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REVIEW ARTICLE

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Complications of oral and peri-oral piercings: a summary of case reports

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Abstract: *Objective:* To systemically search the literature for case reports concerning adverse effects associated with oral and peri-oral piercings on oral health and/or general health. *Material and methods:* MEDLINE and the Cochrane Central Register of Controlled Trials (CENTRAL) were searched up through 1 April 2010 to identify appropriate studies. *Results:* Independent screening of the titles and abstracts identified 1169 papers from MEDLINE and 73 papers from CENTRAL. Subsequently, 67 papers describing 83 cases were processed for data extraction. The case reports described complications in oral and general health. In this review, 96 complications were described for 83 cases. Of the 96 reported complications, 81% (n = 84) occurred in cases of tongue piercings, 20% (n = 21) in cases of lip piercings and 1% (n = 1) in cases of other oral piercings. In eight cases, subjects had two oral and/or peri-oral piercings. Gingival recession was the most frequently described complication. Periodontitis and gingival recession were seen at the central mandibular incisors. Tooth fracture is mostly reported in subjects with tongue piercings. *Conclusion:* Among the case reports, there were complications like normal post-operative swelling and localized inflammation but also more serious complication that may even have been life threatening. Also in the long term, piercing may be associated with gingival recession and tooth fracture. Therefore, oral and/or peri-oral piercings are not without risks. Patients considering a piercing should be made aware of this. Those patients wearing a piercing should be screened by a dental professional for possible complications on a regular basis.

Key words: case report; complications; effects; general health; oral health; oral piercing; peri-oral piercing; review

Introduction

The increased prevalence of highly visible body modifications is of interest to all health care professionals. Body modification is defined as (semi-) permanent, deliberate alteration of the human body, e.g. body piercing. Body piercing involves the insertion of a needle to create an opening through which decorative ornaments such as jewellery may be worn (1). Body areas such as eyebrows, helices of ears, lips, tongues, noses, navels, nipples and genitals are pierced (2, 3).

The most frequently mentioned motivations in the literature are the expression of individuality and the embellishment of one's own body (4, 5). Other major reported motivations for the acquisition of tattoos and body piercings include self-expression, beauty, art and fashion, pleasure, personal narrative, physical endurance, group affiliations and

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commitment, resistance, spirituality and cultural tradition, provocation, a daring attitude, addiction, sexual motivation and 'just for kicks'.

Oral and facial piercings have seen a rapid increase in popularity (6). Dental professionals need to be aware of the issues surrounding this subject and be able to provide correct information to those who are considering an oral or peri-oral piercing (7). Dental professionals may also be confronted by complications to oral health and/or general health resulting from these piercings.

Several anecdotal case reports in the dental and medical literature have highlighted the dangers that can be associated with piercing, describing conditions that have ranged from the relatively benign discomforts of transient inflammation to serious, life-threatening conditions (6) and even death (8, 9). Reported complications are infection, pain, bleeding, oedema, inhalation, dental trauma, contact lesions and oral interferences (10).

Case reports are an important part of the medical literature and continue to be published in dental journals. They often provide the first identification of side effects and are a major source for detection of rare adverse events. So far, one systematic review (SR) (11) has surveyed the available literature on oral piercing with regard to prevalence, complications and side effects. In this SR, the search terms were not published, and the number of papers resulting from the literature search was small. The purpose of this review was therefore to comprehensively search the literature for case reports concerning adverse effects associated with oral and/or peri-oral piercings on oral health and/or general health.

Materials and methods

Focused question

What are the reported effects of oral and/or peri-oral piercings on hard and/or soft tissues in the oral cavity and on general health?

Search strategy

Two internet sources were used to search for papers satisfying the study purpose: The National Library of Medicine, Washington DC (MEDLINE- PubMed) and the Cochrane Central Register of Controlled Trials.

The databases were searched up to 1 April 2010. The following terms were used for the search strategy:

Intervention: < (piercing* OR pierce*)

AND

Outcome: (mouth OR oral OR lip* OR labret* OR cheek* OR bucca* OR tongue OR lingua* OR frenulum* OR philtrum* OR uvul* OR venom OR tooth OR gingiva* OR gum* OR mucos*) >

OR

< (mouth piercing* OR oral piercing OR lip piercing OR cheek piercing OR buccal piercing* OR tongue piercing OR lingual piercing* OR frenulum piercing OR uvula piercing OR venom piercing OR tooth piercing* OR gingiva piercing OR gums piercing OR mucosa piercing) >

The asterisk (*) was used as a truncation symbol.

The eligibility criteria were as follows:

- Humans subjects
- Case reports
- Oral and/or peri-oral piercings
- Outcome:
  - reported effects concerning hard and/or soft tissues of the oral cavity
  - reported effects concerning general health
- Papers in English language

Screening and selection

Two reviewers (NLH and GAW) independently screened the papers, first by the title and abstract. If information relevant to the eligibility criteria was not available in the abstract or if the title was relevant but the abstract was not available, the paper was selected for a full reading of the text. Next, full-text papers that fulfilled the eligibility criteria were identified and included in the review. Any disagreement between the two reviewers was resolved after additional discussion. If a disagreement persisted, the judgment of a third reviewer (DES) was decisive. The two reviewers hand-searched the reference lists of all of the selected studies for additional published papers that could possibly meet the eligibility criteria of this study. Papers that fulfilled all of the selection criteria were processed for data extraction.

Data extraction

Data were extracted by the two reviewers from the selected case reports with regard to the focused question. Any disagreement between these reviewers was resolved after additional discussion. If a disagreement persisted, the judgment of the third reviewer was decisive.

Data analysis

This review intended to provide a complete summary of case reports. It was therefore not feasible to perform a quantitative analysis of the data. Instead, the data are presented descriptively. Data will be presented on oral and general health. Miscellaneous complications are divided into short-term effects (<1 month) and long-term (≥1 month) effects.

Results

Search and selection results

The MEDLINE search identified 1169 abstracts, and the Cochrane search identified 73 abstracts. After screening by title and abstract, 251 papers were selected for full-text reading, after which 188 papers had to be excluded because they provided no information with respect to the focused question

and/or did not match the eligibility criteria. Hand-searching of the reference lists of the 63 selected papers identified four additional papers, as presented in Table 1. Subsequently, 67 papers were processed for data extraction. Nine of the 67 papers described two or more cases, and 13 cases (#5, #12, #17, #26, #27, #28, #34, #35, #36, #37, #38, #39, #64) had two complications within the same subject. A schematic overview of the search is presented in Figure 1.

In total, 83 cases with 96 complications were summarized. Of the 96 reported complications, 81% (n = 84) occurred in cases of tongue piercings, 20% (n = 21) in cases of lip piercings and 1% (n = 1) in cases of other oral piercings. In eight cases, subjects had two oral and/or peri-oral piercings. An overview of complications is presented in Table 2. Short-term, long-term and miscellaneous complications with respect to general health for 16 cases are listed in Table 3.

Oral health

Tooth fracture

Thirteen papers describe 17 cases of fractured teeth associated with tongue piercings. Of these, 15 were molars, nine were incisors and five were premolars. The type of piercing was a barbell in 13 cases and a ring in one case (#04). The tongue piercing in one case (#07) penetrated the tongue from left to right. The reported time of wear varied from 1.5 to 84 months, with a mean time of wear of 14 months. Only one case report (#03) evaluated the fracture according to an index, the Ellis Classification system, (12) and it reported a Class I fracture (enamel only) of the distolingual cusp tip of tooth number 46. In one case (#10), the fracture was so severe that the tooth had to be extracted. The habit of knocking, clacking, biting, clenching, playing, rubbing or tapping the jewellery against the teeth was mentioned as an aetiologic factor.

Gingival recession

Gingival recession associated with oral and peri-oral piercing was described in 23 cases. The reported time of wear varied from 0.5 to 144 months, with a mean time of wear of 38 months. In seven cases (#21, #22, #23, #24, #29, #30, #31) of lower lip piercings, the recession occurred buccally, and in nine cases (#17, #26, #27, #28, #32, #33, #34, #37, #39) with tongue piercings, it appeared lingual to the mandibular front teeth. Six cases (#18, #19, #20, #25, #35, #36) described tongue and lip piercings in the same subject. In five of these six cases, the gingival recession occurred buccally, and in cases #20 and #36, recession also occurred lingually. Clinical examination showed that gingival recession was co-existent with gingival inflammation in three cases (#19, #21, #39). In five cases (#26, #27, #31, #33, #34), the severity of the recession, which varied from 1 to 6 mm, was mentioned. One case (#19) showed a labial recession that nearly extended to the mucogingival junction. In two cases (#30, #31), the Miller (13) classification for gingival recession was applied; case #31 showed Miller Class I (recession not extending to the mucogingival junction) and case #30 showed Miller Class II (recession extending to or beyond the mucogingival junction) at tooth numbers 31 and 41.

Table 1. **Additional publications included after searching the reference lists of selected papers**

From study	Additional publications
Zadik & Sandler 2007 (#37)	Panagakos & Linfante 2000 (#12)
Zadik & Sandler 2007 (#37)	Croll 1999 (#08 and #09)
Brennan *et al.* 2006 (#16)	DiAngelis 1997 (#01 and #02)
Soileau 2005 (#33)	Harnick 1998 (#18)

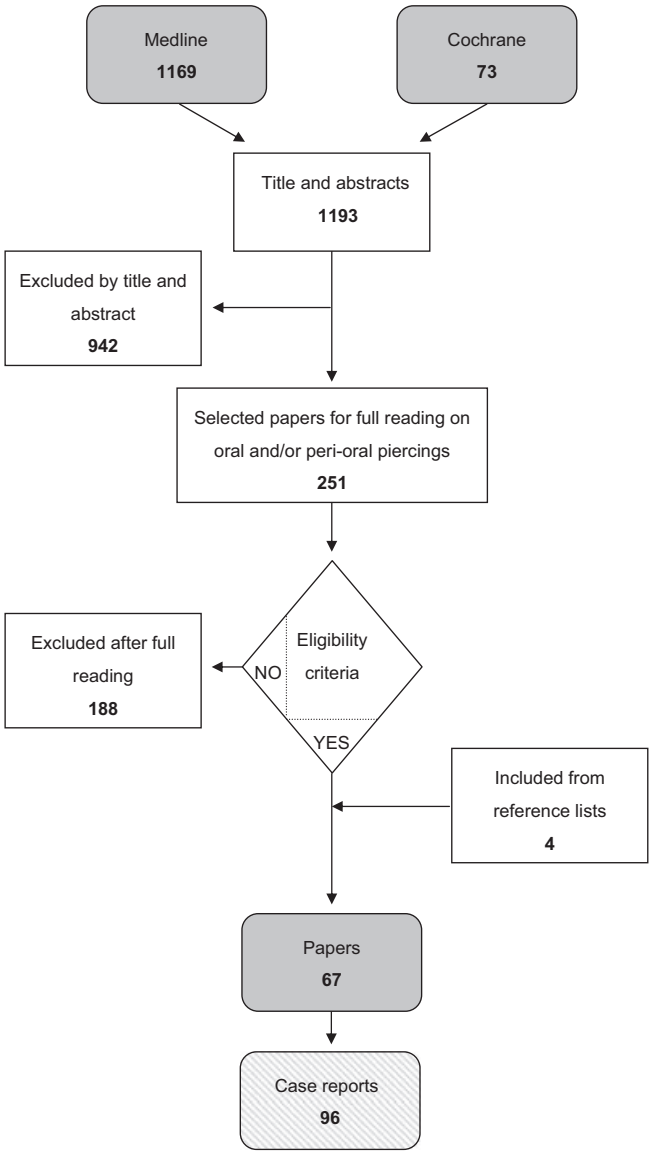

Fig. 1. Search and selection results.

Periodontitis

Eleven cases showed periodontitis associated with oral and/or peri-oral piercing. The subjects in 10 cases wore tongue

Table 2. **Summary of cases about complications of oral piercings, as compiled by the authors**

Complication	Case report number (# no.)	# Cases (# Subjects with multiple piercings)	# Gender	# Tongue piercings	# Lip piercings	# Other oral piercings	Mean age in years (range)	Reported mean time of wear in months (range)
Oral health								
Tooth fracture	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17	17	♂ 8 ♀ 9	17*	–	–	22 (15–33)	14 months (1.5–84 months)
Gingival recession	17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39	23 (6)	♂ 6 ♀ 17	15	14	–	22 (16–30)	38 months (0.5–144 months)
Periodontitis	12, 26, 27, 28, 34, 35, 36, 37, 38, 39, 40	11 (2)	♂ 4 ♀ 7	10	3	–	24 (18–32)	36 months (6–144 months)
Embedding	41, 42, 43, 44, 45, 46, 47, 48, 49, 50	10	♂ 4 ♀ 6	6	4	–	22 (16–28)	4 months (0.25–24 months)
Prolonged bleeding	51, 52	2	♂ 2 ♀ –	2	–	–	17 (15–18)	3 days (1–4 days)
General health								
Endocarditis	53, 54, 55, 56, 57, 58, 59, 60	8 (2)	♂ 4 ♀ 4	9	–	1	19 (18–30)	5 weeks (1 week–8 weeks)
Infection/abscess	61, 62, 63, 64, 65, 66	6	♂ 3 ♀ 3	6	–	–	18 (13–22)	7 days (8 h–14 days)
Ingested piercing	67, 68, 69	3	♂ – ♀ 3	3	–	–	16 (15–17)	–

–, No information, no data presentation or not possible to extract data.
*, Location of the oral piercing in case #10 is assumed by the authors.

piercings, of which two cases (#35, #36) consisted of a tongue piercing and a lip piercing in the same subject. One of these cases (#35) had two ring-type tongue piercings at the tip of the tongue. In this case, tooth number 31 was exfoliated. In only one case (#38), a lip piercing was described as a possible risk factor of periodontitis. In all described cases, the periodontal attachment loss occurred at teeth numbers 31 and/or 41. Nine cases showed gingival recessions of 1–5 mm at the mandibular front teeth. The probing depth and/or clinical attachment loss varied from 3 to 9 mm. The reported time of wear varied from 6 to 144 months.

Embedding

Ten cases showed embedding of oral and peri-oral piercings. The reported time of wear varied from 0.25 to 24 months, with a mean time of wear of 4 months. In six cases, the subjects wore tongue piercings. The tongue piercing was embedded in the ventral surface of the tongue in four of these cases (#43, #45, #47, #50) and in the dorsum of the tongue in one case (#46). For one case (#40), the location of the embedded piercing was not specifically mentioned. Four cases (#41, #44, #48, #49) concerned lip piercings. The vestibular extra-oral part of the piercing was embedded in the soft tissue in two of these cases (#41, #44), and the intra-oral part of the piercing was embedded in the other two cases (#48, #49).

Prolonged bleeding

Two male cases had prolonged bleeding following piercing of the tongue; these cases were 15 and 18 years of age. One subject (#51) had re-pierced the tongue 4 days before and reported to an emergency room because of persistent bleeding. The subject had already removed the piercing but spontaneous healing did not occur. The re-pierced site was continuously bleeding, and a large ventral haematoma with necrotic tissue was present. In case #52, tongue piercing resulted in slow and active bleeding from the ventral site of the tongue and mild swelling of the mid-floor of the tongue.

General health

Endocarditis

Eight cases of endocarditis associated with oral and peri-oral piercing are described. The reported time of wear varied from 1 week to 2 months, with a mean time of wear of 5 weeks. Subjects wore tongue piercings in seven cases, of which two subjects (#53, #59) had a double tongue piercing. One case (#57) had a piercing in the maxillary-labial frenulum. One of the following bacteria was present in blood cultures in these eight cases: *Streptococcus* gram-positive bacteria (#60), *Streptococcus viridans* (#59), *Methicillin-resistant Staphylococcus aureus* (#55), *Staphylococcus aureus* (#58), gram-negative *Neisseria mucosa* (#53), gram-negative *Haemophilus parainfluenzae* (#57)

Table 3. **Miscellaneous complications in the general health of 16 subjects with tongue piercings**

Complication	Case report number (# no.)	Gender	Age in years	Time of wear
Short-term effect				
Hypotensive collapse	70	♀	19	4 h
Loss of insertion needle	64	♂	17	8 h
Airway obstruction	71	♂	18	48 h
Ludwig's angina	72	♀	25	4 days
Herpes simplex hepatitis	73	♀	19	7–14 days
Thrombophlebitis of the sigmoid sinus	74	♀	20	15 days
Tetanus	75	♀	24	21 days
Long-term effect				
Cerebellar brain abscess	76	♀	22	1 month
Atypical trigeminal neuralgia	77	♀	18	3 months
Hypertrophic-keloid lesion	78	♀	20	4 months
Stimulus fibroma	79	♀	19	4 months
Bifid tongue	80	♂	17	1 year
Breakage of tongue stud	81	♀	29	2 years
Lesion of soft tongue tissue	5	♀	28	Several years
NA				
Extraction of piercing	82	♂	32	NA
Positive effect				
Speech improvement	83	♂	18	NA

–, No information, no data presentation or not possible to extract data.
NA, Not applicable.

and *Haemophilus aphrophilus* (#54, #56). The subjects in three cases (#54, #56, #59) had a history of heart disease since childhood. The subject in one case (#59) had a previous history of intravenous drug abuse but denied recent usage.

Infection/abscess

Six cases showed infection/abscess formation associated with tongue piercing. One case (#61) suffered from a swollen, painful and inflamed tongue with purulence. The subject had difficulty with swallowing and speaking and had salivary incontinence. The treatment consisted of removal of the piercing, irrigation of the wound and prescription antibiotics. A 20-year-old woman had submental swelling, pain and difficulty swallowing after having had her tongue pierced 6 days earlier (#62). In another subject (#63), the piercing procedure resulted in a sensitive tongue with an inflamed and oedematous lesion 10 mm in diameter around the tongue stud. Self-piercing and subsequent loss of the piercing needle in case #64 resulted in a swollen reddish tongue and floor of the mouth, hard submental swelling expanding to the submandibular areas, local erythema and difficulty swallowing. In another case (#65), self-piercing resulted in a lingual abscess. A 22-year-old man (#66) developed high fever, drowsiness, 13 multiple ring-enhancing lesions in the brain, surrounding oedema, focal bleeding and fulminant hepatic failure 2 weeks after tongue piercing. The patient eventually died of multi-organ failure.

Ingested piercing

Three case reports described ingestion of a tongue piercing. The three women were 15, 16 and 17 years of age. One subject was 30 weeks pregnant and suffered from an eclamptic seizure in the maternity ward. During the seizure, one half of the barbell was swallowed and shown to be below the diaphragm in the stomach (#67). Another case suffered from right iliac fossa pain after losing the piercing 12 months prior. The patient was initially discharged but returned 4 weeks later with continuous complaints. The piercing was found in an oedematous vermiform appendix (#68). In case #69, the subject swallowed a piercing clip 1 day and a tongue-ring 2 h prior to referral to the surgical department. The objects were detected in the stomach and gut.

Miscellaneous

In total, 16 single cases were described concerning different complications associated with tongue piercing, such as bifid tongue, loss of insertion needle and tetanus infection. In one particular case (#83), the tongue piercing had been deliberately placed to successfully improve speech difficulties.

Discussion

Oral piercings have become popular among young adults during the recent decade (14). However, piercing is not without risks (15). Descriptions of both immediate and delayed complications appear in case reports (14). However, there are likely many more adverse events after oral piercing procedures than the case report literature describes. It is likely that cases similar to the ones summarized in this paper will occur more frequently as the popularity of piercings grows among young people (16). The present paper indicates that the number of cases in which oral and dental complications are associated

with lip piercings is smaller than that related to tongue piercings (16).

The body piercing procedure is relatively quick and simple (17). Anaesthesia is not considered useful during body piercing, as the pain from the puncture is similar to that felt during intravenous access or an injection. Some individuals find the act of piercing pain-free, while others feel only momentary discomfort during the puncture (17). Ethyl chloride spray is used occasionally (18). Body piercings often take place in tattoo establishments; generally, no antibiotic is used, and sterilization methods vary (3). Fresh piercings are open wounds and can therefore be conduits for infection (17). Within the first 5 days after the piercing, significant swelling of the pierced area, light bleeding (cases #51, #52), bruising, tenderness or a light secretion of a whitish/yellowish fluid (but not pus) is normal (19). Healing times vary, but until fully healed, these wounds have the potential to manifest various complications (17), as summarized in this review. After the oral piercing procedure, regular rinsing with antimicrobial mouth rinses and/or saline rinses are suggested (20), which can help the piercing site to heal uneventfully and reduces the risk of an infection (21).

The healing times vary between 6 and 8 weeks for the tongue (22), 6 and 16 weeks for the lower lip (3, 20, 23, 24), and 6 and 24 weeks for the upper lip (16, 24–26). It is generally recommended that the jewellery not be removed for a long period to prevent the piercing site from closing spontaneously (27). The relatively short healing time of the average oral piercing provides a much smaller window of opportunity for exposure to external infection than other common piercings such that of the navel, which has a healing period of 6–9 months (22). However, once healing is completed, it is important to continue performing adequate oral hygiene. The jewellery should be removed daily and cleaned and brushed thoroughly to maintain good oral hygiene and avoid plaque and calculus build-up (27).

Some literature suggests that piercings associated with infection (#61–#66) should be removed only if they are inappropriate for the sites in which they have been inserted or if their presence is likely to retard the healing process (24). However, different authors argue that if the jewellery is removed from infected sites, there is a risk of abscess formation. Although literature on whether to remove piercings from infected sites is scarce, it is generally considered necessary to remove embedded jewellery (24) (cases #41–#50). Patients must be informed fully of the potential implications of removing embedded jewellery before they consent to the procedure; such implications include the subsequent closure of pierced issues, which makes reinsertion of piercings difficult. Alternatively, laceration and infection can occur if the piercing is left in place (24). When removing any form of intra-oral jewellery, the risk of accidental aspiration must be considered (18).

The main problem with non-medical skin penetration is the possible transmission of blood-borne viruses, especially hepatitis B (28). The same universal precautions for preventing transmission of infectious agents must be applied to piercing as to any other invasive procedure. When patients maintain their willingness to have an oral piercing, it is recommended that they search for a licensed piercer who is familiar with infection control measures, including the use of disposable gloves and instruments, sterile single-use needles (29) and an autoclave for inter-patient sterilization (11) as well as appropriate jewellery selection.

Different materials can be used for oral piercings. The metal that most commonly causes allergies is nickel. Silver jewellery can cause poisoning in which the leaching of silver slats discolours the skin (24). According to the Association of Professional Piercers, the jewellery placed in initial piercings should be made of a material that will not react with the body, i.e. implant-grade stainless steel or titanium, gold (14K or higher) or platinum. In some cases, inert plastics like Tygon® or PTFE (Teflon®) are also acceptable (30).

Amateur piercing should be strongly discouraged by providers because of the absence of clinical and anatomical knowledge, which can result in unclean, inadequately pierced openings in the wrong areas (7). Some people choose to pierce themselves. Common methods of self-piercing include safety pins, sewing needles, piercing guns, or other sharp implements (17). In two cases (#64, #65) included in this review, self-piercing resulted in a lingual abscess and loss of the insertion needle. Piercing must be done at a sufficient depth to keep the jewellery in place. Insertion that is too shallow may lead to rejection of the jewellery or an increased chance of injury (23). Because of potential wound contamination and improper placement, self-piercing is not recommended (17).

Removal of all jewellery prior to any dental procedure is recommended, especially when mandibular block anaesthesia is involved (31). The subject with oral and/or peri-oral piercing has to learn how to chew differently and to be careful when eating to avoid biting on the piercing (32). A tongue piercing ball can easily catch between the mandibular and maxillary incisors and cause harm to these teeth (cases #1–#17). Playing with the ornament can also damage the gingiva (cases #17–#39) and increase salivary flow (15). The literature suggests that jewellery-associated recession frequently develops as a narrow, cleft-like defect on the lingual aspect of the mandibular incisors, with recession depths of 2–3 mm or greater, often extending to or beyond the level of the mucogingival junction. Thinner gingival tissues may be at greater risk of breakdown and recession than thicker gingival tissues (33).

Much information about body piercing is available to adolescents through the mainstream and counterculture media, including magazines and the internet. The internet in particular has extensive information regarding body piercing, including detailed personal experiences, piercing studio listings, photographs and explicit descriptions. These sources of information generally neglect to provide information on health risk factors or other information regarding health issues (7). The internet also does not report that piercing may even result in death (cases #66, #73). Because the population is not aware of these potential complications, no professional dental or medical opinions are sought before oral piercing (34). Dental professionals need to be aware of the risks related with elective oral piercing to be able to inform patients about consequences (29), provide appropriate guidance, treat possible complications

and recognize associated lesions. When a patient with an oral piercing arrives at a dental office for a periodic check-up, the structures surrounding oral and/or peri-oral piercings should be evaluated as a part of the oral check-up. Oral piercing should also be incorporated as an item in the evaluation of the medical history (35). Dental professionals will become aware of manifesting complications and become familiar with the potential associated oral and dental problems (36).

Summary and conclusion

Gingival recession was the most frequently described complication. Periodontitis and gingival recession were seen at the central mandibular incisors. Tooth fracture is mostly reported in subjects with tongue piercings. Subjects with tooth fractures reported a habit of knocking, clacking, biting, clenching, playing, rubbing or tapping the jewellery to the teeth.

Among the case reports, there were complications like normal post-operative swelling and localized inflammation but also more serious complication that may even have been life threatening. Also in the long term, piercing may be associated with gingival recession and tooth fracture. Therefore, oral and/or peri-oral piercings are not without risks. Patients considering a piercing should be made aware of this. Those patients wearing a piercing should be screened by a dental professional for possible complications on a regular basis.

Practical implication

With the increased number of patients with piercings at intra-oral and peri-oral sites, dental practitioners should have knowledge and be prepared to address issues that could arise as a result of such a piercing, including potential damage to the teeth, gingiva and the periodontium as well as the risk of oral infection. Because common knowledge is poor (15), patients should be educated regarding the complications that may follow piercing of the oral cavity (37).

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