

Complications following oral piercing. A study among 201 young adults in Strasbourg, France.

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Objective This study was designed to identify and quantify the number and type of complications relating to the oral environment following piercing of tissue in the oral sphere. **Methods** The epidemiological survey included patients attending the University of Strasbourg Dental Hospital, students frequenting the University of Strasbourg canteen, and members of the public attending piercing conferences in Strasbourg, France between the months of February and June 2005. No dental examination was performed as part of this survey. **Results** 201 people were interviewed in this study. The average subject age was 22.7 years and 73.6% were smokers. Women comprised 72.6% of the sample population. Post-piercing complications occurred in 23.4%, but frequency depended on piercing location in relation to the oral sphere. Gingival recession occurred in 8.5%, and chipped teeth in 6.9% of the group who were aware of complications. Titanium, stainless steel and Teflon were associated with recession in 52.9%, 23.5% and 9%, and chipped teeth in 35.7%, 42.9% and 14.3% of this group respectively. **Conclusion** The occurrence of complications was high. There is a need for public education and a further study with a dental examination.

Key words: Chipped teeth, gingival recession, oral piercing, piercing complications.

Introduction

Body piercing is an ancient practice which has existed for millennia (Krause *et al*, 2000). In the 70's piercing of non-traditional facial areas increased in prevalence with punk culture as an affront to conservative western society rules (Folz *et al*, 2000). Slowly, in the intervening decades, piercing that was formally considered to be outrageous has become an every day sight and socially acceptable. Considered as an art form, body piercing is no longer confined to traditional anatomical sites or particular sociological groups (Le Breton, 2000). Oral and peri-oral sites are now amongst the most popular for piercing. This increased acceptance of oral piercing as a fashion accessory has led to treatment of such patients becoming ever more frequent in the dental surgery (Bassiouny *et al*, 2001). This in turn is placing greater responsibility on dentists to manage and treat the effects of such oral foreign bodies (Maibaum and Marguerita, 1997).

The adverse effects of piercing can manifest themselves as a multitude of complications. They may occur immediately post piercing or following a significant period of time, either as a direct result of the piercing procedure or the long term presence of the piercing jewellery. Complications of infectious (Table 1) and non-infectious (Table 2) nature are not trivial events. Case reports of patients with hypovolaemia, severe airway obstruction following lingual infection are numerous in the literature (Fehrenbach and Herring, 1996. Bath-Balogh and Fehrenbach, 1997. Fehrenbach MJ, 1998.). Non-infection complications may occur as a direct result of the piercing

placement procedure. Paraesthesia due to a nerve trauma, agueusia, prolonged bleeding, foreign body penetration, inhalation of the jewellery and speech problems have been reported (Price and Lewis, 1997). Organisation defects, integration or migration of the piercing may have further implications for the oral soft tissues (Folz *et al*, 2000). Mucosal or cutaneous puncture sites constitute a potential entrance for the pathogenic agents present on the surface of the skin or mucosa, or materials used for the procedure. Their penetration into the tissue can cause localized infection, which may subsequently disseminate with life threatening consequences (Fisman, 1999). This applies particularly to oral and peri-oral piercing with regard to the microbial flora present in and around the oral cavity. Bacterial infections linked to piercing of the oral sphere are the most common, and can have life threatening repercussions (Shimokura and Gully, 1995). Documented cases of diffuse cellulitis (Perkins *et al*, 1997), cerebral abscess (Richard *et al*, 2003), septicaemia (Lovejoy and Smith, 1970), bacterial endocarditis (Tronel *et al*, 2001) and tetanus (O'Malley *et al*, 1998) are available. The risk of viral transmission during the piercing procedure also exists. Suspected cases of hepatitis B, C, D, G and HIV (Meskin, 1998) transmission have been reported. (Table 1)

The repercussions of piercing placement are not limited to oral and peri-oral puncture sites. Dental complications such as chipped, fractured and abraded teeth; pulp sensitivity, gingival recession and bone loss have been documented (Biber, 2003). Furthermore, depending on the material constituent of the jewellery (usually

Table 1. Reported potential infectious consequences of body piercing.

<i>Bacterial</i>	<i>Viral</i>	<i>Prion</i>
<ul style="list-style-type: none"> • Endocarditis • Oral Abscess • Cellulites • Ludwig's Angina • Toxic Shock Syndrome • Cerebellar Abscess • Glomerulonephritis • Tuberculosis • Tetanus • Septicaemia • Syphilis 	<ul style="list-style-type: none"> • Hepatitis A • Hepatitis B • Hepatitis C • Hepatitis D • HIV 	<ul style="list-style-type: none"> • Creutzfeldt-Jakob Disease

Table 2. Reported non-infectious complications associated with oral and peri-oral piercing.

<i>Neurological and Vascular</i>	<i>Dental</i>	<i>Allergies</i>	<i>Other complications</i>
<ul style="list-style-type: none"> • Paraesthesia • Ageusia • Parageusia • Hypogeusia • Haemorrhage • Hypovolemia 	<ul style="list-style-type: none"> • Tooth Fractures • Restoration Fractures • Abrasion • Tooth Sensitivity • Pulpal Pathology • Gingival Recession • Tooth Mobility • Electrogalvanism 	<ul style="list-style-type: none"> • Contact dermatitis • Eczema 	<ul style="list-style-type: none"> • Pain • Ulceration • Penetration into tissues • Hyperplasia • Integration into tissues • Rejection & migration • Oedema leading to airway risk • Inhalation

titanium or surgical stainless steel) some individuals may develop metal allergies (Folz *et al*, 2000) and some cases of electro-galvanism have already been noted (De Moor, 2000).

Despite the fashion trend in oral piercing, little accurate information is available regarding the incidence of complications in the published literature. As the experts in the oral sphere, dentists must now be aware of the risks involved in oral piercing and be capable of informing patients of the potential consequences to their oral tissues if they elect to go ahead with oral piercing. In the case of patients determined to get some form of oral piercing, a detailed medical history, advice concerning the way to choose a safe piercing studio, and appropriate after care during the healing period could provide significant help in avoiding initial post-piercing complications when given by their dentists. If dentists are to be effective in their therapeutic role, they must be aware of the complications related to oral piercing in order to deal with them effectively, if and when they occur.

Materials and Methods

In line with the objectives of the study, a questionnaire was designed by the authors in order to identify the types and rate of post piercing complications. The sample consisted of 201 people: patients attending the University of Strasbourg dental hospital, students frequenting the University canteen, and members of the public visiting a piercing conference in Strasbourg, France. The study was conducted between the months of February and June 2005. The chosen subjects were only those who were noticed to be wearing some form of oral or peri-oral piercing.

All subjects were asked to complete the questionnaire with the aid of an author. Any questions with dental or medical terminology, e.g. recession, were explained by the author if the question was not understood by the respondent. No intra-oral examinations were performed.

Results

The sample was composed of 146 women (mean age 22.3 years) and 55 men (mean age 23.9 years), giving a total of 201 subjects (mean age 22.7 years). 148 subjects (73.6%) were smokers and these included 71.2% of the women and 78.8% of the men. The piercings were located in three places: 106 subjects (52.7%) had tongue piercings, 88 (43.8%) had lip piercings and 7 (3.5%) had cheek piercings. The mean time for which the piercing had been worn was 19.2 months. 103 subjects, 51.2% of the total, said they had more than one other piercing not involving the oral sphere.

The majority of respondents reported some form of problem after the initial piercing procedure. 67% recorded discomfort speaking. Eating difficulties occurred in 78.3%, 28.4% had difficulty swallowing and 23.6% problems drinking. Taste disturbance occurred in 12.3% and lasted over a range of two days to a week. 20.4% of the people interviewed have felt an increasing production of saliva during the first week. 51.7% noticed significant swelling of their tongue and lips for at least one week following the insertion of the piercing.

This study found that 23.4% of those currently wearing a piercing had suffered some form of complication. It is worth noting at this point that this study does not include those who had to remove their piercing due to

medical complications. The incidence of complications varied depending on the location of the piercing (Table 3). In the case of individuals who had a lingual piercing, 3.8% declared that they had one or several areas of gingival recession which they believed to be linked to the presence of their piercing, 14.8% of the persons with a labial piercing reported similar recession complications. Chipped teeth occurred in 7.0% of those with an oral or peri-oral piercing. Of those with recession or fractured teeth, 51.6% admitted to playing with their piercing on a regular basis. Recession was reported in 12.9% of the former group, falling to 8.6% in those who claimed not to play with the piercing. Similarly 50% of those belonging to the group who played with the piercing recorded tooth chipping compared to 21.4% of those who did not (Table 4). Titanium, stainless steel or Teflon piercing

accounted for 47.3%, 36.8% and 10.4% of individuals in whom recession was recorded and chipped teeth values of 45.1%, 32.3% and 9.7% respectively (Table 5).

Despite the recommendation that the initial lingual piercing bar should be in place just 4-6 weeks (Botchway and Kuc, 1998), 29.4% of those interviewed were still wearing the same piercing after the recommended time period had elapsed. Of those who had replaced the initial piercing, 47.3% of the subjects chose titanium, 36.7% stainless steel, 10.5% Teflon and 5.5% some other material.

Leaflets repeating post-piercing home care instructions were not given to 16.4% of those who completed this study. The 'self-pierced' comprised 5.3% of all those interviewed, thereby bringing the numbers without post piercing written medical advice to 21.4%. Post piercing

Table 3. Recorded complications and their relation to the position of the piercing.

<i>Complications</i>	<i>Tongue n=106</i>	<i>Lip n=88</i>	<i>Cheek n=7</i>	<i>All piercings n=201</i>
None n=154	75.6%	77.3%	85.7%	76.6%
Recession n=17	3.8%	14.8%	0.0%	8.6%
Fracture n=14	10.4%	3.4%	0.0%	7.0%
Infection n=6	3.8%	1.1%	14.3%	3.0%
Sensitivity n=3	1.9%	1.1%	0.0%	1.5%
Metallic taste n=6	4.7%	1.1%	0.0%	3.0%
Other n=1	0.0%	1.1%	0.0%	0.5%

Table 4. Frequency of complications relating the amount individuals played with their piercing.

<i>Complication</i>	<i>Never play with piercing n=35</i>	<i>Rarely play with piercing n=96</i>	<i>Often play with piercing n=70</i>
No Complications n=154	71.4%	83.3%	70.0%
Recession n=17	8.6%	5.2%	12.9%
Fracture n=14	8.6%	4.1%	10.0%
Infection n=6	5.7%	2.1%	2.9%
Sensitivity n=3	0.0%	2.1%	1.4%
Metallic taste n=6	5.7%	3.1%	1.4%
Other n=1	0.0%	0.0%	1.4%

Table 5. Frequency of complications relating the piercing material.

<i>Complication</i>	<i>Titanium n=95</i>	<i>Stainless steel n=74</i>	<i>Teflon n=21</i>	<i>Other n=11</i>
None n=154	79.0%	78.4%	71.4%	54.5%
Recession n=17	9.5%	5.4%	4.8%	27.2%
Fracture n=14	5.3%	8.1%	9.5%	9.1%
Infection n=6	3.2%	2.7%	4.8%	0.0%
Sensitivity n=3	2.1%	0.0%	4.8%	0.0%
Metallic taste n=6	0.0%	5.4%	4.8%	9.1%
Others n=1	1.0%	0.0%	0.0%	0.0%

mouthwash was used more frequently by those who received written advice than those who did not; 91.9% versus 79.1%. Saline mouth washing fell to 15.1% in those who received lingual piercing, but was higher, 37.5%, in those who had a labial piercing. Despite average wear time of 19.2 months, 56.2% of individuals had never removed their piercing and only 5.8% removed it daily to clean.

Discussion

The major motivation for oral and peri-oral piercing seems to be cosmetic, and it appears to be concentrated in women, as evidenced by the 72.6% of those interviewed belonging to this group. The current generation of young people are constantly exposed to this form of body art via television and advertising. It is not surprising therefore to find that those with a lingual piercing are reluctant or refuse to remove the jewellery despite the risks to their dentition (Dibart *et al*, 2002). Some have linked oral piercing with a lack of concern for future dental health. The fact that over 78% of those with an oral or peri-oral piercing in this study admitted to being smokers may lend further credence to this assumption. The link between smoking and recession in individuals with oral piercing was not examined by this study. Most of the people who completed the questionnaire were university students with an average age of 22.4 years. Considering average time the piercing was worn was 19.2 months the figures suggest that most had the piercing placed around the time of beginning university. It also suggests that the optimum time for dentists to educate young patients, particularly girls, in the pitfalls of piercing should be around the time of leaving school.

Despite potentially significant immediate post piercing complications, most individuals recover normal lingual function within two weeks. Speaking and mastication difficulties dominate the reported initial complications but quickly subside. Difficulties in swallowing, drinking

and increased saliva production were less common but still affect as much as a quarter of those who undergo lingual piercing. As with speaking and mastication problems they resolve in the main within the two weeks following the procedure. Of particular note is the fact that that over half of those interviewed claimed to have experienced what they regarded as significant swelling of their tongue and lips for at least one week following the procedure.

Recession and chipped teeth represented the most commonly admitted consequences of the piercing being present. Interestingly the study identified a number of subgroups within these values, namely those who play with their piercing versus those who do not (Table 4), and the type of material from which the piercing was made (Table 5). Of those who admitted to having recession and chipped teeth, and habitually played with their piercing, the rates of dental hard tissue fracture and recession were in excess of 50% (Table 4). These values are two and three fold higher than individuals who in their own opinion did not play with their piercing. When the habitual 'wrecking ball' action of these foreign bodies is combined with extremely hard materials such as stainless steel or titanium, traumatic consequences are not surprising. Simply not playing with the jewellery did not make an individual immune from dental trauma, as evidenced by recession and tooth fracture within that group occurring in excess of 17% and 21% respectively. These trauma values are the result of an average 19.2 months wear. The second significant factor in oral tissue trauma was the material from which the piercing is made. The vast majority of oral and per-oral piercings are made of titanium, stainless steel and Teflon. Analysis of the questionnaire results strongly support the use of Teflon jewellery over the other available materials as recession and tooth fracture values were substantially lower than those of either stainless steel or titanium (Table 4). An additional advantage of Teflon is the avoidance of metal allergy. Larsson-Stymne *et al* found that 13% of pierced

versus 1% of non-pierced girls reacted to nickel and/or cobalt (Larsson-Stymne *et al*, 1985). Further studies have demonstrated a statistically significant relationship between metal allergy and the number of skin piercings in men (Ehrlich *et al*, 2001). Thus it is reasonable to assume that the incidence of metal allergy will increase as the percentage of the population with piercings increases. Despite significantly lower adverse effects on the dentition with Teflon, only 10.4% of those who had replaced the initial piercing bar chose this material. The vast majority of people had chosen the substantially harder and therefore more destructive option of stainless steel or titanium. In addition a significant number had not even replaced the initial piercing bar within the recommended 4-6 week period. This bar is deliberately long to prevent the ball end becoming embedded in the swollen tongue following the piercing procedure (Farah and Harmon, 1998). As the bar is significantly longer it can be of greater danger to the dentition. Despite the significant potential consequences to the tissues of the oral sphere arising as a consequence of piercing, it is important to recognise that in over 75% of subjects no recession or tooth fracture was recorded. Figures indicating high frequency of recession or tooth fracture within subgroups, while interesting, must be viewed in relation to the relatively low overall values 8.5% and 7.0% respectively.

The piercing procedure is invasive and involves inserting a 14-gauge needle, seven times the diameter of a dental needle, through the tongue. Many significant structures such as lingual arteries, veins and nerves run lateral to the mid line. Poor piercing technique or lack of anatomical knowledge can result in serious damage to these structures. Thus advice regarding effective home care and situations in which emergency medical advice may be needed is essential. Information regarding effective home care is best provided in written form to allow the patient to review the instructions later. Many of the individuals who completed this survey and who received their piercing in a 'professional' piercing studio did not get any form of written home care guidance. The incidence of self-piercing was lower in the questionnaire population than the 50% suggested by Meskin from a previous study, however, the figure of 5.3% is still significant and it has been suggested that these people are more likely to be younger (Meskin, 1998). On combining the number of individuals who were not provided written advice following studio piercing with those who self pierced, we find that almost a fifth with an oral or peri-oral piercing had no written aftercare guidance. This is a potentially dangerous situation as airway restrictions may become rapidly life threatening. Individuals may have no medical knowledge or available information to indicate when emergency medical advice and treatment is needed. Fortunately this study found the incidence of such injuries to be low. Hardee *et al* (2000) have reported that it is not uncommon for the piercing to be carried out without an attempt at reducing the oral microbial load prior to procedure thus exposing sterile tissue to the estimated 10 billion potentially pathogenic microorganisms composing the oral microflora (Botha, 1998). The tongue is an ideal environment for the growth of aerobic and anaerobic bacteria as it is warm, moist

and constantly bathed in nutrient rich saliva (Orville *et al*, 2000). Tweeten and Rickman (1998) have described the involvement of *Staphylococcus aureus*, *Pseudomonas aeruginosa* and group A β -haemolytic *Streptococcus* in wounds caused by lingual piercing (Tweeten and Rickman, 1998). Infections of the tongue are not trivial events and can rapidly become life threatening. Infection may cause oedema and compromised airway (Farah and Harmon, 1998), cerebellar abscess formation (Martinello and Cooney, 2003), toxic shock syndrome, glomerulonephritis, infective endocarditis, septic arthritis, abscess formation (Orville *et al*, 2000) and Ludwig's angina (De Moor *et al* 2000). Numerous case reports are available documenting the emergency admission of patients requiring intravenous antibiotics and surgical intervention due to infection and oedema following lingual piercing (Tronel *et al*, 2001. Olsen, 2000). Despite the potential for serious infection, less than 3% who responded to the questionnaire described infection following oral piercing. It has to be noted that this study only included those who currently had an oral piercing and does not consider those who had to remove their piercing for a medical reason. Thus, it is reasonable to assume that the incidence of infection is higher than that recorded. Advice regarding hygiene also appears to be deficient as over half of those in the study admitting that they had never removed their piercing to clean it, despite an average wear time of 19 months. Most clinicians will recall seeing the characteristic calculus build up around the ball end of the piercing on the ventral surface of the tongue and have noted the difficulty in removing it.

Conclusion

Oral piercing may seem like a trivial procedure to the public, but both the piercing procedure and the long-term presence of the oral object can have very serious consequences. The implication for future public dental health is clear. There is a real need for the education of the public with regard to the deleterious effects of oral piercing. In addition, a further study with a dental examination is needed to identify if the results of this survey accurately reflect the incidence of post-piercing complications. The major problem consists in selecting a representative sample, because of the numerous methods of piercing procedures.

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