

Case Report

Open Access

Risks and Complications in the Use of Oral Piercing - Clinical Cases Report

Dias D^{1,5}, Flores PCS¹, Hilgenberg SP^{1,2}, Pinto EPS², Kummer TR^{1,2}, Jitumori C³, Serpe L^{1,4}, Martins LD¹ and Kozlowski Jr VA^{1,5*}

¹Ponta Grossa State University, UEPG, Av. Carlos Cavalcanti, 4748, Ponta Grossa, Paraná, Brazil

²Centro Universitário de União da Vitória, UNIUV, Av. Bento Munhoz da Rocha Neto, 3856, União da Vitória, Paraná, Brazil

³Centro de Ensino Superior dos Campos Gerais, CESCAGE, Rua Tomazina, 730, Ponta Grossa, Paraná, Brazil

⁴Universidade Metropolitana de Blumenau, UNIASSELVI, Rua Doutor Pedro Zimmermann, 385, Blumenau, Santa Catarina, Brazil

⁵ACUBENS Research Laboratory, Biological and Health Sciences Division, Ponta Grossa State University, UEPG, Av. Carlos Cavalcanti, 4748, Ponta Grossa, Paraná, Brazil

ABSTRACT

Dental professionals must be prepared and up to date to support the patient when any negative effects resulting from the placement and use of an oral piercing are noticed. This effect can have consequences that directly or indirectly affect the patient's physical and psycho-emotional health, such as, for example, permanent plastic and aesthetic deformities. The dentist must also know how to deal with the freedom of thought and desire of those who choose the practice, justifying their own motives such as philosophical passions, prohibitive radicalisms and social/historical behaviors. Furthermore, the dentist must guide and monitor these patients in order to prevent unpleasant local and systemic consequences caused by the use of oral piercing, promoting the individual's health in an integrated way. With the clinical cases presented, it is important that dental professionals are prepared to treat patients when these undesirable consequences are diagnosed. However, the use of piercings is an individual option, which must be respected, and patient guidance must be provided as objectively as possible, to prevent negative consequences resulting from the use of the ornament. Therefore, professionals' concerns must be based not only on clarifying possible local damage, but also on systemic implications, improving the patient's general health status.

*Corresponding author

Kozlowski Jr VA, Ponta Grossa State University, UEPG, Av. Carlos Cavalcanti, 4748, Ponta Grossa, Paraná, Brazil.

Received: March 23, 2024; **Accepted:** March 26, 2024; **Published:** April 04, 2024

Keywords: Oral Piercing, Complications, Tongue Piercing, Labial Piercing, Risks, Gingival Recession, Periodontal Problems, Cancer, Corrosion

Introduction

Piercings, as they are known, are punctures made in the skin or mucosa with the aid of a sharp instrument that creates an opening through which the jewelry can be passed [1]. The use of body ornaments, historically, comes from ancient civilizations and represented values from many cultures, forming part of tribal, cultural and religious rites [2]. Currently, body decoration with the use of piercings is gaining more popularity, especially among teenagers, as this ornament is seen by them as a means of differentiating themselves, expressing their identity, confronting their family members or, simply, as a fashion that became a symbol of beauty [3,4].

As it presents an invasive procedure, the installation of a simple piercing can cause several inconveniences, which may be associated with injuries caused to tissues or the risks arising from negligence and lack of compliance with biosafety precepts, when installing the mouth piercing, which can also cause complications. immediate or delayed, local or systemic, such as edema, bleeding and risks of contamination and infection widespread [5,6].

In order to regulate piercing placement and reduce the dangers associated with its practice, laws governing the operation of ateliers that perform tattooing and placement of earrings and piercings have been made and discussed in different countries. A technical standard aims to facilitate government inspection in tattoo and piercing studios, provides for the conditions for the installation and operation of tattoo, placement establishments of piercing and the similars [7]. In this sense, knowledge on the part of the dental surgeon is important, to inform his patients about the possible risks and complications, as well as the removal of these ornaments. Consequently, the professional needs to have support from the scientific literature that help guide through any doubts before the people using piercing.

General and Specific Objectives

The objective of this work was to carry out a literature review on the risks and complications of using oral piercing with the aim of informing health professionals, especially dental surgeons, regarding the complications and risks that the practice of body piercing, specifically oral piercing may result. Clinical cases and the treatment stages in dental practice described in different situations, highlighting the importance of the dentist in alerting the piercing user about the risks. Show through knowledge the

importance and need for recommendations to be given to patients, given that the piercing can be placed in the bridles and brakes, protective periodontium, or in the tongue, which was directly related to the etiology of gingival retraction.

Brief Piercing History

Historically, the art and decoration of the body through body ornamentation is an ancient practice and was already present in ancient civilizations. It has existed throughout many cultures, often as a religious, cultural, tribal, sexual, political component, or as a caste norm of character identifying slaves. The first record was found in the figure of a dog in Ancient Egypt, approximately 1500 BC, where the navel was pierced as a sign of royalty. The ancient Mayans pierced their lips, tongue, nose and ears with the most expensive jewelry allowed as a sign of spirituality, virility and courage. The Romans used piercings in their nipples and people living in regions close to the South Pacific used piercings in their sexual organs [4]. The Eskimos and Aleuts in their culture practiced piercing the lower lip of teenagers, to symbolize the transition to adulthood through their attitudes and qualities to leave home.

It was also placed on the lips of newborn girls as an act of purification [8]. Even in the era of the Aztecs and Mayans, the highest castes of these people embellished their lips with gold work. The Mayans also developed techniques for creating and installing dental piercings. Using objects similar to manual drills, they created cavities in the tooth enamel that would be filled in the future with precious or semi-precious stones [2]. Chinese and Hindus pierced their lips, cheeks and tongue as religious symbolization. In southern India, the vow of silence was accompanied by piercing the tongue. Amazonian tribes perforated the labial region with pieces of wood due to cultural traditions [9].

African women from the Makolo tribe practiced lip adornment using plates called “Pelele” on their upper lips as a way of attracting the opposite sex. Indigenous peoples from Central and South America, including those from Brazil, wear lower lip piercings and enlarge the holes to place wooden plates [4]. A few decades ago, this practice resurfaced along with the fashion of the punk movement and has been used mainly by young people, regardless of social class, concerned as an approach to “body art” style [8]. The reasons that led ancient populations to use piercing do not differ from those that currently lead them to choose this practice. Therefore, identification with the group, fad or simply a way to attract attention appear as the main factors [4].

Concept and Justification

The search for an aesthetically perfect body is becoming increasingly valued, and one of the resources to achieve it are oral, perioral and body piercings. The word piercing comes from the English verb to pierce, which means to drill, to cross. Piercing consists of drilling some part of the body with the aim of inserting an object to serve as a body ornament in tissues such as ears (helix and earlobe), lips, tongue, nose, navel and genitals [10,11].

The modification of the external appearance is a universal human characteristic that includes both clothing, jewelry and other accessories, as well as “body art”, which includes piercings and tattoos [10,12]. The set of tattoos, piercings, scarifications and body marks came to be called “Body Art”, and it is a fashion that has gained spectacular popularity among young people in recent years. The meaning of body art normally responds to aesthetic

demands, but on certain occasions it exceeds the simple desire to improve one's image, other reasons being the search for identity, risk, boldness, rebellion, sexual pleasure and mental disorders that can lead someone to pierce very sensitive areas of the body [13].

Anthropologists describe the body art as a means of identifying a person as a member of a group, which may be religious, a tribe or gang, or even to denote financial or marital status, or even as a means of beautifying the body [1]. Although, there are many motivations of those who get tattoos or piercings, almost all of them coincide in some points, such as to display art, beauty and fashion on their own body; to express individuality, distinguishing oneself from other people; to express important values or experiences that occurred in your personal history; to test physical resistance, wanting to overcome one's own pain limit; to be part of groups; as a form of protest, against parents, authorities or society; spirituality and cultural tradition: belonging to cultures and ethnicities where these changes have meaning; sexual reasons: piercings in the genitals in order to increase sexual pleasure, or tattoos to express sexual orientation; or without a specific reason for simply acting on impulse.

Materials Used

Ornamental elements are often metallic based on nickel, silver, stainless steel, titanium and niobium, and may also contain precious stones, or they may be made with surgical materials and thermostable plastic polymers such as PTFE (polytetrafluoroethylene), wood or bone. The ideal would be to use hypoallergenic and non-toxic materials, preventing infections and allergies [1]. However, there is no 100% safe material, taking into account the list of harm caused by piercing. Other materials such as plastic (tygon), acrylic, stone, wood, bone, ivory or a combination of the above are used in an attempt to be compatible and not provoke toxic reactions. The use of silver, bronze, copper, gold platinum, chrome is avoided due to the possible allergic and toxic reactions that they may develop [8].

Titanium does not present great cytotoxicity and is highly resistant to corrosion in contact with organic fluids, such as saliva or blood, making it the material of choice for oral and perioral piercings. Analyzed titanium alloys demonstrated that they were biocompatible, as they did not present cytotoxicity. Furthermore, it has been found that these alloys are highly resistant to corrosion [14]. Stainless steel has demonstrated good biocompatibility and is the most used material in the manufacture of piercings, however it is prone to corrosion considering that its composition contains chromium and nickel, elements well known for their toxic, allergenic and even carcinogenic effects.

Types of Piercing

Basically there are three types of piercing, the labrette, consisting of a bar limited at one end by a sphere (or spear, or point) and at the other end by a flat, smooth disc, it is generally used on the lower lip. The barbell consists of a straight or curved bar, limited at the ends by two spheres, one of which is the closure of the adornment. It can be used on the tongue, on the lingual frenulum and more rarely on the uvula. When it is placed on the tongue, and at the time of perforation the size of the lingual bar is larger (should not be smaller than 20 mm), due to inflammation, after two weeks it can be changed to a bar of shorter length [15]. The rings consist of a circumferential bar with one or two spheres at its ends. Preferably it is used on the lips or on the side of the tongue.

Locations of Oral Piercings

Regarding the location of these ornaments, we can find them in different regions such as the ears, eyebrows, nose, peri-umbilical region, male and female genitalia. In the oral cavity, commonly used sites can be found on the tongue, lips, cheek, lingual frenulum and labial frenulum, and even the uvula. It is not uncommon to see rings, subcutaneous piercings and dental piercings. The lip button is a piercing that has two ends, one of which is located in the intraoral region, while the other is generally below the lower lip in an extraoral position.

The tongue is the most common location for oral piercing, and there can be two types of piercing: the midline, being a dorsoventral piercing; the second perforation in more lateral areas of the tongue, rings are generally used in this type of perforation. In median perforation, the translingual bar crosses the tongue, from the back to the belly, in order to expose its ends [4]. The second most common location is the lips, which can be pierced in multiple locations around the vermilion of the lips. Piercings in the form of rings are generally used. Cheek piercings are uncommon where labrettes are used; in this location, the buccal mucosa is pierced and is visible on the outside of the cheek. Lingual frenulum piercings, known as “web” piercings, are uncommon and are the most susceptible to trauma and bleeding. In the uvula, due to the dangerous position, some professionals are against doing it, as cases of airway obstruction and swallowing of the piercing piece may occur.

Laws Regulating the Application of Piercing

Piercing is most often done in specialized studios, by people without professional qualifications, known as Piercers, who are self-taught and are often unaware of human anatomy, the patient's systemic conditions and the correct sterilization and asepsis parameters. exposing the client to various infectious diseases such as tetanus, hepatitis, AIDS and herpes [16,17]. Piercing technicians are not licensed to use local anesthetics and are not authorized to prescribe post-operative medications, so complications such as pain, swelling and bleeding are common. These people involved in the installation of piercings also cannot perform corrective surgical procedures on problematic tattoos or piercings. If the piercer performs any of these procedures, he or she may be charged with illegal practice of medicine [18].

Some institutions, such as the American Dental Association and the American Academy of Pediatric Dentistry, in the United States, have taken a stance against the application of oral piercings, in an attempt to protect minors from the risks that may occur during the act and the complications of applying these ornaments. Some countries, with the aim of regulating and reducing health risks, have formulated laws. The European Commission (EC) wants Member States to produce specific legislation on piercings and tattoos, in order to minimize risks to health. There have been recommendations from the European Union since 2003, nonetheless, many countries continue to have no law regulating or allowing the activity to be monitored [19]. In Brazil, regulates the licensing and operation of ateliers that perform tattooing and placement of earrings, hoops, pins and piercings. Some states and municipalities already have laws to regulate and supervise piercing and tattoo establishments, which allows minors to have tattoos and piercings, as long as there is consent from their parents or guardians [19].

Specific legislation provides for the conditions for the installation and operation of tattoo, piercing and similar establishments like a

technical standard, trying to facilitate the inspection in tattoo and piercing studios. The government's idea is to force professionals in these ateliers to follow minimum hygiene standards and prevent attitudes that could put the health of customers at risk. Among other determinations, the resolution provides for penalties for studios that operate inside homes and for those who do not warn patrons about the risks involved in the process. In addition to determining the operating conditions of the studios, it also includes a guide attached so that inspectors can carry out inspections before granting the health license to the institution.

Among the rules that piercing studios must comply with are maintaining customer records, including parental authorization if they are minors; the use of disposable needles; warn, through posters that are easy to view and read, about the risks involved in the procedure, about the materials used and about the difficulties or impossibility of removing the piercings and tatoos; maintain hand hygiene before and after each procedure; have a trash bin with a lid and pedal for disposing of gloves, cotton and gauze; not maintain a link between the establishment and any residence; tattoo artists and piercing artists have received the hepatitis B vaccine; keep furniture clean and disinfected; do not indicate any type of medication; provide in writing to clients any special care and precautions required after the procedure. More radical procedures that are carried out in some studios in an improvised manner are also prohibited.

According to the Brazilian law, it is prohibited to perform body modifications that constitute a surgical procedure, such as tunneling, tongue bifurcation, implants, among others. The resolution also prohibits tattoos and piercings on minors under 18 without parental permission; tattoos on cartilaginous tissues, such as the nose and ears; carrying out tattoos and piercings in a public square, outdoor space or unhealthy location; carrying out practices that require regulated professional qualifications; and prescription of medicines for clients, even if they are for topical use, such as ointments [7].

Although laws and prohibitions have their role in prohibiting the use and application of piercings and tattoos by minors without parental consent, it is not enough and they do not guarantee the application of piercings in the oral cavity without risks and complications. Application practices must be regulated in order to protect all users, regardless of age. Until a solid national policy is established, it ends up being the responsibility of health professionals and dental surgeons to know about such complication situations, so that they can provide adequate guidance and treat, when necessary, patients with these illnesses, and It is also necessary to demand measures from the governments to preserve the health of patients, such as information campaigns and the requirement for authorization to carry out this practice.

Risks and Complications Associated with Piercing

When looking for aesthetics or fashion, users of peri- and intraoral piercings are subject to risks that they are often unaware of. The indiscriminate use of these ornaments has increased substantially in recent times. People use them without knowing the risks and complications they are being exposed to with this practice. People who undergo piercing are subject to risks and complications, which can have adverse consequences for the oral health, or even the systemic health of users. These consequences may occur during the piercing procedure, or be delayed, manifesting themselves in the short or long term after placement, and may be involved

with infectious processes. The risks associated with piercing and wearing it for a prolonged period of time are fundamentally related to two factors: the quality of the procedure and the type of material used.

The act of installation, as it presents an invasive procedure, can cause several inconveniences. The most common complications are: bleeding or even severe hemorrhages, tissue trauma, such as paresthesias, edema and infections [5]. According to Marquezan and collaborators [19], if the piercing is not placed in the exact location of the lingual midline, prolonged hemorrhage or paresthesia may occur, due to the presence of vascular-nervous bundles located parallel to it. It is also during the installation that the transmission of diseases can occur as it is a practice that involves bleeding. There are reports in the literature of various diseases such as Hepatitis B and C, AIDS, infections in general, arthritis, glomerulonephritis, infectious endocarditis, which can develop from the practice of body art [1].

Regarding late events, the chances of observing problems in the oral cavity increase the longer the piercing is worn [20]. Complications can occur causing damage to the teeth, periodontium and covering tissues, such as gingival recessions, mucosal trauma and tooth fractures. Other reactions are trauma to the gingival tissue and mucosa, taste changes, hypersalivation, calculus accumulation, halitosis, tooth fractures, and interference with speech, chewing and swallowing. The local allergic reactions due to contact with non-precious metals in ornaments; chronic inflammatory reactions, such as foreign body granulomas, are possible too [18].

Local and Systemic Risks and Complications

The changes caused by oral piercings that cause unwanted effects range from simple localized pathologies to some that systemically affect the body of the piercing user. And it is in this sense that these risks and complications can be classified as local or systemic (Table 1):

Table 1: Description of Risks and Likely Complications Arising from Piercing Using

Local	Systemic	Other problems
Pain	Allergy	Cancer
Edema	Airway obstruction	Accidents due to aspiration or swallowing
Bleeding	Hepatitis	Changing the radiographic image
Gingival or mucosal trauma	AIDS	Social complications
Fracture	Condyloma	Psychological problems
Abrasion	Tetanus	Nerve damage and paresthesia
Hypersensitivity to metal	Leprosy	
Gingival recession	Bacteremia	
Sialorrhea	Bacterial endocarditis	
Difficulty speaking, chewing and swallowing	Ludwig's angina	

Formation of galvanic currents		
Hypertrophic scar		
Plaque Accumulation		
Halitosis		

Problems Related to Local Complications of Oral Piercing Pain and Edema

These are common complications, as the professionals who perform the drilling are not qualified to use local anesthetics, nor prescribe post-operative medication. Edema can cause upper airway obstruction; therefore, one must be aware of this fact, especially edema related to tongue piercing [21]. When tongue piercing is installed, it causes the beginning of an inflammatory process and, as a result, the thickness of the organ can double in size. In the 6 to 8 hours after piercing the tongue, the tissues begin to inflame, the process increasing during the following 3-4 days. The submental and submandibular nodes also increase due to the inflammatory process, and the effects can last for a few weeks. If it triggers an allergic or infectious process, there will be an increase in volume of the tongue that could compromise the upper airways, obstructing the individual's oropharynx, and even death due to asphyxiation may occur [13].

Hypersensitivity to Metal

Depending on the type of piercing material, the risk of chronic irritation or hypersensitivity to the metal may increase. As already mentioned, there are substances, such as nickel, chromium or nickel-cobalt, which have a high probability of promoting allergic reactions, and should be avoided when choosing the ornament material. It was observed that among the allergic reactions caused by the metals used in the manufacture of piercings, surgical steel, despite its biocompatibility, can undergo a corrosion process, releasing chromium and nickel as by-products. Several authors consider contact dermatitis to be the most common allergic reaction related to nickel and cobalt [22].

Traumas, Fractures and Abrasions

These are the most frequent injuries described due to the use of intraoral piercings [18]. The habit of pushing and placing the jewelry between the teeth, or the act of hitting the object against the teeth can cause trauma, fractures and abrasions, or the detachment of enamel spicules, even causing pulp implications such as sensitivity to cold and sweet substances, and pain. Patients with parafunctional habits such as bruxism, the risk of fractures or wear and tear increases greatly [23]. Care must be taken by dental surgeons when applying anesthesia because piercing attached to the tongue may produce a fracture or accidental trauma to the teeth or soft tissues [24].

Gingival Recession

Marginal gingival recession is the displacement of the thin layer of gingival tissue apically to the cemento-enamel junction, exposing the surface of the tooth root. Many conditions have been mentioned as etiological factors and some studies have considered some possible determining factors, such as: plaque-related inflammation; brushing trauma; dental crowding; orthodontic treatment; inadequate restorative processes and placement of jewelry (piercing) in the perioral region [5]. Lingual piercing with a barbell can cause accumulation of plaque and calculus supra and subgingival in lower anterior teeth due to the lower sphere of the piercing being in continuous contact with the teeth [13].

The repetitive trauma caused by piercing against the periodontium can cause mild, moderate or severe gingival recession, which can be justified by the fact that users have the habit of projecting the object against the gingival tissue. Piercings placed in the tongue caused the lingual recession of the lower incisors, along with an increase in the depth of the periodontal pockets. Piercings placed on the lower lip caused gingival retraction on the buccal surface, but without increasing the depth of the periodontal pockets [25]. The development of recessions on the buccal surface of the lower incisors can occur between 6 months and 2 years after the adornment is placed, with a greater incidence after two years of piercing use, especially if the piercing was longer in length [20].

Formation of Hypertrophic Scars or Keloids

For the piercing to heal, the body's response to rejecting foreign objects must be overcome. In those individuals whose body has not adapted to wearing jewelry, rejection of the piece can cause a retractable scar, known as a keloid, or there can be hyperplastic scarring. One factor that can contribute to hyperplastic growth is the movement of the piercing over the tissue to which it was applied. The keloid can evolve over several months, with the epithelial covering of the piece, even complicating its removal [13].

Sialorrhea (Hypersalivation)

The presence of a piercing in the oral cavity is a physical stimulus, produced by contact with the metal, which induces parasympathetic activation and, therefore, leads to an increase in salivary secretion, producing sialorrhea [23].

Formation of Galvanic Currents

There is the possibility of the formation of galvanic currents through contact with other metals in the mouth, such as amalgam restorations, which can cause pulp hypersensitivity [3].

Plaque Accumulation and Calculus Formation/ Halitosis

Piercing is an area of increased predisposition to the accumulation and retention of food and dental biofilm and more complex hygiene, leading to the onset of periodontal diseases and halitosis. Due to the ionic composition of saliva, there is an increase in calculus deposits both in the dental structures and in the piercing itself. Dental biofilm retention factors that compromise adequate oral hygiene, providing means for increasing the development of cavities and periodontal diseases. It must also be considered that halitosis rates may be higher in piercing users, as the ornament becomes, as mentioned, a plaque retention factor, which allows greater bacterial activity, in order to produce volatile sulfur compounds, responsible for unpleasant odors, characteristic of halitosis [23].

Difficulty Speaking, Chewing and Swallowing

Piercing can interfere with speech by interfering with normal mouth movements, and can cause defects in the pronunciation of sounds with the consonants s, sh, th, ph, ty, v. When chewing and swallowing, the piercing can get in the way due to the interposition of the object with the tongue, and the other muscles involved in these movements [8].

Problems Related to Systemic Complications of Oral Piercing

Rarely, the application of mouth piercing will cause changes in systemic health. Generally, complications and disorders arising from its installation refer to the head and neck region, in addition to the oral cavity itself and the stomatognathic system. In general, in most cases of body art performed, the amount of damage to the

individual's health is relatively small, despite the potential risk of disease transmission in practices involving bleeding. Among these systemic changes are bacterial infections, such as bacteremia, septicemia, bacterial endocarditis, Ludwig's Angina, changes in leukocyte levels and even hemorrhage. Another compromise is the possibility of aspiration or swallowing of the piercing. As well as bacterial infections, other communicable diseases are likely to occur in piercing users, such as viral and fungal infections. The potential risk of transmission of infectious diseases is due to instruments such as non-sterilized needles and ornaments, varies according to the circumstances and hygiene of the piercing installation procedures and lack of aseptic precepts in the studios that are responsible for applying the piercing.

Hepatitis

The transmission of the viruses responsible for the different forms of hepatitis (B, C, D or G) presents itself as a major risk factor within the practice of body piercing, and in some cases with fulminant manifestations immediately after the piercing [11,26]. The use of reusable needles, in particular, has been cited as a risk factor for Hepatitis C virus infection among body piercing practitioners [1,21].

Acquired Immunodeficiency Syndrome (AIDS)

In infected individuals, the HIV virus can be found in most body fluids: in blood, saliva, semen, tears, urine, breast milk, ear and vaginal secretions. The most frequent routes of transmission are: sexual contact, parenteral exposure to blood or transmission from mother to fetus during the perinatal period and organ transplantation. HIV virus infections can probably be transmitted through piercing. In general, both the professional who performs the drilling and the user are subject to exposure by the virus present in the instruments used during the piercing installation [11].

Tetanus

Wounds or other infectious processes involving the head and neck can cause cephalic tetanus, which is a rare form of tetanus that is strongly related to the practice of body piercing and has been documented in the world literature [11,26].

Condyloma Acuminata

Condyloma is considered a sexually transmitted disease (STD), with lesions developing at the site of sexual contact or trauma, characterized by a virus-induced proliferation of the stratified squamous epithelium of the mouth and larynx, genitalia and perianal region. The trauma of the installation associated with the presence of viral types can develop this pathology [11], because, once present, self-inoculation to other sites covered by mucosa is possible. Oral lesions most frequently occur on the labial mucosa, soft palate and lingual frenulum [26].

Ludwig's Angina

Ludwig's Angina is a type of cellulitis, resulting from an infection secondary to the piercing that is not treated. It can appear immediately after intraoral perforation, causing diffuse cellulitis on the floor of the mouth and the suprahyoid region, affecting the connective tissue and quickly extending to the submandibular, submental and sublingual region [13]. It is an acute, aggressive bacterial infection that forms and spreads rapidly and progressively. It has easy communication with the pterygomandibular and peripharyngeal spaces, thus facilitating the spread of infection to neighboring cervical areas, potentially reaching the mediastinum. It can seriously affect systemic health, with fever exceeding 40°C, making swallowing and breathing

difficult, even compromising the patient's systemic life, requiring urgent medical intervention [11,23].

Bacteremia

Perforations in the skin and mucosa allow the penetration of microorganisms into the subcutaneous layer of the skin, which can cause bacteremia, but this rarely persists for more than 15 minutes. Bacteremia can introduce microorganisms into the bloodstream, originating from a focal infection (cellulitis at the piercing site, for example). The bacteria in the bloodstream can lodge in abnormal or damaged valves in the endocardium or endothelium, close to anatomical defects, resulting in endocarditis causing a serious infection of the valvular endocardium in people who suffer previous cardiac changes [27].

Infective Endocarditis

As it is an invasive procedure, the practice of body piercing is considered high risk for the development of infectious endocarditis because the oral cavity has microorganisms that cause bacterial endocarditis on its surface; because the piercing has a prolonged healing process associated with trauma to the oral mucosa around the piercing; due to the fact that the procedures are carried out by professionals who are not from the health sector and under adequate hygiene conditions; because biofilm forms on the surface of the jewelry, it is difficult to clean the trauma site [28-31].

Leprosy and Tuberculosis

Leprosy is a chronic infectious disease produced by *Mycobacterium leprae*. In precarious hygiene conditions, the microorganism can be easily transmitted to other people due to the high incidence of piercing practices in the orofacial region. Tuberculosis is a chronic disease caused by *Mycobacterium tuberculosis*, and like leprosy, the transmission of the disease due to the practice of piercing is associated with precarious hygiene conditions in establishments and the negligence of professionals who install jewelry in relation to the health of their clients are aggravating the contamination by this disease [26,32].

Candidiasis – Fungal Infection

Infection with *Candida albicans*, a fungal microorganism similar to yeast, is called candidiasis. In fact, *C. albicans* may be a normal component of the oral microflora, and 30 to 50% of people have the microorganism in their mouths, without clinical evidence of infection. Consequently, among the complications caused by the practice of body art, *Candida* infections can occur [21,33].

Other Problems Related to the Use of Piercing Cancer

Oral piercing may be related to one of the etiological factors of oral cancer, although oral cancer is multifactorial in nature, due to the release of substances considered carcinogenic such as chromium, as well as the contribution to the development of lesions, as the continuous use of oral piercing generates low-intensity chronic trauma. Research indicates that the movement of the piercing within the tissues causes a reaction of inflammatory cells and tissue hyperplasia, with the possibility of neoplastic formation [3]. The most used material in the manufacture of piercings is surgical steel, as it has good biocompatibility and lower cost.

However, one of its main limitations for clinical use is its tendency to corrode, considering that it contains nickel and chromium in its composition. The use of chromium in metal alloys for oral use suggests greater caution, due to its toxicity and carcinogenic potential [34, 35]. Currently, it is known that low-intensity chronic trauma

and the release of chromium into the oral cavity by piercing, alone, are not capable of inducing carcinogenic changes. However, when associated with risk factors, such as smoking, alcohol consumption, ionizing radiation and genetic susceptibility, the risk of the tissue suffering pre-malignant changes increases, increasing the probability of developing malignant tissue changes. These are factors that dental surgeons should take as a concern, considering the fact that, especially among young people, a significant percentage of them, in addition to wearing piercings, are also smokers, alcoholers and drug abusers. These factors combined could more quickly induce the appearance of alterations in tissues and malignant lesions [36,37,38].

Aspiration Accidents

Caused by poor fixation or sudden movements during manipulation during placement or during chewing, they can cause respiratory or digestive injuries [13].

Radiographic Changes

When faced with the need to take an intraoral or extraoral x-ray, it may be necessary to remove the piercing so that the metal does not impede the visualization of certain structures on the x-ray. When taking panoramic x-rays, any metallic object present above the cervix must be removed. Cheek, tongue and lip piercings must be removed before periapical or interproximal x-rays [8].

Problems Related to the Social and Psychological Complications of Piercing

Body piercing can be interpreted as a visible violation of common beauty standards and causes provocation in society. One of the main motivations of piercing users is, in fact, to provoke society, especially among teenagers. Other reasons include personal satisfaction, being bold, being fashionable and being part of a group [11]. Psychosocial risks are also documented and include embarrassment, low self-esteem and disappointment [1]. Piercing users are also stereotyped by society as marginalized, people who had poor education, individuals who came from broken homes, who had unhappy childhoods, with separated or dead parents. People who practice body art rarely attend churches, and when are drugged or pressured by friends, are more susceptible to adopting risky behaviors such as drug use, eating disorders and suicidal practices [39]. Body piercing has also been described as a type of mutilation of the body (considered immaculate by some social groups). In the job market, individuals who wear piercings tend not to be hired, as they convey a negative impression to employers, although, this type of discrimination must be considered inappropriate [11], because of the people free will and the necessity of the continuous pluralistic, democratic and eclectic society development, with equilibrium and emphasizing about the dangers of piercing using [40].

Clinical Cases

Case 1

A caucasian, male, 22 years old, attended the UEPG Periodontics clinic, reporting in the anamnesis that he had good systemic health, but the main complaint was having pain in the third molars that were erupting. The patient reported that he has been wearing a tongue piercing for two years. Upon clinical examination, edema was observed associated with the lower third molar, in tooth 38, characterizing pericoronitis. Gingival recession was also observed on the lingual surface of teeth 42, 41, 31 and 32, and small fractures on the incisors of the upper central incisors (Figure 1), associated with the use of piercing and the presence of calculus. The radiographic examination revealed the presence of calculus adhered to the roots and horizontal bone loss on teeth 32, 31, 41 and 42 (Figure 2).



Figure 1: Patient Case 1, Presenting Accumulation of Calculus on the Lingual of the Lower Incisors and Small Fractures on the Incisors of the Upper Incisors

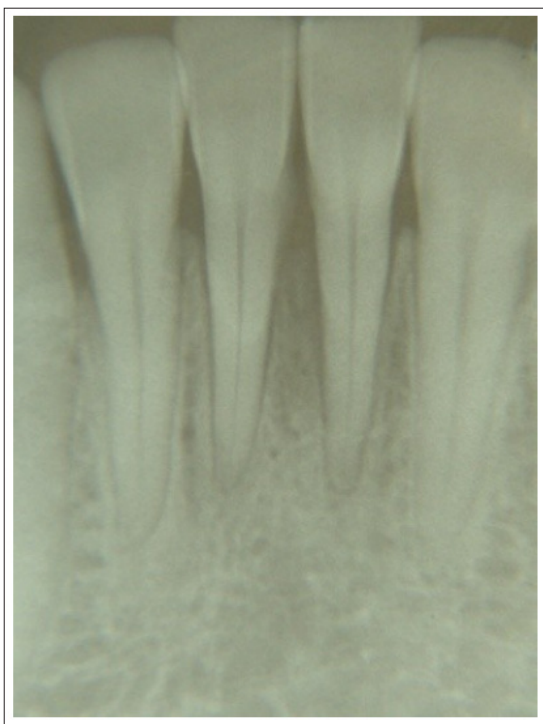


Figure 2: Periapical X-Ray Indicated Calculus Accumulation and Horizontal Bone Loss on Teeth 32, 31, 41 and 42

The emergency clinical procedure to reverse the pericoronitis condition was the application of hydrogen peroxide with cotton wool on the third molars and referral to the Stomatology Surgery clinic for the extraction of this third molar (38). This patient was also advised about the risks and complications associated with the use of tongue piercing, in order to try to convince him to abandon the use of the piercing. He then, of his own free will, decided to remove the adornment to avoid worse complications (Figure 3). In another session, manual scaling was performed with Gracey 5-6 curettes of the coarse calculus and root planing with an ultrasonic instrument was performed on the surfaces of the lower teeth with recession. Hygiene guidance was also provided, alerting him to the need to use dental floss and an effective brushing technique

to avoid calculus accumulation later. The patient was informed about the importance of the procedures performed and were done with the patient's full consent. The case has been continued, and the patient still does not have a tongue piercing.



Figure 3: Scar Associated with the Piercing Site, in the Midline of the Tongue

Case 2

A caucasian, female, 15 years old, went to the UEPG clinic complaining of gum bleeding. In the anamnesis, the patient reported having good systemic conditions, and using a piercing in the middle region of the tongue for 1 year. Upon clinical examination, a fracture was observed in the incisal portion of the upper central and lateral incisors (12, 11 and 21, 22) (Figure 4 and 5), small gingival recession on the lingual surface of the lower anterior teeth and gingival edema, especially in the gums associated with the lower teeth (Figure 4). Traumatic movements of the tongue affecting in the lower incisors of low intensity were observed (Figure 6 and 7) even with the tongue in a resting position (Figure 8). The patient did not present any pain in her gums or teeth. Periapical radiography indicated severe vertical bone resorption in teeth 41 and 31, especially in the mesial region, with periodontal ligament thickening of the tooth 31 (Figure 9).



Figure 4: Patient Case 2 Presents Gingivitis and Small Fractures in the Upper Incisors

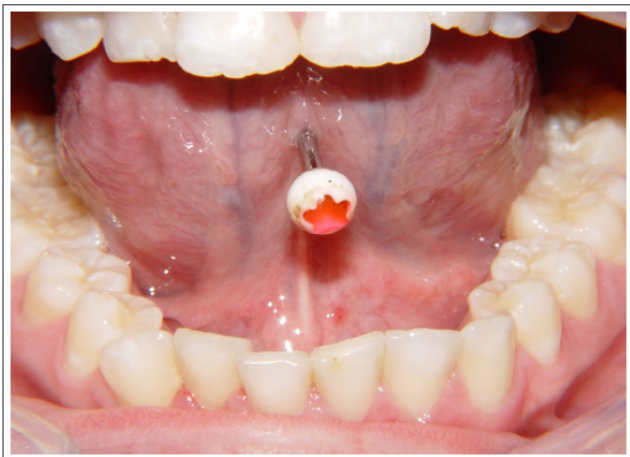


Figure 5: Patient Case 2, Barbell Tongue Piercing with Tongue Raised



Figure 8: Patient Case 2, Barbell Tongue Piercing with Tongue at Rest



Figure 6: Tongue Abnormal Movements in the Patient JFC



Figure 7: Tongue Abnormal Movements Affecting the Lower Incisors

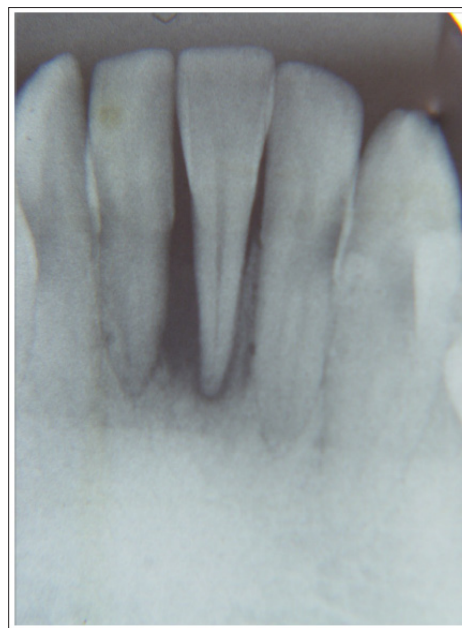


Figure 9: Periapical X-Ray Indicated Severe Vertical Bone Resorption on Teeth 41 and 31

Pulp vitality testing was conducted with Endo-Ice® and indicated that the pulp tissue of both teeth was viable. In the first session, the teenager was advised on the risks and complications arising from the use of a tongue piercing, as well as any accessory used intraorally. More complex cases were reported to her of patients who wore the piercing for a longer period of time and its consequences, thus creating risks if she continued using the jewelry.

With this information, the patient was convinced that the best alternative would be to remove the piercing. In the second session, with the patient no longer wearing the piercing, prophylaxis with pumice stone and hygiene guidance were given. Supra- and sub-gingival periodontal treatment was carried out with scaling, planing and root polishing manually and ultrasonically, maintaining the pulp vitality of the compromised teeth. Hygiene guidance was also provided, as well as the importance of using dental floss and the best brushing technique to avoid the accumulation of plaque and gingivitis on the teeth. Interdental brushes were used and recommended to the patient as a part of a periodontal maintenance

program. The patient was informed about the importance of the procedures performed, which were carried out with the free consent of the patient and her guardian. The patient did not use the piercing again. She has not lost her teeth, and there has been no need for endodontic treatment to date.

Case 3

A caucasian, 26 years old, female, attended the UEPG Dentistry clinics, complaining that the root of her tooth was showing and she was afraid of losing it. During the anamnesis, she showed that she had good systemic conditions except for the fact that the patient reported having had a tongue piercing at the age of 18. At the age of 22, still wearing her piercing, she went to a dentist to orthodontic treatment. In the radiographic documentation made at the time, prior to the application of the device, bone rarefaction was observed around tooth 31, characterizing an endo-perio injury, already a likely serious consequence of prolonged use and trauma caused by the piercing, the patient reports that at the time there was dental mobility.

At the age of 23, she had to wear a palate expander, and despite being advised by her orthodontist that it would be dangerous to use it simultaneously with the piercing, she chose to continue using the piece. Then, one day while chewing, the piercing ended up getting caught in the expander, causing rupture of the lingual frenulum accompanied by severe bleeding and pain. Traumatized by this fact, she decided on her own to stop wearing the adornment. Upon clinical examination, extensive gingival recession was observed, severe periodontal recession on the lingual aspect of the mandible on the lingual side of tooth 31 (11mm) and presence of a 2mm pocket (Figure 10). In tooth 41, the recession was smaller (3 mm), but also with the presence of calculus, inflammation, and a 2 mm pocket. On the dorsum of the tongue, the lingual frenum insertions are not visible (Figure 11).



Figure 11: Patient with Absence of Lingual Frenulum, Due to Trauma Caused by the Lingual Piercing

In this first clinical examination session, oral hygiene guidance was also provided, indicating the use of interdental and unitufo brushes, due to their compact sizes, which would better clean this region in order to reduce gingivitis and plaque accumulation, maintaining the clean the root and stop bone loss and gum recession. As a treatment approach, in the second session, scaling and root planing of the lower anterior teeth were performed. The intervention began with infiltrative anesthesia with 3% prilocaine and 0.03 IU felypressin. With Gracey 5-6 curettes, all surfaces of teeth 32, 31, 41 and 42 were scaling. When the bleeding stopped, the coronal was polished with rubber cups and pumice stone. As there was a history of endo-perio injury, a vitality test was carried out with tetrafluoroethane gas at -23° C, Endo-Ice®, giving negative results for elements 31 and 41, making it necessary to treat the teeth endodontically before any periodontal surgical procedure, such as a gingival and connective tissue graft. The endodontic treatment was for elements 31 and 41 and was carried out by the patient's private dentist for reasons of schedule compatibility. Now 26 years old, she stopped orthodontic treatment a few months ago, and has a splinting that extends from element 33 to 43 (Figure 12). The possibility of subsequently performing a gingival and connective tissue graft in this area is now being studied to correct the mucogingival defect by covering the root and increasing the attached gum by a specialist.



Figure 10: Patient Case 3, Presenting Gingival Recession Associated with the Lower Incisors Showing Severe Involvement in the Lingual of Tooth 31



Figure 12: Patient Case 3, With a Splinting that Extends from Element 33 to 43

Case 4

A 20 years old, male, attended the UEPG Periodontics Clinic. This patient related using labial piercings during 2 years (Figure 13, 14) and he sought care because of a inner upper lip wound that was not healing (Figure 15, 16 and 17). Excisional biopsy was conducted and anatomopathologic exam indicated atypical cellular proliferation (Figure 18).



Figure 13: Patient Case 4 using Labial Piercings



Figure 14: Patient Case 4 using Bottom Labial Piercing

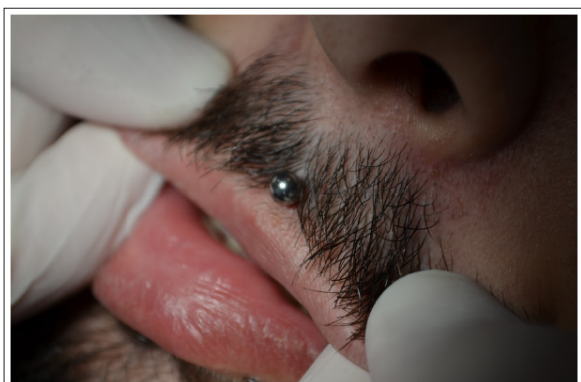


Figure 15: Patient Case 4 using Upper Labial Piercing

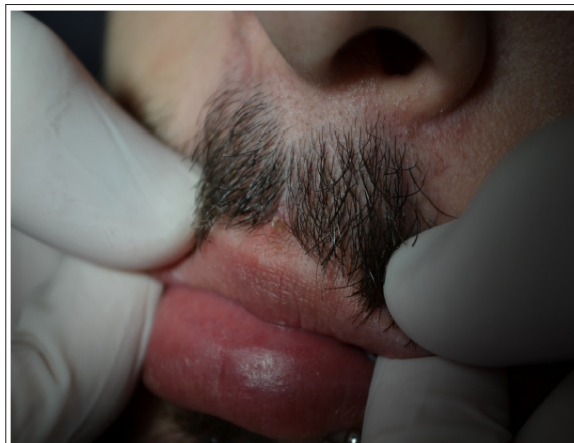


Figure 16: Patient Case 4 without Upper Labial Piercing



Figure 17: Patient Case 4 with Inner Upper Lip Wound that was not Healing



Figure 18: Patient Case 4 with Atypical Cellular Proliferation by Piercing Using

Case 5

A 18 years old, Caucasian, female, attended the UEPG Periodontics clinic, reporting in the anamnesis that she had good systemic health, but the main complaint was having inflammation in her teeth. She was using a tongue piercing for 2 years (Figures 19 and 20). In the intraoral clinic exam, localized periodontitis in the elements 31 and 41 was observed. Periodontal probing demonstrated a pocket in tooth 31 (on the mesiolingual surface - 7mm, lingual - 8mm, Vestibular 2mm), mobility and lingual gingival recession of 5 mm (Figure 21). In addition, suppuration and bleeding at the time of probing and the presence of a vestibular fistula was observed (Figures 22 and 23).



Figure 19: Patient Case 5 using Tongue Piercing

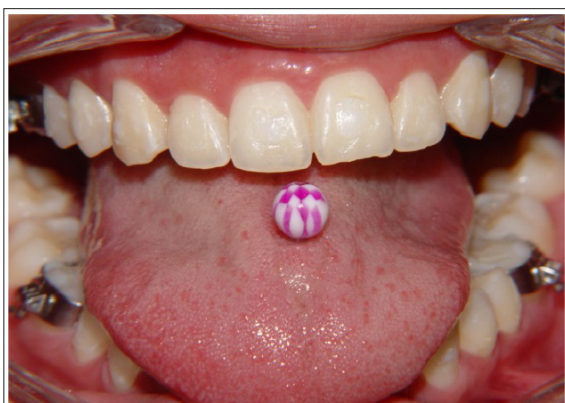


Figure 20: Patient Case 5 using Tongue Piercing, Dorsum Position



Figure 21: Patient Case 5, Lingual Gingival Edema with Recession of 5mm



Figure 22: Patient Case 5, Fistula Associated with the Root Compromised by Endo-Perio Injury of Tooth 31 by Piercing (Check the Position of the Piercing in the Figure 19)



Figure 23: Patient Case 5, Fistula Associated with the Root Compromised by Endo-Perio Injury of Tooth 31 by Piercing (Check the Position of the Piercing in the Figure 20)



Figure 24: Patient Case 5, Alveolar Bone Loss Associated with an Infectious Process already Compromising the Root Canal

When analyzing the radiographic exam, extensive alveolar bone loss was observed, involving the root apex, thus characterizing an endoperio lesion with dental pathologic migration (Figure 24).

This patient was advised that the reason for the significant infection she was carrying could be associated with the use of tongue piercing, which could be a significant factor in the appearance of lingual gingival recession, and which, associated with the patient's systemic health and poor oral hygiene, could justify the presence of this localized periodontitis. Therefore, we advised that the best possible option in this case would be for her to stop wearing the ornament if she wanted to preserve her tooth. She then, somewhat upset, but understanding the reasons, spontaneously decided to remove the adornment to avoid worse complications, such as the loss of the tooth element (Figure 25).

As a treatment approach, the patient was referred to the Integrated Clinic for endodontic treatment, and would later return to the Periodontics clinic to undergo periodontal treatment. In a second control session, the patient attended the clinic showing an improvement in her clinical condition, with regression of the fistula (Figure 26) and the inflammatory process.

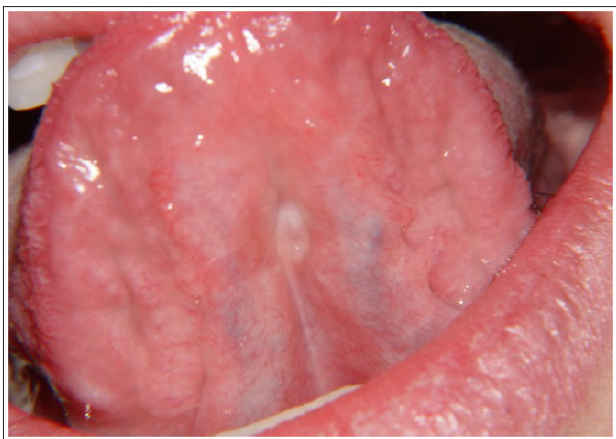


Figure 25: Patient Case 5, Hypertrophic Scar after Removal of the Tongue Piercing



Figure 26: Patient Case 5, Fistula Showing Regression

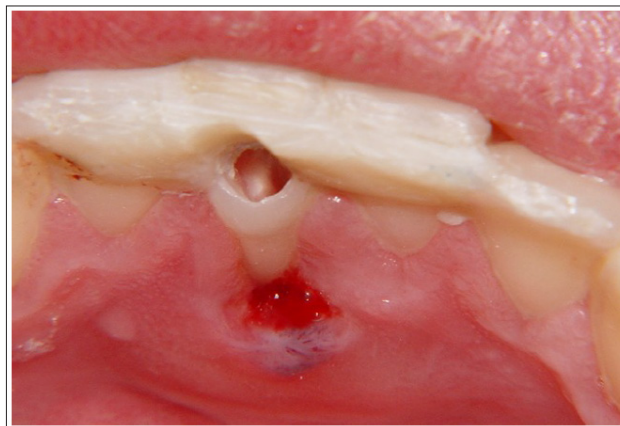


Figure 27: Patient Case 5, Endodontic Treatment and Splinting with Composite Resin

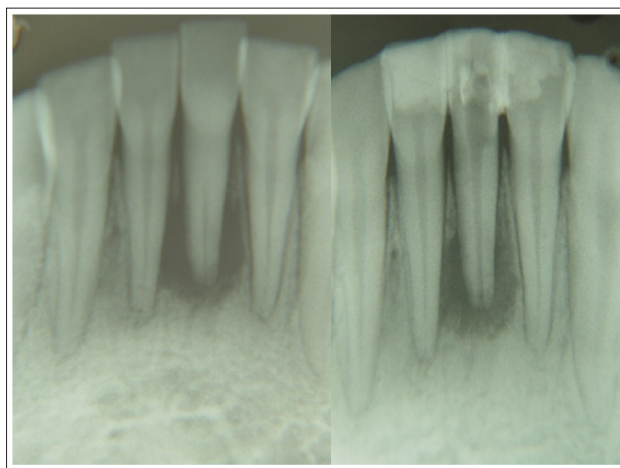


Figure 28: Patient Case 5, Endodontic Treatment with Calcium Hydroxide Showed a Visible Improvement in the Amount of Bone Adjacent to the Teeth with Bone Resorption

At the Integrated Clinic, the endodontic opening was made and the tooth was placed with an intracanal dressing (Calcium Hydroxide, P.A.) during four sessions with time interval of the fifteen days. The mobility was restrained with composite resin (Figure 27). When examining the current radiograph, there was a visible improvement in the amount of bone adjacent to the root of the teeth (Figure 28). Hygiene guidance was given to the patient, warning her about the importance of maintaining healthy gums and continuing the treatment. The patient was informed about the procedures carried out and how stopping using the piercing was essential for the tooth to be preserved. All procedures were carried out with the patient's full consent, but she did not return for the endodontic conclusion and periodontal maintenance program.

Discussion

Piercing has a significant historical and cultural value, so much so that it has gained space and popularity today. Practically all parts of the body, including the navel, eyebrows, nose, ear, nipples, sexual organs, oral and perioral region, have been used for the insertion of piercings, of a variety of models, sizes and manufactured from different types of materials [9].

With this fashion coming to the fore again and a number of people using it, the undesirable consequences caused by this practice are of great importance to us dentists [31,41]. From a medical perspective, the use of body piercing is not just a fashionable adornment, but can produce local and systemic effects [42]. We have the knowledge so that we can alert our patients about these risks, and so that we know how to act therapeutically if these complications are already evident [43]. These undesirable complications will differ depending on the region where the piercing was applied, but they all have similar development characteristics [44,45]. However, because the orofacial region is a very important part for personal relationships and nutrition, especially the mouth, lips and tongue, care with these structures must be doubled in people who practice piercing, as any carelessness can cause damage to these structures and a lot of discomfort. The mucosa, especially the oral mucosa, is moist, highly vascularized, has a large bacterial population and is in constant movement. These characteristics that will determine most of these risks that appear in the literature, such as edema, paresthesia, damage to teeth and periodontium, and local and systemic infections [46].

When a patient seeks guidance from their dentist and reports that they want to get a piercing, this patient must be advised to make aware of all the problems they are exposing themselves to and that piercers are not professionals capable of offering security to their client, as they do not may prescribe anesthetics and medications, as they do not have training in human anatomy/physiology and biosafety, and the patient may be exposed to infectious diseases such as Hepatitis B, C, D and G, herpes simplex, AIDS, and fungal infections [40].

When choosing the material for the piercing, the characteristics of the composition of the adornments must be taken into account. Allergic reactions have been observed caused by the metals used in the manufacture of piercings, such as surgical steel, which despite being biocompatible, can undergo a corrosion process, releasing chromium and nickel as by-products that have an allergenic characteristic. Chromium has been considered carcinogenic when exposed to other risk factors. And, therefore, titanium was the most biocompatible for making earrings and oral piercings [36,38].

If the patient insists on having a piercing, they should see a dentist or doctor beforehand to assess their health and prepare them to receive the jewelry, which may include everything from controlling post-operative symptoms to using analgesic drug therapy, anti-inflammatory and antibiotic [47]. In the postoperative period, it may be necessary to administer medications, which can interfere with the body's homeostasis, such as self-medication of non-steroidal analgesics of the salicylate type, which reduce platelet adhesion and can increase post-installation bleeding, in addition to causing aggression to the gastrointestinal mucosa, causing organic weakness. Taking antibiotics can compromise the immune system. If the patient is already an oral piercing user, the dentist must advise him on hygiene, as the piercing is capable of accumulating plaque and dental calculus. A condition that can favor the appearance of diseases such as cavities and periodontal conditions close to the piercing or throughout the mouth [48]. In addition to these conditions, there is a greater risk of fracture, due to contact between the jewelry and the tooth. The presence of gingival recession can be justified by the fact that users have the habit of projecting the object against the gingival tissue [49].

In the clinical cases presented, there was a common risk factor which was tongue piercing, and the same complication which was

the presence of an accumulation of bacterial plaque, supra and/or subgingival calculus, gingival recessions and tooth mobility. The clinical approach was the same: we advised the reasons why they should remove the piercings; oral hygiene instructions were given, we performed prophylaxis, scaling and root planing in the affected region with the purpose of reducing inflammation, bleeding and the possibility of loss of bone support. It was also essential to take periapical radiographs to evaluate possible spacing of the periodontal ligament and/or a loss of lamina dura. In cases affected by endo-perio injury, the patient was advised to undergo root canal treatment before undergoing periodontal treatment.

The progression of gingival recession stops with the removal of the piercing, even though definitive treatment must involve surgery to repair the mucogingival defect. Therefore, the need for surgical procedures (reconstructive mucogingival surgery) such as tissue grafting becomes explicit. conjunctival and gingival posterior control of the patient, in retractions resulting from contact of the adornment with the gums and/or mucosa. Therefore, the periodontist must also provide guidance on removing the adornment, as well as performing reconstructive mucogingival surgeries. In cases of patients resistant to removal of piercings oral cavity, demonstrating clinical injuries can be a persuasive factor.

The patient should be reminded of the importance of not using alcohol- or peroxide-based mouthwashes for a prolonged period of time, as they can dehydrate the adjacent mucosa. Other personal hygiene precautions include daily removal and cleaning of the ornament, washing hands before piercing hygiene procedures; adequate oral hygiene, with special attention to the tongue when there is a tongue piercing; avoid parafunctional habits of biting the piercing; seek dental help if you notice changes in your teeth or mucous membranes and have periodic dental appointments for follow-up; the patient may be suggested to replace the metallic material with another, lighter and more flexible one, avoiding further damage to the adjacent tissues [40, 50]. Additionally, the piercing using can lead to damage due to degenerative or accidental processes, through the practice of sports and trauma from various causes [51,52]. Instructions regarding the practice of sports must also be given. Any body jewelry must be removed during sports, including intra and perioral piercings [19].

Dental professionals must be prepared and updated to support the patient when any negative effects resulting from the placement and use of an oral piercing are noticed. This effect can have consequences that directly or indirectly affect the patient's physical and psycho-emotional health, such as, for example, permanent plastic and aesthetic deformities [51,52]. The dentist must also know how to deal with the freedom of thought and desire of those who choose the practice, justifying their own motives such as philosophical passions, prohibitive radicalisms and social/historical behavior. Furthermore, the dentist must guide and monitor these patients in order to prevent unpleasant local and systemic consequences caused by the use of oral piercing, promoting the individual's health in an integrated way [40].

Final Considerations

The Dental Surgeon has a very important role in guiding patients who use mouth piercings and those who report having the objective of placing the adornment. Therefore, to convince the patient that this is not a good choice, it is essential to have knowledge about oral piercing and its local, systemic and social complications, emphasizing an ethical position that demonstrates sensitizing parents and users about the dangers and disadvantages of piercing,

as well as guiding those who insist on using it, that care must be taken in hygiene and in its use when practicing sports. In addition to demanding regulation and inspection of body art establishments, by the competent government bodies. With the clinical cases presented, and faced with a common complication that is gingival recession with loss of bone support, it is important that dental professionals are prepared to treat patients when these undesirable consequences are diagnosed, as in the case of the need for repair of mucogingival defects, emphasizing that gingival recession only stops with the removal of the tongue adornment. However, the use of piercings is an individual option, which must be respected, and patient guidance must be provided as objectively as possible, to prevent negative consequences resulting from the use of the ornament. Therefore, professionals' concerns must be based not only on clarifying possible local damage, but also on systemic implications, which will favor the promotion of the patient's general health.

References

1. Greif J, Hewitt W, Armstrong ML (1999) Tattooing and body piercing. *Body art practices among college students.* Clin Nurs Res 8: 368-385.
2. Ring ME (1985) *Dentistry. An illustrated history.* St. Louis: Mosby Co <https://search.worldcat.org/title/Dentistry:-an-illustrated-history/oclc/911634319>.
3. Boardman R, Smith RA (1997) Dental implications of oral piercing. *J Calif Dent Assoc* 25: 200-207.
4. Canto GL, Oliveira J, Ouriques KA, Wolf FL (2002) Mouth piercing: what dentists should know. *Rev Assoc Paul Cir Dent* 56: 345-349.
5. Damante CA, Taga MLL, Sant'Ana ACP, Greggi SLA, Rezende MLR de, et al. (2007) Tongue piercing use as an uncommon etiological factor of gingival recessions. *Perionews* 1: 325-328.
6. Costa CG, Tortamano IP, Silva Jr JCB (2003) Oral piercings and the role of dental surgeons. *RPG Rev Post Grad* 10: 171-177.
7. Paraná, State Department of Health (2007) SESA Resolución nº 0126, of March 1, 2007. Provides for the conditions for the installation and operation of Tattoo, Piercing and similar establishments.
8. Escudero Castano N, Bascones Martinez A (2007) Possible local and systemic alterations of oral and perioral piercings. *Av Odontostomatol* 23: 21-33.
9. Scully C, Chen M (1994) Tongue piercing (oral body art). *Br J Oral Maxillofac Surg* 32: 37-38.
10. Cossio ML, Giesen L, Araya G, Pérez-Cotapos ML (2012) Association between tattoos, piercings and risk behaviors in adolescents. *Rev Med Chile* 140: 198-206.
11. Stirn A (2003) Body piercing: medical consequences and psychological motivations. *Lancet* 361: 1205-1215.
12. Nicoletti A (2004) Teens, tattoos and body piercing. *J Pediatr Adolesc Gynecol* 17: 215-216.
13. De Urbiola Alis I, Vinals Iglesias H (2005) Some considerations about oral piercings. *Av Odontostomatol* 21: 259-269.
14. Bordji K, Jouzeau JY, Mainard D, Payan E, Netter P, et al. (1996) Cytocompatibility of Ti-6Al-4V and Ti-5Al-2.5Fe alloys according to three surface treatments, using human fibroblasts and osteoblasts. *Biomaterials* 17: 929-940.
15. Peticolas T, Tilliss TS, Cross-Poline GN (2000) Oral and perioral piercing: a unique form of self expression. *J Contemp Dent Pract* 1: 30-46.
16. Shacham R, Zaguri A, Librus HZ, Bar T, Eliav E, et al. (2003) Tongue piercing and its adverse effects. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 5: 274-276.
17. (2001) Oral piercing and health. *J Am Dent Assoc* 132: 127.
18. Almeida AS, Cardoso CAB, Pereira AAC, Hanemann JAC (2008) Oral Piercing Complications: a Literature Review. *UNOPAR Cient Ciênc Biol Saúde* 10: 5-14.
19. Marquezan M, Souza LT, Tanaka O (2008) Oral piercing: beauty, risks and the role of dentistry. *Rev Fac Odontol Porto Alegre* 49: 12-15.
20. Ventä I, Lakoma A, Haahtela S, Peltola J, Ylipaavalniemi P, et al. (2005) Oral piercings among first-year university students. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 99: 546-549.
21. Price SS, Lewis MW (1997) Body piercing involving oral sites. *J Am Dent Assoc* 128: 1017-1020.
22. Pécora GA, Reyes A, Pedron IG, Utumi ER, Borsatti MA (2010) Complications due use of oral piercing - Clinical evaluation and management. *Odonto* 18: 51-57.
23. De Moor RJ, De Witte AM, De Bruyne MA (2000) Tongue piercing and associated oral and dental complications. *Endod Dent Traumatol* 16: 232-237.
24. Brennan M, O'Connell B, O'Sullivan M (2006) Multiple dental fractures following tongue barbell placement: a case report. *Dent Traumatol* 22: 41-43.
25. Brooks JK, Hooper KA, Reynolds MA (2003) Formation of mucogingival defects associated with intraoral and perioral piercing: case reports. *J Am Dent Assoc* 134: 837-843.
26. López-Jornet P, Camacho-Alonso F (2006) Oral and dental complications of intra-oral piercing. *J Adolesc Health* 39: 767-769.
27. Dubose J, Pratt JW (2004) Victim of fashion: Endocarditis after oral piercing. *Curr Surg* 61: 474-477.
28. Kloppenburg G, Maessen JG (2007) Streptococcus endocarditis after tongue piercing. *J Heart Valve Dis* 16: 328-330.
29. Carano N, Agnetti A, Allegri V, Tchana B, Saracino A, et al. (2010) Infective endocarditis following body piercing: Presentation of one case due to Gemella morbillorum and review of the literature. *Med Sci Monit* 16: 124-128.
30. Friedel JM, Stehlik J, Desai M, Granato JE (2003) Infective endocarditis after oral body piercing. *Cardiol Rev* 11: 252-255.
31. Malcangi G, Patano A, Palmieri G, Riccaldo L, Pezzolla C, et al. (2023) Oral Piercing: A Pretty Risk-A Scoping Review of Local and Systemic Complications of This Current Widespread Fashion. *Int J Environ Res Public Health* 20: 5744.
32. Civatte J, Bazex J (2007) Piercing and tattooing: regulation is needed to reduce complications. *Bull Acad Natl Med* 191: 1819-1838.
33. Mosaddad SA, Talebi S, Hemmat M, Karimi M, Jahangirmia A, et al. (2023) Oral Complications Associated with the Piercing of Oral and Perioral Tissues and the Corresponding Degree of Awareness among Public and Professionals: A Systematic Review. *Diagnostics (Basel)* 13: 3371.
34. Espírito Santo RA, Dos Santos LFG, Conceição JG, PontesJRM, Israel MS, et al. (2007) Oral piercing: risk factor for cancer? *R Ci Med Biol* 6: 233-239.
35. Masood M, Walsh LJ, Zafar S (2023) Ion release from oral piercings from in vitro acidic challenges. *Aust Dent J* 68: 98-104.
36. Lupi SM, Zaffe D, Rodriguez y Baena R, Rizzo S, Botticelli AR (2010) Cytopathological and chemico-physical analyses of smears of mucosa surrounding oral piercing. *Oral Dis* 16: 160-166.

37. Domingo MG, Ferrari L, Aguas S, Alejandro FS, Steimetz T, et al. (2019) Oral exfoliative cytology and corrosion of metal piercings. Tissue implications. *Clin Oral Investig* 23: 1895-1904.
38. Masood M, Walsh LJ, Zafar S (2023) Oral complications associated with metal ion release from oral piercings: a systematic review. *Eur Arch Paediatr Dent* 24: 677-690.
39. Armstrong ML, Roberts AE, Owen DC, Koch JR (2004) Contemporary college students and body piercing. *J Adolesc Health* 35: 58-61.
40. Kozlowski Jr VA, Dias D (2023) Oral piercing: risks and complications. *Annals International Conference on Dentistry and Oral Health* 22.
41. Saccomanno S, Ieria I, Manenti RJ, Giancaspro S, Pirelli P (2021) Complications of oral piercing: a review of the literature and two case reports. *J Biol Regul Homeost Agents* 35: 167-178.
42. Aldulaijan H, Fatani B, Alphaed N, Alquhayz M, Alnafea A, et al. (2023) Knowledge and Awareness of Oral and Perioral Piercing and Its Complications Among the Population in Riyadh. *Cureus* 15: e41930.
43. Chambrone L, Chambrone LA (2006) Clinical aspects associated with the use of oral piercing. *Rev ABO Nac* 14: 40-43.
44. Chambrone L, Chambrone LA (2003) Gingival recessions caused by lip piercing: case report. *J Can Dent Assoc* 69: 505-508.
45. Er N, Ozkavaf A, Berberoglu A, Yamalik N (2000) An unusual cause of gingival recession: oral piercing. *J Periodontol* 71: 1767-1769.
46. Fenato MC, Miura CSN, Boleta-Ceranto DCF (2010) Mouth piercing: is your health worth this fad? *Arq Ciênc Saúde UNIPAR* 14: 157-161.
47. Trindade CP, Guaré RO, Bonecker MJS (2003) Oral piercing: general considerations and clinical case reports. *J Bras Odontopediatr Odontol Bebê* 6: 203-209.
48. Fragelli CMB, Campos JADB, Gaspar AMM (2010) Considerations regarding the use of tongue piercing. *Rev Gaúcha Odontol* 58: 451-455.
49. Alves LV, Silva AMB, Fonseca ACL, Miranda MS (2011) Problems related to tongue piercing: case report. *Adolescência & Saúde* 8: 59-62.
50. Salama F, Piatkowski A, AlMaflehi N, Sufyan A (2023) Perception and knowledge of oral and facial piercings among dental students: web-based survey. *J Contemp Dent Pract* 24: 42-47.
51. Gazzeri R, Mercuri S, Galarza M (2006) Atypical trigeminal neuralgia associated with tongue piercing. *JAMA* 296: 1840-1842.
52. Fleming PS, Flood TR (2005) Bifid tongue - a complication of tongue piercing. *Br Dent J* 198: 265-266.

Copyright: ©2024 Kozlowski Jr VA, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.