have sufficient motivation, as there is an aesthetic factor.

During the examination, professional oral hygiene was performed using the Woodpecker ultrasound device (Group I) and the Air-Flow sand-jet device (Group II).

The patients were divided into 2 groups of 40 patients each. During the examination, dental and general somatic history was collected, followed by examination of the oral cavity and determination of the condition of the teeth, mucous membrane, and bite. All patients were trained in controlled tooth cleaning, with correction of toothpaste and toothbrush.

When conducting the survey, the patients' complaints were taken into account: the formation of a coating, as well as the duration of its appearance, the presence of an unpleasant odor from the mouth. They learned about the nature and results of the treatment previously administered. To determine the general somatic status, the presence of diseases of the respiratory, cardiovascular, and endocrine systems, gastrointestinal tract, allergic reactions, and pregnancy was determine.

The hygienic condition of the oral cavity was assessed using the simplified hygiene index (IGU-G), (OHI-S), J.R.Green, J.R. Vermillion, (1964), which allows for a separate assessment of the amount of dental plaque and dental calculus. When assessing the condition of the gums, the RMA index was used, which objectively reflects the condition of the periodontium and is used to assess the results of preventive and therapeutic measures.



The OHI-S hygiene index according to Greene-Vermillion (1964) was determined based on clinical examination data. For this purpose, the presence of coating (CIN) on the vestibular surfaces of teeth 16, 11, 26, 31, and the oral surfaces of teeth 36,46 was assessed. During the examination, "Eritrozin" tablets were used. The following criteria were used to assess dental plaque:

- 0 - no coating and staining;
- 1 - the coating covers no more than 1/3 of the surface or the presence of a color;
- 2 - the coating covers from 1/3 to 2/3 of the surface;
- 3 - the coating covers more than 2/3 of the tooth surface.

After examination, before performing occupational hygiene, the oral cavity was rinsed with 0.1% chlorhexidine solution for 1 minute. Subsequent patients underwent professional oral hygiene using the Woodpecker ultrasound device and the Air-Flow powder-jet device.

At the end of treatment, oral cavity was repeatedly rinsed with a 0.05% chlorhexidine solution for 1 minute, and the condition of the teeth after professional hygiene was assessed.

After 7 days of observation of the OHI-S index, there was a tendency towards a decrease in the indicator. The examination data, conducted after a week, indicated an improvement in the oral hygiene status in the studied groups. It should also be noted that the hygiene level in patients of group I was higher than in patients of group II. The average score in the group where professional oral hygiene was performed using an ultrasound device was 0.5. In group II, this indicator was 1.1 points, which indicates a deterioration in the oral cavity's hygienic condition. The data demonstrated better results compared to patients' initial stomatological appeals.

**Results:** As a result of the conducted research, it is noted that the Air Flow procedure cannot remove thick and subgingival tooth stones. Therefore, if this is required, the tooth is removed using the ultrasound method before cleaning. No matter what microparticles the powder is, it is still an abrasive method. During the procedure, the protective layer is removed from the enamel, so you shouldn't neglect the procedure of applying protective lacquer. In rare cases, with certain structural features of the dental enamel after the procedure, it may crack.

It is important to note that performing only professional oral hygiene once every six months using ultrasound scanners is not enough to achieve consistently good results. The specialist should make an important emphasis on the patient's own oral hygiene.

**Conclusion:** the use of ultrasonic and sand-jet apparatus systems contributes to the improvement of the oral cavity's hygienic condition. At the same time, we did not reveal clear differences in the effectiveness of a particular type, as evidenced by most of the presented indicators and the subjective assessment of dentists by the speed (quicker) removal of dental deposits, even significant ones.

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