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Human Immunodeficiency Virus and Repercussions in Dental Medicine: Narrative Review

Universidade Fernando Pessoa

Faculdade de Ciências de saúde

Mestrado Integrado em Medicina Dentária

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"Trabalho apresentado à Faculdade de Ciências de Saúde da Universidade Fernando Pessoa, como parte dos requisitos para a obtenção do Grau de Mestre em Medicina Dentária."

Zakaria Assila

RESUMO

Nos anos que se seguiram ao início da infeção por VIH, o foco foi a investigação terapêutica. Desde a introdução da terapia anti-retroviral em 1996, a mortalidade e morbilidade relacionadas com o VIH caíram drasticamente. Contudo, a epidemia permanece muito ativa, o que demonstra a necessidade de uma mudança de paradigma em termos de testes e prevenção.

Os cuidados de saúde orais estão entre as mais importantes necessidades não satisfeitas das pessoas que vivem com VIH/SIDA, podendo dever-se às barreiras que enfrentam no acesso aos cuidados de saúde, tais como o estigma e o medo de discriminação. As pessoas que vivem com o VIH têm de facto relatado experiências negativas em consultórios dentários e com pessoal dentário. No entanto, há uma falta de estudos recentes e aprofundados que captem as perspectivas atuais das pessoas que vivem com VIH no que diz respeito ao acesso aos serviços dentários.

Apesar dos avanços em quase todas as áreas de investigação do VIH e da SIDA, a doença é ainda mal compreendida.

As lesões orais são comuns e variadas nas pessoas infectadas por VIH e estão entre os primeiros sintomas da infeção. Além disso, candidíase, leucoplasia pilosa oral, sarcoma de Kaposi afetam fortemente o prognóstico da progressão da infeção.

Palavras-chave: VIH; Manifestação Oral; Tratamentos

ABSTRACT

In the years following the onset of HIV infection, the focus was on therapeutic research. Since the introduction of the antiretroviral therapy in 1996, HIV-related mortality and morbidity have fallen sharply. However, the epidemic remains very active, demonstrating the need for a paradigm shift in terms of testing and prevention.

Oral health care is among the most important unmet needs of people living with HIV/AIDS, which may be due to the barriers they face in accessing health care, such as stigma and fear of discrimination. People living with HIV have indeed reported negative experiences in dental offices and with dental staff. However, there is a lack of recent, in-depth studies that capture the current perspectives of people living with HIV regarding access to dental services.

Despite advances in almost all areas of HIV and AIDS research, the disease is still poorly understood.

Oral lesions are common and diverse in HIV-infected individuals and are among the first symptoms of infection. In addition, candidiasis, oral hairy leukoplakia, Kaposi's sarcoma strongly affect the prognosis of the progression of the infection.

Keywords : HIV; Oral Manifestations; Treatments

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I write these words with my eyes filled with tears, I don't know if heaven hears my prayers, but as I write these words, my dearest wish is that you can still be among us to see the result of my work. I wish I could see the pride in your eyes, I wish I could hold you in my arms and hear you say that you will always be with me. I beg you to stay a little longer, we need you here.

As long as there is life, there is hope. I will always be your son and you will always be my mom. Forever. *« On arrête pas le cheval au milieu de la rivière. »*

Words are weak to tell you how much I love you.

To Salomé and Jade who did me the honour of sharing my pains, my falls and my difficulties of these last two years, and whose enthusiasm equals their efficiency at the task.

To Sarah for her generosity and support.

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LIST OF ABREVIATIONS

HIV - Human Immunodeficiency Virus

AIDS - Acquired Immunodeficiency Syndrome

HAART - Highly Active Antiretroviral Therapy

ART - Antiretroviral Therapy

UNAIDS - Joint United Nation Programme on HIV/AIDS

CD - Cluster of Differentiation

PHI - Primary HIV infection

PTC - Post-Treatment Control

OC - Oral Candidiasis

KS - Kaposi's Sarcoma

HSV – Herpes Simplex Virus

OHL - Oral Hairy Leukoplakia

LGE - Linear Gingival Erythema

NUG - Necrotizing Ulcerative Gingivitis

NUP - Necrotizing Ulcerative Periodontitis

PLWHA - People living with HIV/AIDS

I - INTRODUCTION

The Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS) pandemic has become a human and social disaster, particularly in resource limited settings. Oral health is an important component of the overall health status in HIV infection and essential component of the quality of life (Bajpai & Pazare, 2010; Petersen, 2006). HIV related oral abnormalities occur in 30 to 80% of the affected patient population (Reznik, 2006).

Five million people worldwide are infected with HIV every year, and globally, the number will continue to increase unless more effective measures are taken to prevent new infections. In the United States, this number has stabilized since the late 1990s at approximately 40,000 cases per year (Nokta, 2008).

With the advent of highly active antiretroviral therapy (HAART) and better management of HIV disease, the incidence of some of the oral complications of HIV infection has decreased, and others have not changed (Nokta, 2008).

HIV stigma persists within healthcare settings, including dental settings, manifesting itself in myriad, intersecting ways, and has been shown to be damaging in the healthcare setting (Yuvaraj et al., 2020).

1. Materials and Methods

This work consists of a narrative review on The Human Immunodeficiency Virus and its repercussions on dentistry, addressing the different social, professional and medical consequences of HIV. For the search, articles were collected from the PubMed databases.

The keywords used in the search, in English languages were: HIV; Oral Manifestations; Treatments.

Priority was given to articles published between 2000 and 2022, but also to publications published earlier, as long as they were considered relevant to the research. Thus, 24 papers were selected and used for this academic work.

II- DEVELOPMENT

1. The Human Immunodeficiency Virus

a. Definition

HIV is transmitted by exposure to HIV-infected body fluids or tissues through unprotected sex, re-using drug-injecting equipment and vertical transmission from mother-to-child (Kelly, 2009; Centers for Disease Control and Prevention, 2010).

HIV is present in saliva however it is not considered a risk factor for transmission since it is present in low levels and, also due to the existence of endogenous antiviral factors in saliva (Bolscher et al., 2002; McNeely et al., 1995). There is no evidence that HIV can be transmitted through contact with tears, sweat, urine or faeces (McLean et al., 2012).

b. Global Epidemiology of HIV

HIV-1 remains a global health problem of unprecedented dimensions. Since the recognition of AIDS in 1981 and the discovery of HIV as the causative agent in 1983, 60 million people have become infected with this virus, 25 million of whom have died (Gottlieb et al., 1981; Barre-Sinoussi et al., 1983; UNAIDS, 2010). Although the percentage of people living with HIV globally has stabilised since 2000, the overall number of people infected with HIV has steadily increased to an estimated 33.3 million in 2009 (UNAIDS, 2010).

Globally, 20% of people living with HIV are unaware of their status. Out of the 37.9 million PLWHA, only 23.3 million are accessing HIV medications (Santella, 2020). The number of deaths from AIDS-related illnesses among PLWHA has decreased from 1.7 million (2004) to 770,000 (2018) (Santella, 2020).

Additionally, new infections have also decreased from 2.9 million (1997) to 1.7 million (2018) (Santella, 2020). More than half of new infections are among key populations (men who have sex with men, people who inject drugs, transgender individuals, sex workers) and their sexual partners (Santella, 2020). The global incidence-prevalence

ratio, which indicates the epidemic transition, has gone from 11.2% (2000) to 4.6% (2018). Thus, we are not on track to end the AIDS epidemic by 2030 (Santella, 2020).

2. Impact of HIV on Healthcare Professionals and Their Patients

a. Role of the Dentist

HIV is a systemic infectious disease that dental healthcare professionals can help to identify with the goal of improving health outcomes, addressing health disparities and improving quality and quantity of life (Reznik et al., 2016).

Dentists should not underestimate the contribution they can make in the diagnosis of HIV by identifying its oral manifestations. Due to the complexity of HIV infection and its associated complications, a team approach to the management of HIV is ideal, with dentists as important contributors to this multidisciplinary approach (McLean et al., 2012).

Further, HIV screening using saliva seems well-suited to the dental setting, perhaps more easily integrated into practice (at least procedurally) than in many other settings. Also, given that expanding the reach of HIV services is a core goal of global HIV/AIDS campaigns, dental care providers offer an opportunity to reach individuals who seek dental care but no other health-related services (Riddle, 2020). Some dental care providers are already playing active roles in HIV services, particularly in utilizing rapid HIV tests in oral health settings. Recent research, policies, and practice guidelines offer promising models for providers interested in joining the national and global efforts to end the HIV epidemic (Riddle, 2020).

Rapid HIV screening works by seizing either antibodies or antigen on a surface and then attaching molecules to them that are made visible for individuals or clinicians to see. This process occurs in approximately 20 minutes. All rapid screening tests have what is known as a window period, that is the time during which infection is undetectable. Most recent fourth generation rapid tests have a window period of one month. When test results are read, they can be found to be reactive (that is, preliminary positive) or negative (Santella et al., 2016).

All reactive test results should be followed by a confirmatory test. This confirmatory test is also known as a Western blot test and detects HIV antibodies in the blood sample. There are nine rapid HIV tests available in the United Kingdom. All manufacturers report sensitivity (true positive rate) and specificity (true negative rate) above 99% (Santella et al., 2016).

b. Ethics and Discrimination

The emergence of the HIV pandemic has challenged the ethics of all health care professions. The gravity, infectious nature and social stigma of the illness has led to a range of ethical dilemmas in management and research into oral and dental care (Shirlaw et al., 2002).

All healthcare professionals are bound by legislation that makes it illegal to discriminate on the basis of HIV status. HIV is covered by both Commonwealth and state/territory legislation. The Commonwealth Disability Discrimination Act not only protects people living with HIV, but also people believed to have HIV and people who associate with people living with HIV or believed to be HIV-infected (McLean et al., 2012).

Race, color, creed, sexual identity and culture should not impinge on treatment planning (Rule & Veatch, 2004). It is unethical to refuse to treat patients based on their HIV status alone. Oral Health Care Worker are not expected to provide treatment beyond their areas of expertise and referrals are appropriate as long they are not pretexts for discrimination or a refusal to treat (Shirlaw et al., 2002).

Notably HIV Futures 6 surveyed over 1000 HIV positive individuals and found 26% had experienced less favorable treatment from their health services and 10% had experienced discrimination due to their HIV status (Grierson et al., 2009). Thus, HIV service organizations advise HIV positive individuals to 'think carefully' before disclosing HIV status to dental professionals (McLean et al., 2012).

Therefore, dental education programs at all levels should give consideration to interventions to address attitudes and potential biases of dental graduates. Many of the people living with HIV have unmet dental needs but are reluctant to seek treatment due to concerns over discrimination and lack of confidentiality (Patton et al., 2003; Singer et al., 2012).

c. Assessment of Occupational Risk Transmission

To prevent the hazard of disease transmission, a variety of infection control techniques or processes are used. The strategies need to be rehearsed, used routinely for every patient, audited, and the audits need to be reviewed and the results shared, in order to improve or maintain prevailing standards (Reznik et al., 2016).

A medical history may alert the team of a potential risk. However, by instituting standard infection control with barrier protection, effective sterilization techniques, and safety devices for needle, it is possible to greatly reduced the risk. In the case of HIV disease transmission in the medical setting, postexposure prophylaxis has proven to be another important tool for reducing the clinician risk (Reznik et al., 2016).

d. Psychological Impact

Research has addressed some of the concerns raised by dental care providers. Regarding concerns about offending patients by addressing HIV, one study surveyed a national representative sample of 600 dental patients at urban clinics where free HIV screening was offered (Bradley et al., 2018). Among surveyed patients, 85% evaluated HIV screening in the dental setting as acceptable, citing the main reasons for screening as wanting to know their status, and having a free HIV test available.

Another survey of patients reported that a majority were willing for the dentist to screen for a variety of medical conditions, including HIV (Greenberg et al., 2012).

3. Therapeutic Aspects

a. Prevention

Today, knowing one's HIV status can significantly improve an individual's well-being. In increasing numbers of countries, communities and subgroups, HIV-positive adults who are aware of their serostatus can receive prophylactic care for opportunistic infections as well as antiretroviral treatment, protect their unborn children from infection, and plan for their children's long-term well-being (Al–Harthi et al., 2000;

Volberding, 1999). If antiretrovirals are accessed and adhered to, the health of a person living with HIV is likely to improve and their lowered viral load can further decrease transmission (Pedraza et al., 1999; Quinn et al., 2000).

b. Mother-To-Child-Transmission

Prevention of mother-to-child transmission has seen advances in both industrialized and resource-constrained settings (Luzuriaga & Sullivan, 2005; McIntyre, 2006; Newell, 2006). Intrapartum transmission has been reduced by increasing access to interventions such as one dose of nevirapine to mother and newborn baby (Simon, Ho & Abdool Karim, 2006).

Concerns about drug-resistant viral strains have led to several trials with combined treatments to reduce transmission during the intrapartum period (Chaix et al., 2006; McIntyre, 2006; Cressey et al., 2005). In some settings, elective delivery by caesarean section can further reduce HIV-1 transmission during the intrapartum period, but the benefits of the intervention could be countered by post-partum sepsis and increasing maternal mortality (Read & Newell, 2005).

c. Sexual Transmission

Reduction of heterosexual transmission is crucial for control of the epidemic in many parts of the world (UNAIDS, 2006; Chan, 2005). Prevention is achieved through reduction in the number of discordant sexual acts or reduction of the probability of HIV-1 transmission in discordant sexual acts. The first can be achieved through abstinence and sex between concordantly seronegative individuals. Abstinence and lifelong monogamous relationships might not be adequate solutions for many people and therefore several interventions aiming at lowering the risk of transmission per discordant sexual act are in the process of clinical testing. Male and female condoms provide a proven and affordable prevention option (De Vincenzi, 1994; Weller & Davis, 2002). In combination, these options are also more commonly referred to as the ABC (abstinence, be faithful, condom use) approach (Simon, Ho & Abdool Karim, 2006).

d. Treatment

The current standard of care is to treat people with HIV infection with antiretroviral therapy (ART) as soon as feasible, both to improve their own health and to reduce their risk of HIV transmission to others. Standard initial treatment today consists of a three-drug oral daily regimen composed of two nucleoside analogue reverse transcriptase inhibitors in combination with a third drug, either an integrase inhibitor, a non-nucleoside reverse transcriptase inhibitor or a protease inhibitor (Phanuphak & Gulick, 2020).

The key goals of ART are to:

- Achieve and maintain suppression of plasma viremia to less than the current assay's level of detection
- Improve overall immune function as demonstrated by increases in Cluster of Differentiation (CD) 41 T-cell count
- Prolong survival
- Reduce HIV-associated morbidity
- Improve overall quality of life
- Reduce risk of transmission of HIV to others

To achieve these goals, the clinicians and patients must recognize several key principles:

- Current antiretroviral regimens do not eradicate HIV; viral rebound occurs rapidly after treatment discontinuation, followed by CD4 decline, with potential for disease progression.
- Strict adherence to the prescribed regimen is essential in order to avoid viral rebound and the potential for selection of drug resistance mutations.
  (Pau & George, 2014)

e. Post-Treatment

Recent years have seen reports of individuals living with HIV who are able to control viral replication after stopping ART. Whereas spontaneous 'elite controllers' who maintain undetectable viraemia have been recognized from early in the HIV epidemic, such ART-induced control is a relatively new and unexpected phenotype. Described as post-treatment control (PTC), it appears to be more frequent than spontaneous control in

untreated individuals and is particularly associated with ART initiation during primary HIV infection (PHI). Of particular interest in the development of HIV cure strategies, understanding the mechanisms driving PTC may inform interventions to induce long-term virological remission (Martin & Frater, 2018).

Currently available oral antiretroviral regimens are extremely potent at providing viral suppression and restoring the prospect of relatively normal lives with minimal toxicity and the simplicity of once daily single-tablet dosing. Other regimens or routes of delivery, for example weekly oral or long-acting parenterally administered agents, whether combined with small molecules or antibodies or both, may be useful for treatment in circumstances where daily oral therapies are difficult to administer, and when adherence may be deficient (Jacobson & Flexner, 2017).

f. Oral conditions associated with HIV treatment

HIV medications can cause a taste disturbance. Dry lips are associated with HIV treatment, particularly the protease inhibitor, indinavir. The cracking and crusting of the lips can be extremely uncomfortable and unaesthetic. Protective creams designed for use on the lips, such as papaya-based lip ointments can be helpful in alleviating this condition (McLean et al., 2012).

Other conditions associated with HIV treatment include xerostomia, oral ulceration, erythema multiforme (Stevens–Johnson syndrome), lichenoid reactions and hyperpigmentation. There is the potential that many drugs prescribed by dentists may interact with cART, therefore medications should always be prescribed in consultation with the patient's medical practitioner(s) (McLean et al., 2012).

4. Oral Manifestations

Oral candidiasis (OC) is a frequent oral manifestation of HIV infection. OC can be used as a prognosis marker for HIV infection and occurs as a pseudomembranous, erythematous or rarely hyperplastic variant. Angular cheilitis is also seen. *C. albicans* is

frequently isolated but other species such as *C. krusei* and *C. dublienensis* are emerging. Resistance against fluconazole is common (Reichart, 2003).

Bacterial oral infections are comparatively rare and are predominantly localized to the gingiva and periodontium. Linear gingival erythema (LGE), necrotizing ulcerative gingivitis (NUG) and necrotizing ulcerative periodontitis (NUP) have been described in HIV-infected patients (Reichart, 2003).

Initially, these diseases were considered specific for HIV infection. In recent years, however, it has become apparent that gingivitis and periodontitis in HIV-infected patients do not differ from those in immunocompetent individuals. AIDS-associated Kaposi's sarcoma (KS) predominantly occurs at the palate, the gingiva and the dorsum of the tongue (Reichart, 2003).

Histopathologically, oral KS is identical to classical KS. Oral KS has been treated surgically, using laser, radiotherapy and intralesional injections with chemo and immunotherapy. After introduction of HAART oral manifestations, such as OC, gingivo-periodontitis and KS are rarely seen (Reichart, 2003).

a. Candidiasis

Caused primarily by *C. albicans*, it is the most frequent oral manifestation. Although not being, by itself, pathognomonic of AIDS, OC may be an indication of immunosuppression and disease progression (Hirata, 2015).

b. Angular Cheilitis

Mixed infection involving *C. albicans* and *Staphylococcus aureus*, manifests itself as red cracks with origin from the labial commissure of the mouth, and may be present along with intraoral candidiasis. The concomitant occurrence of dry mouth is not an uncommon cofinding (Hirata, 2015).

The treatment of OC includes topical and systemic antifungal medication. Topical therapies include topical antifungal mouthwash, tablets and oral gel. These formulations should be used concomitantly with systemic drugs, especially in cases of esophageal candidiasis. Topical antifungal therapies are more effective in patients with CD4 counts over 150-200 cells/mm^3. Common topical treatments are nystatin oral suspension (100,000 units/mL), nystatin tablets, and oral gel, for example, miconazole and

clotrimazole 1%. The most common systemic antifungal agents are fluconazole (150-mg tablets) and itraconazole 100 mg. Resistance to fluconazole was reported as occurring in patients with severe immune deficiency. Treatments of fluconazole-resistant patients with a combination of fluconazole and terbinafine have been successful (Hirata, 2015).

c. Oral Hairy Leukoplakia

Oral Hairy Leukoplakia (OHL) is viral in origin and is associated with the Epstein-Barr virus. It presents on the lateral border of the tongue as white, hyperkeratotic, vertical stripes that are not removable when rubbed. OHL is often an early indication of HIV, and it is strongly related to immunosuppression and HIV disease. It is in most cases a symptom-free lesion that rarely requires treatment (Gennaro et al., 2008).

d. Kaposi's Sarcoma

Kaposi's Sarcoma (KS) is still one of the most common malignancies in patients with HIV infection. In 1981, the simultaneous occurrence with *Pneumocystis* pneumonias in young men who have sex with men led to the first descriptions of the AIDS. This entity is named after the Hungarian dermatologist Moritz Kaposi who first described the 'classical' KS in 1872 (Hoffmann et al., 2017).

In contrast to the classical KS, the HIV-associated KS may affect the whole skin and mucous membranes. Lymph nodes and internal organs such as stomach, gut, lung, or liver may also be involved. The progression of the disease is highly variable and reaches from small lesions that remain stable for many years to extremely aggressive courses, in which progression may lead to death within a few months (Hoffmann et al., 2017).

e. Herpes Simplex Virus

In general, the presence of intraoral lesions by Herpes Simplex Virus (HSV) is the result of the reactivation of a latent virus, and among immunocompromised individuals, this condition can be more severe, with a diverse manifestation. Although ulcers caused by HSV-1 and HSV-2 are clinically indistinguishable, in the oral cavity, HSV manifest in the form of vesicles with ulceration, with subsequent healing. These are small, shallow ulcers, and tend to be healed in 7-10 days, although this period may be extended in immunocompromised patients. Patients may present clinical signs and symptoms that

resemble those of PHI, such as malaise and an intensely painful cervical lymphadenopathy. Differential diagnosis should include other viral infections, such as cytomegalovirus, varicella zoster, and aphthous ulcers (Hirata, 2015).

f. HIV-associated Periodontal diseases

Since Winkler and Murray first described HIV-associated periodontal disease, several reports have focused on variants of gingivitis and periodontitis in HIV disease and AIDS. Gingivo-periodontal disorders have been variably defined, but can be classified as (Reichart, 2003):

1. linear gingival erythema (LGE; formally HIV-associated gingivitis)
2. necrotizing ulcerative gingivitis (NUG)
3. necrotizing ulcerative periodontitis (NUP; formally HIV-associated periodontitis)
   (Reichart, 2003).

g. Parotid Enlargement

Parotid enlargement has been recognized as a distinct feature of HIV infection in children since the first descriptions of the disease. This manifestation has been reported in 10 to 30% of children with symptomatic HIV infection. The presence of parotitis is a predictor of positive prognosis and long-term survival in HIV-infected children. Typically, the parotid glands are diffusely swollen and firm without evidence of inflammation or tenderness. The swelling is chronic with unilateral or bilateral involvement and is occasionally accompanied by dry mouth. Parotid enlargement can also be seen in adult HIV disease (Naidoo & Chikte, 2004). Treatment is symptomatic (e.g., treatment of dry mouth) with over-the-counter topical fluoride treatments (Reichart, 2003).

III- DISCUSSION

A consensus meeting of experts (ADA, 1994 *Cit in* Shirlaw and al, 2002) stated that it was both safe and desirable to make regular dental care available to HIV-positive patients (Shirlaw et al., 2002).

The consensus guidelines also advocated a preventive approach for the HIV-positive patient:

- Optimize oral hygiene
- Establish regular review periods
- Screen for HIV-related oral lesions and treat if necessary
- Screen for xerostomia as a possible symptom of HIV or as side-effect of HAART

By the third Oral AIDS Workshop (in London in 1996) many national dental associations had adopted guidelines advising dentists that a patient living with HIV could be safely treated in general practice, provided that universal infection control was observed. Some countries embodied this principle in their legislation and made discrimination against an HIV-positive patient an offence. A review of the literature published since 1996 supports the earlier views. There are reports in the literature of delayed healing following extractions (Robinson et al., 1992; Asseri et al., 1997; Dobson 1997 *Cit in* Shirlaw et al., 2002); poor response to periodontal treatment (Robinson, 1992; Glick et al., 1994 *Cit in* Shirlaw et al., 2002); and endodontic failures (Cooper, 1993; Glick 1994 *Cit in* Shirlaw et al., 2002).

As the incidence of these suboptimal results in HIV-positive patients is not significantly greater than in the general population, HIV status alone would not be grounds to modify treatment. All the problems that arose responded to subsequent remedial treatment.

Concerns about local anesthetic competing with a patient's HAART medications for breakdown in the liver remain a hypothetical consideration. The benefit of effective pain control would seem to justify the minimal risk of toxicity (Shirlaw et al., 2002).

Over the last 15 years the profile of this patient population has evolved from the chronically sick, frequently dying from their disease to the present mix of long-term survivors and the chronically well. Access to HAART means that many HIV-positive patients now present with a functional immune system and a viral load that is

undetectable. Dental care for these patients requires no particular modification. In poor communities where HAART is unavailable and laboratory tests infrequent, the dentist may not know how ill the HIV-positive patient is. A blood analysis can assist in planning treatment. In its absence, generally the more ill the patient, the more likely the need for one of the modifications listed in Table 1.

Treatment can be prioritized thus:

- Relieve pain and treat infection
- Restore function
- Prevent further disease
- Consider aesthetics

Individual national resources dictate that every country develops its own response to HIV, while the dental professional has an obligation to shape and assist with that response at a local level (Shirlaw et al., 2002).

Balancing the dental health needs of patients against any residual personal fear within the dental team must consider the lessons learned from the AIDS pandemic. Keeping abreast of the latest information to base decision-making on factual information instead of emotionally based opinion is a logical way to optimize clinical outcomes.

The dental doctor needs to feel confident that standard precautions are sufficient to prevent occupational exposure and transmission. For instance, in the case of Ebola the current standard precautions adopted in the dental setting would not be adequate and the wider implications for the community have first to be addressed by isolation of the patient and quarantine before a team trained in the provision of treatment in high-risk situations can address any non-systemic health issues.

Understanding the systemic implications of any new disease and potential consequences to oral health and disease are also vital to produce positive treatment outcomes. Educational efforts need to keep pace with developments to ensure that the health needs of the population are catered for with a timely, morally sound, evidence-based approach.

Willingness to treat PLWHA among dental healthcare workers has improved in the recent past, but the attitude varies greatly by region and country. Even though the risk of

needle stick transmission of HIV infection in dental setting is extremely low (less than 0.3%), the transmission risk is influenced by various factors like the presence or absence of blood on the needle, type of infectious agent, depth of needle penetration and susceptibility of the host. Transmission of any new infectious disease can only be prevented by following standard precautions that may have been modified to counter any novel aspects of transmission or increased virulence of the new disease. In the future, if any new infectious disease occurs it is important to update the knowledge about its occurrence and its clinical presentations along with improvement of the skills to safely attend such patients in the dental operatory (Reznik et al., 2016).

People with HIV infection are not required by law to disclose their HIV status to dentists, doctors or other healthcare professionals. HIV service organizations encourage people with HIV infection to consider disclosure when having a medical examination, treatment or procedure as there is the potential for HIV medication and related conditions to affect other treatments or therapies. However, services advise that such decisions must be made carefully given many people living with HIV have experienced stigma and discrimination from healthcare professionals following disclosure (McLean et al., 2012).

When a person discloses his or her HIV positive status, dentists and all other healthcare professionals have a broad duty under state, territory or federal privacy laws to ensure that confidentiality is maintained. That duty extends to the collection, storage and protection of health records. Dental practices should employ procedures to only grant access to information to those people who are authorized to have access, in order to use or disclose the information for the purpose for which it was collected. Of equal importance are security measures to prevent unauthorized access to the records and where practicable, procedures for storing the information in a way that the identity of the person is not readily apparent from the face of the record, e.g. by the use of identification codes. Procedures for destruction of the records to protect the privacy of the information, where the record is not to be retained, must also be in place (McLean et al., 2012).

Dental professionals can improve the quality of life of this population by treating oral infections and alleviating pain. However, dental professionals can have social and psychological anxieties that prevent them from providing clinical care. Some people

living with HIV have unmet dental needs as they are reluctant to seek treatment due to concerns over discrimination and lack of confidentiality.

Dental curriculum teaching should provide a sound scientific basis to ensure knowledge and understanding of HIV/AIDS and dental management and cross-infection control. Undergraduate education should also produce professionals capable of providing compassionate and competent care, and so teaching must challenge dental student's attitudes to reduce prejudicial behaviors (Coulthard et al., 2020).

IV. CONCLUSIONS

Although the science surrounding HIV has evolved tremendously over the last few decades, PLWHA still face persistent stigma and discrimination in various areas of their lives. In the area of dental health, unfortunately, there are still cases of discrimination in access to care, lack of knowledge about HIV and negative attitudes towards PLWHA. There is a fear of being discriminated against in accessing dental care, as well as discomfort with the issue of disclosure of HIV status to dental professionals.

Viruses currently constitute a significantly greater infectious risk for the dental profession than that posed by bacteria. Indeed, the danger lies mainly in the existence of chronically infected patients who excrete viral particles for months or years with or without clinical signs. In the present state of affairs, we can only sound the alarm because there is a lack of control of contamination in dental practices.

However, the respect of the universal precautions and the permanent education of the dental surgeon concerning the risk and the prevention of the viral infection remain the most effective strategy of prevention against the viral contamination. Not to mention considering all patients as potentially infected.

Although dentists are naturally reluctant to discuss sensitive issues such as sexuality with patients, it is nevertheless their professional responsibility to participate in the prevention and early detection of these pathologies with serious consequences.

The resurgence of sexually transmitted infection in recent years requires that the dental doctor be alerted and trained on this issue.

ANNEX

Table 1: Circumstances when routine dental treatment may need to be modified (Shirlaw et al., 2002).

Circumstances necessitating modification from the routine norm:

- Low CD4 lymphocyte levels predispose to oral lesions requiring specific treatment
- Reduced platelet levels below 60 000 cells mm^{-3} (normal 150 000–400 000) effect clotting time
- Reduced neutrophil levels below 500 cells mm^{-3} (normal 2500–7500) may require antibiotic prophylaxis
- Patients with late stage AIDS may require a rolling treatment plan with regular reviews of ability to attend and withstand treatment

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