

Oral self-test for HIV virus detection: Update in Dentistry

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Dear Editor,

Acquired Immunodeficiency Syndrome (AIDS) remains an important public health problem worldwide.¹ HIV infection is one of the few incurable diseases nowadays thus leading to costly public expenses for its diagnosis, prevention, and control.^{1,2}

According to the Centers for Disease Control and Prevention of the United States, in 2017, 1 in 8 individuals were unaware of their HIV infection condition.² In Brazil, according to the Ministry of Health, 866,000 people are estimated to live with HIV, considering, in 2018, 17.8 cases/100,000 inhabitants as the detection rate and 4.4 deaths/100,000 inhabitants as the mortality rate.³

The precise diagnosis of this disease is fundamental, as well as raising awareness among infected patients to avoid the virus transmission and allow treatment to be performed in a timely manner. The most recognized and well-known method is the blood test. However, this test causes discomfort to the patient due to its invasiveness, besides relying on a specialized technique for collection. New detection methods have thus been gaining prominence, such as rapid testing using saliva, which is less invasive and enables the individualization of treatment, providing personalized and humanized care.⁴

Given the importance and relevance of this subject, this letter aims to divulge this new test and show its importance, as well as factors to be improved regarding this type of diagnosis.

The literature used was obtained by researching the subject in the following databases: PubMed, the CAPES's portal for journals, Medline, BBO, LILACS, and Scielo. For this, keywords such as "HIV", "Saliva", "Anti-HIV Antibodies", and "HIV Infections" were used in both Portuguese and English. The inclusion criteria were articles published online, covering, primarily, the period between

2012 and 2019, in Portuguese, Spanish, and English, and that addressed issues related to the topic of this study.

This rapid test measures HIV antibodies using saliva,⁵ and can be applied by the patient himself.⁶ This test uses the polymerase chain reaction to amplify the signal of HIV antigens marked with DNA molecules and linked to the HIV antibodies, which are present in the saliva of infected individuals.⁷

Compared to the conventional blood testing, studies report that the HIV rapid test performed using saliva presents high specificity (above 99.9%) and sensitivity (above 93%), for imported kits and those produced in Brazil.^{8,11} This test is a useful screening tool capable of showing results in up to 20 minutes (Figure 1),¹² which allows the result of this test before conventional testing through blood test. Furthermore, this test can detect HIV antibodies in a short period after exposure to the virus, in about 3 weeks,¹³ thanks to lower levels of viral antibodies in saliva when compared to blood.⁷

In a survey of young Africans,⁶ approximately 30% of blood tests for HIV diagnosis have an invalid result and only 5% of saliva-based tests presented this result. This indicates a promising aspect of HIV rapid tests using saliva as a medium.

The rapid test also has the potential to address socio-structural barriers associated with testing, including matters regarding confidentiality and access to medical care.¹⁵ The acceptability of the rapid saliva test is higher when compared to the old blood test (Table 1).^{6,16} Thus, it is essential to improve this test and reduce the number of undiagnosed HIV cases.

Several studies have already been performed to assess saliva biomarkers in HIV patients, such as nitric oxide detection,¹⁷ antioxidants,¹⁸ decrease of salivary pH, and buffer capacity.¹⁹ The future scope of biomarker research

is the investigation of CD4 levels in saliva, which may help in the early diagnosis of immunodeficiency syndrome.²⁰

Expanding this HIV testing reality into the dental context could result in a great benefit, while allowing the expansion of the number of people aware of their HIV infection and patients to start their treatment sooner.¹⁰ Furthermore, dentists are crucial in early detection of oral lesions that may occur during the course of HIV infection, e.g., candidiasis, hairy leukoplakia, linear gingival erythema, necrotizing gingivitis and periodontitis, Kaposi's sarcoma, and non-Hodgkin lymphoma.^{20,21}

Although we realize that much has already been discovered on this subject, there is still much to be explored when considering the diagnosis and prevention context of this disease – one that continues to affect thousands of people in Brazil and worldwide. We believe that the rapid oral HIV self-test using saliva has great potential to facilitate the diagnosis and allow the treatment of HIV-infected patients. Thus, this test can improve public health aspects related to HIV/AIDS, besides positively influencing the quality of life of HIV-positive patients.

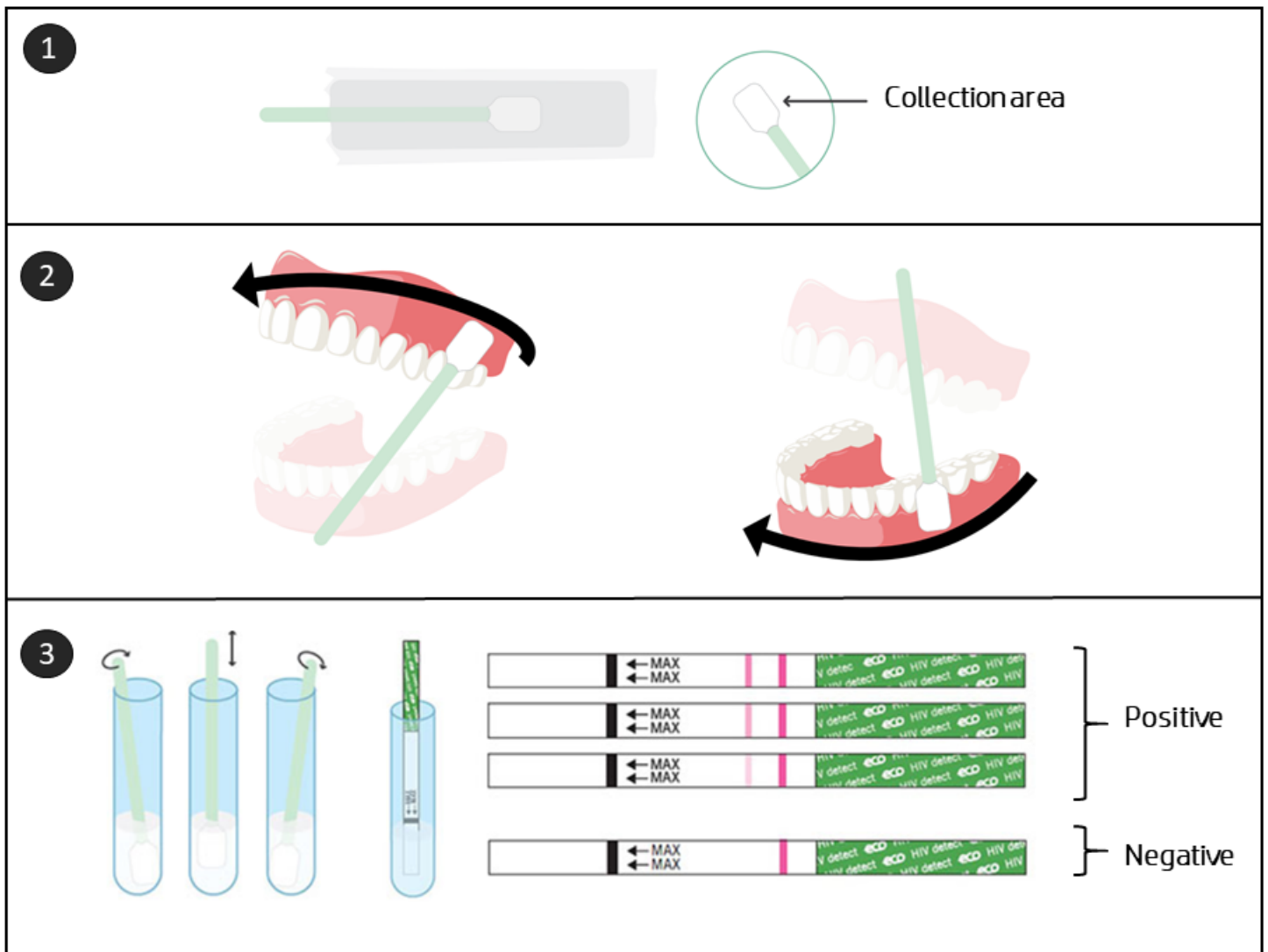


Figure 1. Standard collection scheme for oral HIV self-test (*Adapted from the Manual HIV Detect Oral *Autoteste em Saliva*¹⁴)

Caption:

- 1) Remove the swab from the packaging;
- 2) Gently apply the swab over the upper vestibular gum for 30 seconds, repeat the process in the lower vestibular gum;
- 3) Place the swab in the tube with the diluent solution and gently mix for 45 seconds. Remove the swab and insert the test strip into the tube containing the sample mixed with the diluent solution according to the image.

Table 1. Advantages and disadvantages of oral self-testing for HIV detection

Advantages ^{4,8}	Disadvantages ^{9,10}
<ul style="list-style-type: none"> • Privacy • Lower cost • Easy to handle • Reduced venipuncture stress • Less likely to transmit diseases • Simplicity of technique • Increases test capture and frequency • Possibility of early diagnosis 	<ul style="list-style-type: none"> • Possibility of mistake in the patient’s technique • Lack of patient’s emotional preparation to receive the result

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Mini Curriculum and Author’s Contribution

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