THE RELATIONSHIP BETWEEN WEARING PROTECTIVE MASKS AND POOR ORAL HEALTH

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ABSTRACT

Since the beginning of the COVID-19 pandemic, the number of people wearing masks in everyday life has increased. At the same time, there has been a noticeable rise in the amount of patients with bad breath (foetor ex ore), gingivitis, caries, and xerostomia. The appearance of these symptoms and diseases caused by wearing a mask is designated by the term *mask mouth*. The aim of this article is to establish the link between wearing protective masks and deteriorating oral health. From the conducted research, it has been established that wearing a surgical mask over a long period of time leads to reduced air exchange in the mask and "recycling" of exhaled air. This leads to inhalation of air with increased CO2 content and increase in pCO2 in the blood, which is subsequently compensated by rapid and deep breathing in most cases through the mouth. The goal is to exhale the accumulated CO2. As the mask reduces air exchange, the level of CO2 in the mask remains relatively high. Prolonged breathing through the mouth often leads to xerostomia. Saliva is known to have protective functions against the development of bacteria in the oral cavity through its antibacterial properties. Xerostomia can be a prerequisite for the development of various diseases of bacterial origin, such as gingivitis. Furthermore, oral respiration leads to an increase in temperature and CO2 in the air in the mask and a decrease in pH in the oral cavity, which are optimal conditions for biofilm formation, plaque buildup, development of most bacteria, e.g., *S. mutans*, which is the main cause of caries.

Keywords: *obesity, protective masks, deteriorating oral health, COVID-19*

INTRODUCTION

Since the beginning of the COVID-19 pandemic, the number of people wearing masks in everyday life has increased. At the same time, there has been a noticeable rise in the amount of patients with bad breath (foetor ex ore), gingivitis, caries, and xerostomia. The appearance of these symptoms and diseases caused by wearing a mask is designated by the term mask mouth. When such symptoms emerge, one must know the source and ways of prevention, so that they do not lead to more serious diseases and pathological processes. Prevention is the basis of modern dentistry. With the increased wearing of protective masks for long periods of time, it becomes more imperative to maintain good oral health of patients.

AIM

The aim of this article is to establish the link between wearing protective masks and deteriorating oral health.

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MATERIALS AND METHODS

For the period September 2020–February 2022, in the available database (Pub Med, Bio Med Central, Science Direct, Scopus, Web of Science, Embase), a systematic analysis of scientific publications examining the consequences of wearing masks among patients was conducted.

RESULTS

From the conducted research, we have come to the conclusion that wearing a surgical mask over a long period of time leads to reduced air exchange in the mask and "recycling" of exhaled air. This leads to inhalation of air with increased CO2 content and increase in pCO2 in the blood, which is subsequently compensated by rapid and deep breathing, in most cases through the mouth. The goal is to exhale the accumulated CO2. As the mask reduces air exchange, the level of CO2 in the mask remains relatively high (1).

Symptoms from prolonged wearing of a surgical mask are systemic and local. Systemic symptoms manifest in the nervous, respiratory, and cardiovascular systems. In the nervous system these are headache, dizziness, confusion, and lethargy. In the respiratory system, there is rapid breathing, and in the cardiovascular system, the changes are rapid pulse and increased blood pressure (2).

Prolonged breathing through the mouth often leads to xerostomia. Saliva is known to have protective functions against the development of bacteria in the oral cavity through its antibacterial properties. Furthermore, oral respiration leads to an increase in temperature and CO2 in the air inside the mask and a decrease in pH in the oral cavity, which are optimal conditions for biofilm formation, plaque buildup, development of most bacteria.

Local symptoms in the oral cavity, which are mainly due to oral breathing, are xerostomia, entry of air with an increased amount of CO2, increase the temperature of the air environment (3). Xerostomia is due to reduced saliva production. Saliva has protective functions against the development of bacteria in the oral cavity by coating the teeth, its buffering and antibacterial properties. With xerostomia, the composition of saliva changes, it also has a reduced amount and high viscosity. As a result, it will be difficult to restore the normal pH in the oral cavity. Xerostomia can be a prerequisite for the development of various diseases of bacterial origin, such as gingivitis (4).

Mouth breathing is also a prerequisite for increasing the temperature and CO2 in the air in the oral cavity and decreasing the pH in the oral cavity. These consequences are optimal conditions for the development of most bacteria, including S. mutans, which is the main cause of caries (5). This is followed by the formation of a biofilm on the tooth surfaces and, subsequently, the accumulation of dental plaque (6).

For the purposes of the current scientific study, a survey was conducted. The survey was carried out on the basis of a questionnaire containing 11 questions with the option to choose only one answer but with an opportunity to add a short comment. The survey was anonymous and conducted on a voluntary basis in March 2022. The results are presented in graphic form and are accompanied by relevant analyses and conclusions. A total of 76 participants have taken part of this survey. The gender distribution of the participants was as follows: 61.1% women and 38.9% men. In the study, the respondents ranged in age from 11 to 70 years old.

When asked, "Have you noticed any changes in your oral health since you started wearing masks?"—24% answered yes, and 76% answered that no changes were observed (Fig. 1).

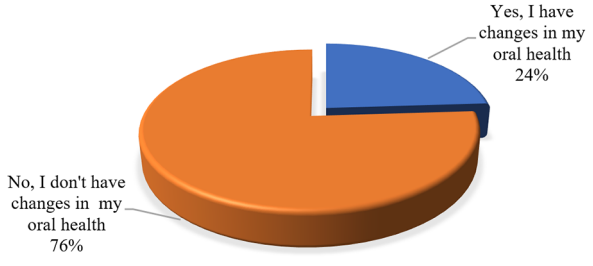

Fig. 1. Percentage distribution of survey participants and changes in the oral cavity after long-term wearing of protective masks.

To the open-ended question "If the answer is yes, what are your complaints?"—72.2% complained of bad breath, 11.1%—bad breath and inflamed gums, 11.1%—inflamed gums, and 5.6%—bad breath and caries. (Fig. 2).

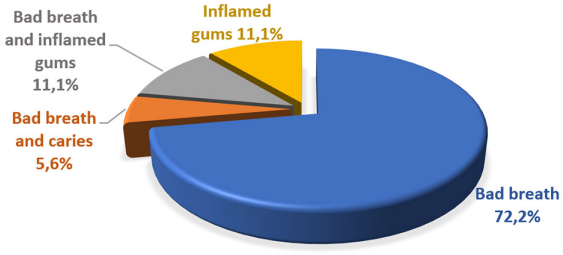

Fig. 2. Percentage distribution of different complaints.

CONCLUSION

The development of mask mouth has become more common in recent years. Prophylaxis and getting the patients acquainted with symptoms of the condition, such as xerostomia and bad breath, is extremely important to prevent their occurrence and further development of pathological processes in the oral cavity due to prolonged wearing of protective masks.

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