

УДК 811.111 (075.8)

Plitkin V., Yaskevich E., Lushkashevich K.

## **The Problem of Usability of Dental Equipment**

Belarusian National Technical University

Minsk, Belarus

Medical equipment has been developing and improving since its inception, but the problem of ease of use has not lost its relevance to this day. This topic is quite extensive, so it needs to be considered gradually. Dental equipment was selected for consideration. A survey was conducted among 25 private dentists of two groups: the first group was with work experience up to 20 years, the second - from 20 to 40 years. Consider the results of the survey by the groups.

According to the results of the survey, the following inconveniences were identified in the first group:

1. The harm of using air-water cooling for a health worker when working with a drill;
2. Noise, strong air heating and vibrations during the operation of the water distiller;
3. Harm to the eyes when working with polymerization lamps;
4. Noise and vibration during compressor operation;
5. Loss of rubber properties on buttons;
6. Small vibrations during the operation of the drill tips;
7. Lighting in the drill;
8. Unnecessarily small adjustment step of various devices.

The results of the survey of the second group showed that the rapid development of this area over the past 30 years has completely eliminated all inconvenience for them at work. This is due not only to an increase in resource, efficiency in the use of the working space and improved ergonomics, but also with

the increased availability of many technologies. This result also means that doctors are so accustomed to some inconvenience that they do not attach much importance to them [1].

Consider recommendations for solving these problems:

1. In this situation, dentists need to use a medical visor, respirator and other first-level PPE, which minimizes the risk of aerosol contact with the human body. It is also necessary to regularly sanitize the medical office.

2 and 4. The compressor and water distiller can be installed in separate rooms by connecting them to the tanks directly in the office, which already significantly reduces the noise level during operation. Placement near the wall is not recommended. To further reduce the noise level, you can use leaky noise suppression boxes or various casings.

3. The solution to this problem is a fairly simple improvement of the medical visor for the needs of dentists. It can be implemented by adding a swivel joint at the attachment points of the visor to the headband, on which a folding protective glass will be attached, to lock in the extreme open position of which L-shaped stops will be used. This improvement has a drawback - the inability to use with a headlamp or other equipment. In this case, the protective glass can be made bent at the top edge in order to hook it on the top edge of the visor. With this method of attachment, it is possible to use additional equipment on the doctor's head, but the usability is reduced.

5. In such a situation, we can only recommend the installation of rubber from other compositions, or the replacement of buttons with buttons of a different design, without the use of rubber, if the equipment allows such a replacement.

6. A disposable bandage band can be used to reduce vibration. This solution is already applied in the field of tattoos.

7. There is no obvious solution to this problem, since the brightness of the nozzle LEDs is individual for each manufacturer. Dentist quote: “You need to work through the shift with each nozzle to understand”

8. One of the doctors gave her an exhaustive description: “... the next thing is to adjust the speed of the electric motor. A separate touch of the button changes the speed by one percent, and to change the parameter, for example, by forty percent, you need to press the button for half a minute - this is very inconvenient”. The solution is quite simple: when you press the button for more than three seconds, the parameter starts to automatically change at a certain speed, after which you can release the button and set a more accurate value with single clicks. All this is solved by software firmware [2].

Summing up the article, we can say that its main goal was precisely to highlight the existing inconveniences (which were analyzed in the report in more detail) in this area. Some of the recommendations that have been given may be controversial, but with the rapid development of this industry, the main thing is to highlight the problem, and a way to solve it will definitely appear.

#### References:

1. Website for dental technicians and orthopedic dentists [Electronic resource]. – Mode of access: <https://dentaltechnic.info/>. – Date of access: 18.03.2022.
2. Clinical dentistry: textbook / V.T.Trezubov. S. D. Arutyunov [and others]: Practical Medicine, 2015.