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POTENTIAL ROLE OF CONVENTIONAL MOUTHWASHES AGAINST COVID-19 IN DENTISTRY

DİŞ HEKİMLİĞİNDE COVID-19'A KARŞI GELENEKSEL AĞIZ GARGARALARININ POTANSİYEL ROLÜ

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Abstract

Lots of people use mouthwashes to combat oral microorganisms. Current research has recommended that the throat and salivary glands are significant sites of viral replication and spread during the initial COVID-19 illness, implying that mouthwashes should be employed. The closeness to the patient throughout oral and dental procedures, the heavy production of aerosol, and the existence of SARS-CoV-2 in the saliva indicate the oral cavity is a likely means of spread. To minimize the quantity of pathogenic viruses in aerosols as well as droplets throughout dental procedures, mouthwashes such as chlorhexidine gluconate (CHX), povidone-iodine (PVP-I), and hydrogen peroxide (H2O2) have been advocated. There is very little clinical data that shows mouthwashes help avert SARS-CoV-2. This article intends to deliver a thorough review of the latest suggestions on the application of oral rinses to combat the COVID-19 disease outbreak and to outline the pros and cons of the most commonly used mouthwashes during routine dental procedures.

Keywords: *COVID-19, Corona Virus, Dental Procedures, Mouthwash, SARS-CoV-2.*

Özet

Birçok insan ağızdaki mikroorganizmalarla savaşmak için gargara kullanır. Mevcut araştırmalar, boğaz ve tükürük bezlerinin viral replikasyonun önemli yerleri olduğunu ve ilk COVID-19 hastalığı sırasında yayıldığını, gargaraların kullanılması gerektiğini ima etti. Ağız ve diş prosedürleri sırasında hastaya yakınlık, ağır aerosol üretimi ve tükürükte SARS-CoV-2'nin varlığı, ağız boşluğunun olası bir yayılma yolu olduğunu gösterir.Dental prosedürler boyunca aerosollerdeki ve damlacıklardaki patojenik virüslerin miktarını en aza indirmek için klorheksidin glukonat (CHX), povidon-iyodin (PVP-I) ve hidrojen peroksit (H2O2) gibi gargaralar savunulmaktadır. Gargaraların SARS-CoV-2'yi önlemeye yardımcı olduğuna dair çok az klinik veri var. Bu makale, COVID-19 hastalığı salgınına karşı ağız gargaralarının uygulanmasına ilişkin en son önerilerin kapsamlı bir incelemesini sunmayı ve rutin ağız ve diş prosedürleri sırasında en sık kullanılan gargaraların artılarını ve eksilerini özetlemeyi amaçlamaktadır.

Anahtar Kelimeler: *COVID-19, Corona Virüsü, Diş Prosedürleri, Gargara, SARS-CoV-2.*

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OVERVIEW / GENEL BAKIŞ

Introduction

The Coronavirus first arose in Wuhan, China in 2019. The World Health Organization (WHO) has announced it as a global pandemic, which means it has become a matter of international concern (1). In the following month, the pathogen of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was recognized (2). SARS-CoV-2 shares genetic commonalities with the SARS coronavirus (SARS-CoV) and the Middle East respiratory syndrome coronavirus (MERS-CoV). It is assumed that SARS-CoV-2 can be transmitted from animal to human via animal contact. The pandemic began with the Chinese horseshoe bats and eventually spread to humans by way of the pangolin (3).

Conventional practice has been to have antiseptic mouthwash prior to dental procedures (4). They play a crucial role in reducing pathogens in the mouth (5). Recent studies have shown that mouth rinsing with antiseptics can help to reduce the risk of SARS-CoV-2 spread (6, 7). The efficacy and rationale for antiseptic mouthwash use against SARS-CoV-2, however, are somewhat ambiguous at this time. This article intends to describe the popular antiseptic mouthwashes, their benefits, and their drawbacks in dental procedures during this pandemic situation.

Pathogenesis of coronavirus

Coronaviruses have a lipid envelope around them that contains the spike glycoproteins needed for infection (8). Interaction between these glycoproteins and angiotensin-converting enzyme-2 (ACE-2) receptors facilitates viral entry into cells (9). The allocation of ACE-2 receptors in the human body may demonstrate possible paths of infection (10). Oral mucus membranes, gingival epithelium, and epithelial cells of the salivary glands are all rich in ACE-2 receptors (10, 11). Emerging research suggests the crucial involvement of the salivary glands and throat in the initial spread of early COVID-19 case scenarios (12). The viral load of SARS-CoV-2 in human saliva is noticed at a high level (13). It has even been mentioned that it can be found in the gingival crevicular fluid also (14). Saliva interactions are linked to virus spread and oral tissues could be a reservoir from which SARS-CoV-2 transmission could occur during coughing, sneezing, speaking, as well as dental procedures (6, 15). If methods for reducing viral particles that pass through the oral mucosa are found, then SARS-CoV-2 spread will be limited. Oral rinses that destroy the lipid envelope have the capability to reduce the SARS-CoV-2 viral load in the mouth as well as the oropharynx (12, 16, 17).

Povidone-iodine (PVP-I)

PVP-iodine (PVP-I) is a water-soluble iodine material (18) that has been commonly utilized for skin antiseptics prior to surgery (19). It is also used as an oral cavity rinse (20). It is utilized at a concentration of 1% for oral mucositis, oropharyngeal infection prophylactic, and as a preventive measure against hospital-acquired pneumonia (21-23). Polyvinylpyrrolidone releases free iodine, and then it induces protein and DNA structures to break down and microbes to die (22). PVP-I tends to work by preventing infection and limiting

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the spread of human and avian influenza viruses by obstructing viral adhesion to cellular receptors and inhibiting viral activation and propagation from infected cells (24). PVP-I has been shown in studies to have more antiviral properties than other mouthwashes. A study has shown that PVP-I mouth rinse can reduce both enveloped and non-enveloped viruses in the laboratory (23, 25). In laboratory experiments, PVP-I mouth rinse lessened the viral count of SARS-CoV and MERS-CoV viruses noticeably (26, 27). In vitro, PVP-I mouthwash (1% w/v) was efficient against SARS-CoV-2, the virus that causes COVID-19, according to another study conducted recently (28).

In vitro, PVP-I gargle and mouthwash exhibited significant and quick virucidal action against SARS-CoV-2 within 15 seconds (29). In the COVID-19 crisis, previous research findings have suggested using this mouthwash prior to dental treatments to avoid the spread of disease (6). The Japanese Respiratory Society's advisory committee suggests that patients and healthcare professionals gargle with PVP-I four times daily to avoid hospital-acquired pneumonia (29). According to recent studies, using 0.23% PVP-I mouth rinse for no less than 15 seconds prior to procedures may considerably lower the salivary viral count (27). An in-vitro study concluded that preprocedural rinsing with diluted PVP-I in the range of 0.5% to 1.5% for 15 seconds showed complete viral inactivation over hydrogen peroxide against the SARS-CoV-2 virus (30). Because incidents of aspiration pneumonia have been published, caution should be exercised when addressing unconscious patients; therefore, only a limited volume is suggested. Secondly, it should be noted that PVP-I is not advised for pregnant women, patients currently experiencing radiotherapy, and those with thyroid disease (31).

Chlorhexidine (CHX)

Chlorhexidine (CHX) is a conventional mouthwash that is used all over the world (32). It has a variety of antimicrobial impacts. When tested on various oral bacteria, including gram-positive and gram-negative, aerobic and anaerobic organisms, previous studies found that CHX is the most effective (33-35). It is employed in dentistry to manage periodontal disease and minimize dental plaque (36). It is a routine procedure to use CHX prior to dental procedures that decrease oral microorganisms (37). Adverse effects may include staining of the teeth, creation of super-gingival calculus, and alteration of taste (34). An in vitro trial shows that CHX has efficacy against a number of viral loads, including enveloped viruses, after exposure of five minutes (38). In addition, regarding the effectiveness of CHX in lowering the coronavirus family of viruses, it was advised that patients not undergo any dental treatment before its use (39). Certain research on certain enveloped viruses has shown that different concentrations of CHX destroy the viruses (40). New research findings concluded that CHX was not as effective as PVP-I in abolishing COVID-19 before dental treatment (6). After using 15 ml of 0.12% CHX for 30 seconds, SARS-CoV-2 was suppressed for two hours, implying that its use could be effective in the control of COVID-19 spread (13). However, there is limited evidence that CHX is efficient against coronaviruses.

Hydrogen peroxide (H_2O_2)

For more than 70 years, H_2O_2 has been utilized in dentistry, either alone or in conjunction with salts (41). It's an odorless, clear, and colorless liquid substance that serves as a mouthwash (42). In vitro research revealed that 3% H_2O_2 efficiently inactivated various types of viruses within 30 minutes, such as influenza, respiratory syncytial virus, and coronavirus. Coronaviruses and influenza viruses were extremely susceptible (43). Inactivation of coronaviruses (e.g., SARS, MERS) is possible with H_2O_2 concentrations as low as 0.5%

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within one minute on non-living surfaces (44). Many viruses, including swine flu, rubella, rabies, and many others, are reported to be susceptible to H_2O_2 (45). Because SARS-CoV2 is susceptible to oxidation, pre-procedural mouthwash comprising oxidizing agents such as 1% H_2O_2 has been recommended as a way to limit the viral load in the saliva (6). In contrast to PVP-I oral antiseptic rinse, pre-procedural rinsing with H_2O_2 for 15 seconds and 30 seconds at concentration levels of 1.5% and 3.0% showed limited antiviral activity (30).

SUMMARY / SONUÇ

Despite the drawbacks of this concise review and the inadequacy of clinical evidence, we recommend the utilization of pre-procedural mouth rinses in dental procedures to reduce the SARS-CoV-2 viral load and lower the threat of cross-infection while dealing with patients during the COVID-19 outbreak. Antiseptic mouth rinses must be evaluated in clinical trials with control respondents to determine their effectiveness against SARS-CoV-2. A lot of studies are required to evaluate the potential of mouthwash against SARS-CoV-2.

Acknowledgements / Teşekkür

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