

The complication of oral piercing and the role of dentist in their prevention: a literature review

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SUMMARY

Objectives. The work report about the complications of oral piercing and the role of dentist in their prevention.

Materials and methods. The authors conducted a systematic review of the literature through the Medline database by entering “oral piercing”, “piercing and complications”, “piercing and hygiene” as keywords. Articles published between 1988 and 2012 were considered.

Results. Oral piercing is linked to several potential complications. Many of them are due to scarce awareness of the risk, bad habits and inadequate oral care.

Conclusions. The dentist should motivate patients with oral piercing to maintain a good oral care, provide instructions and conduct periodic inspections to secure their understanding and implementation in order to prevent complications.

Key words: oral piercing, piercing and complications, piercing and hygiene.

INTRODUCTION

The term "piercing" refers to a practice carried out in order to insert the jewelry on a site drilled through needles into the skin, usually without anesthesia (1). Oral and perioral piercing already has been practiced in ancient populations and associated with religious, tribal, cultural or sexual symbolism – currently became extremely popular in industrialized countries (2, 3).

There are many reasons to practice a body piercing. Teenagers and young adults want to express their individuality in a simple desire, some people consider it like a test of courage and endurance of pain or a form of provocation and challenge to society, other see it like a fashion (3-5).

There are different forms of body piercing that are applied in different parts of the body, particularly in the oral cavity. The jewelry are made with non-toxic and hypoallergenic materials as for example 14 or 18 K gold, titanium, stainless steel or acrylic (2, 6-8).

Several authors have reported the infections as a common complication of oral or perioral piercing. These complications can appear during the execution of the piercing or because of prolonged persistence in the mouth.

The aim of this literature review is to show the main local and systemic complications and the possible side effects related to oral piercing, to describe the knowledge of common people toward oral piercing and to explain the role of the dentist and dental hygienist in the oral hygiene instruction and motivation of the patient who wears oral piercing. These dental specialists are essential in the prevention and treatment of the most common infections developed from oral piercings and have a key role in the treatment of the sequelae connected. The hypothesis of the study was: the association between oral piercing and increased oral and systemic health risks.

MATERIALS AND METHODS

It was made a systematic review of the literature using the Medline database (www.ncbi.nlm.nih.gov/pubmed). To conduct the research have been used the following keywords: oral piercing, piercing and complications, piercing and hygiene.

The inclusion criteria were:

- articles written from 1988 to 2012
- articles analyzing the practice of oral pierc-

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ing and its potential clinical implications and those devoted specifically to the role of the dentist and hygienist

- original articles, systematic reviews, longitudinal prospective and retrospective studies

The exclusion criteria were:

- articles not written in English
- articles written before 1988
- articles without abstract available and case reports

Applying these criteria, 50 articles were selected, read and analyzed.

RESULTS

Piercing used in the mouth

Oral piercing sites for jewelry placement include the lips, cheeks, frenum, uvula. However, the most common site for oral piercing is the tongue. Piercings that are most frequently applied in the oral and perioral area are captive – bead ring, labret and barbell.

- The captive bead ring is a ring-opened at the end of which is screwed a metal ball. It is widely used as the first piercing in the labial area and it is easy to keep clean and does not create any initial edema (2, 9).
- The labret is a metal round bar of variable length which has at one end a metal disk with flat closing at the opposite end. It is currently widely used like a piercing on the lingual dorsal-ventral and perilabial area (2, 9).
- The barbell, finally, it differs from the labret for the spherical shape of the fixed end.

The predilected area of the piercing in the oral cavity are the lips and tongue, followed by the cheeks, uvula and lingual frenulum (10, 11).

The lip piercing is generally applied on the lower lip near the corners of the mouth where the lips meet. However, piercing can be made anywhere near the area of the lip known as the vermillion border.

The tongue piercing can be on the dorsal-ventral or dorsal lateral side. Dorsoventral is the more common and safer of the two types, dorsoventral tongue piercing involves inserting the jewelry from the dorsal to the ventral surfaces of the tongue. The piercing is commonly made in the middle of the tongue and requires the avoidance of major blood vessels during the procedure. Dorsolateral type of piercing is made through the width of the tongue with the barbell studs located on the top of the tongue at the lateral borders, maintaining the position of the barbell post across that width. This type of oral piercing is not

considered a safe procedure and most professional piercers will not perform it, because of the vascularity of the tongue. A tongue frenulum piercing is a piercing through the frenulum underneath the tongue, known as the frenulum linguae. More rarely, the lingual piercing is positioned at the level of the horizontal plane (12). The continuous movement of the tongue results in a best healing tissue between 4 and 6 weeks than other sites of the oral cavity (11).

The piercing on the cheek is generally inserted at the level of the dimples and should always be before the first molar to minimize the risk of injury of the Stensen duct, which opens in the vestibule in the correspondence of the second upper molar.

The uvula piercing is uncommon because of the increased difficulty of execution and the placement of the jewel, as well as the increased risk of ingestion (12).

A study of Boardman *et al.* (11) agree that, from the statistical point of view, the cheeks piercing is most frequently associated with complications compared to the tongue piercing (10).

Complications of oral piercing

Oral piercing has become widely popular over the past few years. However, many people aren't aware of the dental problems that can go along with it. Some dental problems that can result from oral piercing are: infection, fractured or chipped teeth, swelling, pain, scarring, tooth loss, gum damage, loss of taste, mouth sores. The literature shows numerous complications associated with oral piercing that varies in their severity: from initial topical infections to systemic infections that are more dangerous (human immunodeficiency virus or HIV, hepatitis B and C, tetanus, tuberculosis), able to be chronic and significantly worsen the quality of life of the person (1). These complications can appear during the execution of the piercing or because of jewel prolonged persistence in the mouth.

Complications associated with the execution of the hole of the piercing

During the execution of the hole of the piercing is possible to observe the local bleeding which, in a highly vascularized tissue like tongue, can provoke an important haemorrhage (8-13). It is therefore essential that the piercing is effuated by qualified and experienced personal. Bleeding is not the most frequent complication of the tongue piercing (11), but it is dangerous for the compromised individuals, it is therefore recommended to investigate the haemorrhagical history of the subject (14). Oral infections are related to other infections in the body because of the bacteria presented in

the oral cavity. For example, when the tongue is punctured for the oral piercing, the bacteria on the tongue can release into the bloodstream and travel to the heart. Anyone considering oral piercing should talk with their dentist first to make sure that they are practicing good oral hygiene that is essential in preventing serious infections. This risk is also increased by touching the site or the jewelry with unsanitary hands, consuming unsanitary food or liquid and contact with foreign objects. Although any piercing is prone to infection, a recent study in the *Journal of Adolescent Health* (January 2011) found that stainless steel jewelry can accumulate more bacteria than jewelry made from plastics such as Teflon®. So wearing plastic jewelry pose less risk for infection rather than the metal. The tongue is richly innervated by sensory and motor fibers, that's why the piercer have to be attentive not to cause nerve damage. These complications can occur like the sensory deficits, motor and gustatory damages (8, 9) and are more common in the lingual dorsal lateral than in dorsal ventral side of all executed piercing (2). The complications of piercing can also be systemic, therefore, must be respected specific provisions of sterility to prevent the transmission of infectious diseases such as hepatitis B and C, HIV, Herpes Simplex Virus (HSV), Epstein-Barr Virus (EBV) and *Candida albicans*, tetanus, syphilis, tuberculosis and bacterial endocarditis (2, 15). Although some of these infections do not have serious consequences in healthy patients, but can produce catastrophic effects in immunosuppressed patients. The literature describes the case of an immunosuppressed patient that during the execution of a piercing has been infected by HSV, with evolution in fulminant hepatitis and death of the subject (16). The hepatitis B and C can be transmitted by the use of non-sterile equipment. In particular, the hepatitis B can be transmitted by asymptomatic chronic subjects with hepatitis B through a very small amount of blood. In addition, the virus is able to survive for several months on the contaminated surfaces. Also bacterial endocarditis can be contracted at the time of an oral piercing. Subjects that have a risk is recommended antibiotic prophylaxis (17, 18). Has not yet been scientifically proven the transmission of the virus HIV at the time of the execution of the piercing, however, can not be excluded this risk.

Complications associated with the persistence of the piercing.

The complications associated with the intraoral or perioral piercing are essentially local, that presents in the mucosa. Very often appears erythema, edema and local inflammation because of the

mucosal trauma of the piercing (7-9, 19). These complications may persist for weeks and sometimes produce the granulomatous reactions (8), or create the development of sublingual ranule, which can be surgically removed (20).

The difficulty to remove food debris and maintain optimum oral hygiene at the site of the piercing, lead to the creation of an ideal environment for the accumulation of plaque and tartar causing pain, bad breath, edema, local infections and gingivitis (7, 19).

Several authors have described the infections like the complications of the oral and perioral piercing that invades the subcutaneous tissue. The tongue piercing has a high risk of the *Staphylococcus aureus*, group A *Streptococcus* and *Pseudomonas aeruginosa* infections. The proximity of the lymph node chain can influence the local infection to spread systemically (21) with serious consequences such as airway obstruction, endocarditis (17, 18) and bacteremia (2, 8, 9, 13).

After oral piercing, the Ludwig's angina is another complication that can appear because of the presence of anaerobic bacteria (2, 8, 19). It is an connective tissue inflammation with the symptoms of the tongue swelling, neck pain, and breathing problems. This condition can cause serious complications such as air way blockage or sepsis.(2)

It may also occur the benign scarring and keloid formation, that influenced by the systemic diseases and by drugs assumption (22). The tissue hyperproliferation might be caused by the continuous movement of the jewel within the tissue (11). In some cases, the epithelium may cover the insertion hole of the piercing that creates difficulty to remove the jewel (9), that is described in a case in which the jewel has been partially covered by the lingual mucosa, probably because of the patient incorrect habit, causing its penetration into the opposite side with the mucosal healing (23). The soft tissue constant friction because of the oral and perioral piercing can also cause traumatic and painful ulcerations (24).

The presence of the jewel in the oral cavity, especially on the tongue, can interfere with mastication, swallowing and phonation (2, 9, 19). The oral piercing is therefore contraindicated in patients with dysfunctions and in arthritic patients with temporomandibular joint involvement, in which the stomatognathical multifunction may already be affected (25, 26). The piercing continuous contact with the lingual papillae may also cause alterations of the papillae, reducing the perception of taste (8). The stimulation of the salivary flow is a complication that has been observed in several studies (8, 9, 19) – including a study of Venta *et al.* (27) showing

that in 63% of cases the increased salivary flow is observed because of the introduction of a foreign body in the oral cavity. In the literature it is also described the anaphylactic reactions that occur like a contact dermatitis due to nickel, chromium or nickel-cobalt that content the piercing jewelry (8, 9, 13). The increased fashion of the piercing in young adults can lead the increased sensibilization to nickel that can cause unpleasant allergic reactions in patients who have the orthodontic devices containing nickel (28). In the nineties, the European Union has issued a directive to limit the nickel content in all products intended for direct contact with human tissue, with a threshold of 0.05 g for the intraoral and perioral piercing. The gold used for the manufacture of these jewelry should be at least 14-18 K (8, 9). The use of inert, biocompatible and non-toxic materials has a fundamental importance to minimize the risk of infection after possible ingestion of the jewel (2).

The patient should be particularly careful when remove and insert the jewel and check daily that its ends are properly tightened to reduce the risk of swallowing and airway obstruction. It also important to avoid the "playing" with the piercing to minimize the risk of teeth and gums injury.

Study of Campbell *et al.* (4) showed a high incidence (19%) of periodontal lesions in patients with oral piercing, many of periodontal lesions required periodontal surgery (4, 29, 30).

The gingival recession from trauma and periodontal inflammation are very common, especially in the cases with the lip piercing (31), because of the jewel metal disc that is inside the oral cavity in contact with the marginal periodontium (2, 4, 10, 13, 32, 33).

Recessions associated with the labial piercing occurs mainly on the gingival buccal side of the mandibular central incisors (27, 34-36) without increasing of the depth of the periodontal pocket (34), while those related to the tongue piercing are associated with increased depth of the periodontal pocket (10).

Several authors have noted that the recessions increase significantly with the use of long jewelry, which come more easily in contact with the teeth and soft tissues, and appears to be significantly related to the persistence time of the piercing inside the oral cavity (4, 9, 27).

To minimize the risk oral tissues damage, is recommended the use of acrylic balls.

Due to the continuing trauma caused by the jewellery it is possible to find localized horizontal bone loss (19) or dehiscence (2, 9).

Oral piercing is also directly related to traumatic insults to the teeth, that can be produced by parafunctional habits or any type of play with jewellery. The changes of the dental structure can be fracture, abrasion or chipping of enamel fragments (9, 13), which in some cases lead to tooth sensitivity and pulpal involvement (6). Fractured teeth are a common problem for people with tongue piercing. People chip teeth with tongue piercing while eating, sleeping, talking and chewing. These alterations occur more frequently in the molar (61%) and the premolar area (31%) with the use of large jewelry (4). In the patients with the piercing, the ceramic restorations have the risk of fracture, so it is good to recommend to patients to remove permanently the jewellery or replace it with a non-metallic. The patient with the tongue piercing who has a fixed orthodontic appliance, such as a rapid palatal expander (37-39), is predisposed to the periodontal damage.

Also after surgery or removal of the mucosa to facilitate the eruption of the included teeth, the presence of the jewel is a factor which delays the physiological healing processes (40, 41). There were finally reported cases of diastema and dental misalignment caused by the trauma of tongue piercing (42).

DISCUSION

Several dental associations, the most American Dental Association, are officially contrary to oral piercing because of the many complications associated with it (28, 43). However, the oral pearcing is more and more widespread.

The population is not always aware of the possible implications correlated with oral piercing. People usually do not ask a dentist opinion before executing the oral piercing and very often do not require the qualified personal (11, 37).

Although dentists and hygienists usually discourage the patient from the decision to execute piercing, but not always have a success, so it is critical that dental clinician should be prepared not only to adress the complications of the oral piercing but also to provide information of the prevention, diagnosis and treatment. The role of dental clinicians is to inform the patient about the possible consequences of body piercing in the oral cavity, to explain not to underestimate any symptoms, and consult as soon as possible the dental or medical clinic or ospedal in case of the symptoms (2, 44, 45). Patients often tend to underestimate the injury of the piercing.

The dentist and the dental hygienist plays a key role in the importance of maintaining optimal oral hygiene in order to prevent the plaque in the area of the jewel, which produces an ideal environment for the proliferation of microorganisms.

In particular, at the level of the tongue there are proliferation of the anaerobical bacterias from the subgingival sites and this causes an increase of periodontal bacteria concentration (for example *A. actinomycetemcomitans*, *Porphyromonas gingivalis*, *Prevotella intermedia*, *Tannerella forsythia* and *Treponema denticola*) on the surfaces of the healthy teeth and teeth with periodontal pathology (46-48). Poor oral hygiene and increased plaque seem to favor the growth of bacteria at the site of the piercing, which can represent that microorganisms enter into the bloodstream and cause infection and inflammation (11, 14). It has been shown that the greater the size of the jewel, the worse conditions of hygiene (49). Smoking also appears to play an additional role on the accumulation of plaque (50).

The hygienist should inform piercing wearers their increased susceptibility to bacterial infections and teach them how to clean and disinfect the jewel, how to protect the oral cavity maintaining good oral hygiene. For this aim these patients will receive the series of recommendations, guidelines and instructions and will check their understanding and implementation:

- After the execution of oral piercing, the patient should follow a liquid and cold diet for the first 24 hours, followed by a soft diet. For the first 5-7 days should be avoided hard, hot or spicy food;
- Pain, edema and swelling are common in the first 24 hours after application of an oral piercing and can be useful to dissolve in the mouth a few ice cubes to limit it, but if you suspect that the infection is starting, you should remove the jewel and go to the dentist to prescribe appropriate drugs;
- The patient should not perform oral rinse for the first 24 hours. Later, during the period of tissue healing, must gently brush the dorsal surface of the tongue and then rinse with a mouthwash containing chlorhexidine 0.12% 2 or 3 times a day for 10 days. Chlorhexidine digluconate is effective against Gram-positive and Gram-negative bacterias and its effect is considerably greater respect the other antibacterial agents (51);
- In the first days after the execution of the piercing, a chlorhexidine gel is useful to limit the inflammation and infection. If

present the clinical signs like inflammation and infection may be useful to apply the chlorhexidine gel on the affected surface 2 times a day for 5 days;

- The patient should regularly remove the jewel and to clean it gently with a soft toothbrush, or to clean in a chlorhexidine solution;
- The patient must avoid the consumption of alcohol, caffeine and smoking for at least the first few days because they may accentuate the swelling, bleeding, pain (41);
- As soon as the swelling decreases the jewel must be replaced with one of smaller dimensions to protect of damage to the hard and soft tissues and the accumulation of plaque;
- It must be avoid to touch the area affected by the piercing and any type of play of piercing jewellery. It is necessary not to masticate chewing gum and tobacco to prevent any oral tissue injury during healing. It also have to be corrected the bad habits such as nail biting.

From the dental point of view a patient with oral piercing does not require special care.

According to the authors, in patients with tongue piercing in the case of truncal anesthesia and placement of the rubber dam may be necessary to remove the jewel. If the tongue is anesthetized, there is a greater risk that the tongue piercing could damage teeth and periodontal support.

When the jewel is removed in the odontoiatric clinic, it can be helpful to keep the site clear with a nonmetallic instrument (2).

Finally, the jewel removal is absolutely necessary during both oral and periodontal surgery, to ensure the greatest possible asepsis of the oral cavity, and during the execution of intraoral radiographs to avoid the artifacts (2).

CONCLUSIONS

Intraoral and perioral piercing is a practice essentially of the aesthetic purposes, but can be potentially dangerous, because is related to a number of local and systemic complications. The correlation between an oral piercing and increase health risks was proved. It is therefore essential that patients intending to effete the oral piercing should be warned of the possible risks and their prevention. The dentist and the dental hygienist must occupy with carefully attention of this patient category by providing them the behaviour guidance and rules with periodic controls for early diagnosis of possible complications.

The dental clinicians play an important role in the preservation of oral and general health of patients with piercings. Maintaining optimal oral

hygiene is fundamental in order to minimize the risk of complications after performing the oral piercing (52).

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