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## The prevalence of oral and peri-oral piercings in young adults: a systematic review

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**Abstract:** *Objective:* To determine the prevalence of oral and/or peri-oral piercings in young adults based on a systematic review of the available literature. *Material and methods:* The MEDLINE-PubMed, Cochrane-CENTRAL and EMBASE databases were comprehensively searched through April 2012 to identify appropriate studies. The prevalence of oral and/or peri-oral piercings was evaluated in the general population, as well as by gender and by anatomical site. *Results:* An independent screening of 1711 unique titles and abstracts resulted in 13 publications that met the eligibility criteria. In total, 11 249 participants (mean age, 20.6 years) were questioned and/or examined for oral and/or peri-oral piercings. In the studies that provided information concerning the presence of oral and/or peri-oral piercings, the prevalence varied from 0.8% to 12%, resulting in a mean prevalence of 5.2%. When examined based on anatomical site, the most common sites were the tongue (a prevalence of 5.6%), followed by the lip (1.5%). Oral piercings were more prevalent in women (5.6%) than men (1.6%). *Conclusion:* Among the populations that were studied, oral and/or peri-oral piercings were observed in a relatively small percentage (5.2%) of young adults. The prevalence was approximately four times higher among females when compared with males. On the basis of the literature, the tongue was the most common oral site for a piercing. Dental care professionals are in an ideal position to offer information regarding safe piercings and to provide advice regarding oral hygiene, aftercare and possible complications.

**Key words:** oral piercing; peri-oral piercing; prevalence; systematic review

## Introduction

Body piercing has been practiced in almost every society throughout history. Piercings have been found on preserved bodies of people who lived between 4000 and 5000 years ago (1). It was commonly confined to the ears, mouth and nose (2). Anthropologists describe body art or modification as a way for an individual to identify with a specific group (e.g. a religious group, tribe or gang). Moreover, it may be a way of denoting one's financial or marital status or even as a way of beautifying the body (3). Egyptian pharaohs pierced their navels and Roman soldiers pierced their nipples to demonstrate courage and virility, respectively (4). The Mayans pierced their tongue to demonstrate virility and courage as well (5).

Piercing has been performed using a variety of materials, including wood, metal, pottery and ivory (6), especially on the Asian, African and

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American continents (7). In some African tribes, wooden plates are worn in the upper or lower lip, whereas in others, ring-shaped wires are worn only on the lower lip. Natives of sub-Saharan Africa and South America pierce each other using bone, beads and pieces of wood (1). Eskimos and Aleuts pierced the lower lips of boys with stones, bones or ivory as a rite of passage into puberty (5). Eastern cultures such as Hindus and the Chinese have been known to pierce the lips, cheeks or tongue with an assortment of materials.

The introduction of Christian influences has led to a decrease in the numerous cultural practices of body piercing (5). In recent years, however, body piercing has gained widespread popularity, especially among young adults (8). The main cause of this growth in popularity may be cultural commercialism spread by the media. More specifically, media messaging may have altered a previously held view of body modifications and their associations with certain subcultures (9). In the 90s in Europe and North America, a body piercing was seen by those in the 'punk' and anti-establishment subcultures as a symbol of deviance and rebellion (10). Body piercing nowadays is practiced across many social and age groups (8). Early experimentation in Western cultures with oral body modification was largely limited to the lips (i.e. lip stud or labret); lip piercings can be placed anywhere around the vermillion border (5). However, tongue piercings with a stud or barbell have recently become a popular (6) and fashionable phenomena in modern society. As a more recent form of fashion, individuals may be more adventurous with oral piercings (11).

The literature describes the different short-term and long-term effects associated with oral and/or peri-oral piercings on oral and general health. A recently published review provides a comprehensive overview of the case reports concerning these adverse effects (12). Gingival recession was the most frequent complication, followed by tooth fracture and periodontitis. Case reports also described embedding of the piercing and prolonged bleeding after piercing. Endocarditis, infection and/or abscess, and ingested piercing are possible complications on general health (12). Serious complications, which may cause considerable post-operative discomfort, result in the loss of teeth and can even be life-threatening. Therefore, oral and/or peri-oral piercings are not without risk. It is important to determine the prevalence of oral and/or peri-oral piercings to estimate the impact of this phenomenon on every day clinical practice, especially for the dental care professional. The purpose of this systematic review was to determine the prevalence of oral and/or peri-oral piercings among young adults based on a systematic review of the literature.

## Material and methods

### Focused question

What is the prevalence of oral and/or peri-oral piercings among young adults?

### Search strategy

Three internet sources were used to identify papers satisfying the study purpose. These included the National Library of Medicine, Washington, DC (MEDLINE-PubMed), Cochrane Central Register of Controlled Trials (CENTRAL) and EMBASE (Excerpta Medical Database by Elsevier). The databases were searched for studies conducted in the period up to and including April 2012.

**The search strategy was customized according to the database being searched. The following terms were used in the MEDLINE-PubMed 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 mucosa\*)>

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.*

### Screening and selection

Two reviewers (NLHH and GAW) independently screened the papers, first by title, and later by abstract. If the 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 this review.

The eligibility criteria were as follows:

- Humans subjects
- Young adults
- Cross-sectional studies/cohort studies/survey studies
- Oral and/or peri-oral piercings defined as any piercing that involves intraoral structures or has intraoral communication.
- Outcome:
  - Prevalence of oral and/or peri-oral piercings in general, as well as by gender, and anatomical site
  - Scores by absolute numbers or percentages based on questionnaires and/or examinations
- Papers in the English language
- Papers specifically evaluating groups that were classified as being 'at risk' were excluded

Any disagreement between the two reviewers was resolved after additional discussion. If a disagreement persisted, the judgment of a third reviewer (DES) was considered to be decisive. The two reviewers (NLHH and GAW) hand-searched the reference lists of all of the selected studies for



additional published papers that could possibly meet the eligibility criteria. Papers that fulfilled all of the selection criteria were processed for data extraction.

### Data extraction and analyses

Regarding the focused question, data were extracted from the selected papers by the two reviewers (DES and NLHH).

After a preliminary evaluation of the selected papers, the data were presented in a descriptive manner. First, the percentage of piercees (i.e. pierced subjects) was extracted per study, as well as by gender and piercing site. Next, the weighted mean prevalence was calculated for the total population, as well as populations on gender and anatomical site.

## Results

### Search and selection results

The searches resulted in 1711 unique papers. After screening by title and abstract, 89 papers were selected for full-text reading, after which 76 papers were excluded because they provided no information regarding the focused question and/or did not match the eligibility criteria. Hand searching of the reference lists of the selected studies resulted in no additional papers. Subsequently, 13 papers were processed for data extraction. A schematic overview of the search and selection results is presented in Fig. 1.

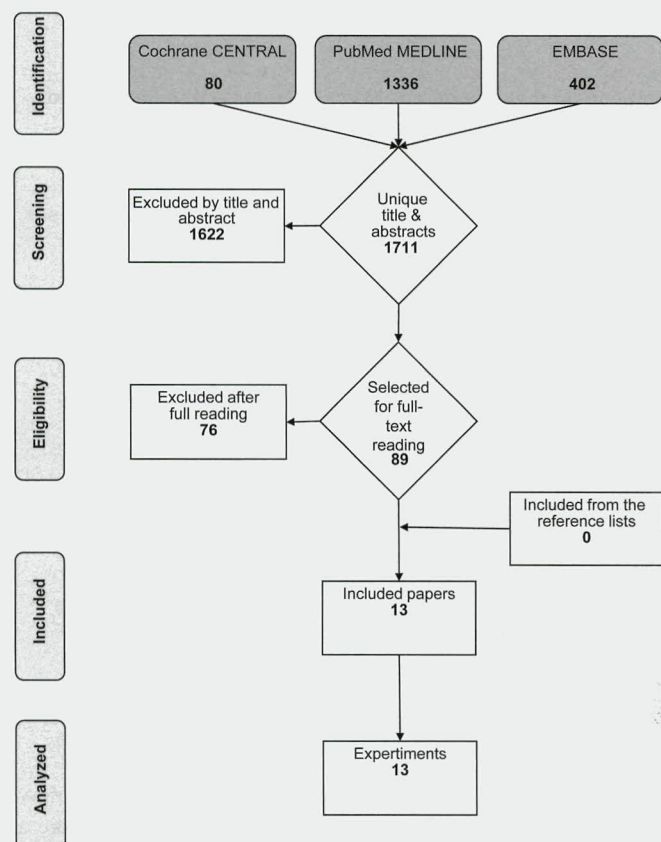


Fig. 1. Search and selection results.

### Study design

The included studies described a cross-sectional evaluation, which is the observation of a defined population at a single point in time. A total of nine studies used a questionnaire to collect data concerning the prevalence of oral and/or peri-oral piercings. Of these studies, five studies were anonymous surveys (#03, #06, #07, #08, and #12), four were voluntary (#05, #07, #08, #12) and two were confidential (#03, #12). Study #01 used the Armstrong Team Piercing Attitude Survey (ATPAS), which is based on previous field studies and has been reviewed in the literature (3, 13–15). In one study (#03), the questions regarding body piercings were from the 'Body Art Survey' designed by Armstrong for high school students (16). Other studies used interviews (#05, #10) and/or dental examinations (#04, #05, #06, #13) to obtain the data.

### Number, age, range and group of subjects

The total number of participants varied per study from 234 (#13) to 2266 (#05). The weighted mean age of the study participants was 20.6 years (Table 1). The included studies assessed different young adult groups defined as 'students' (#01, #03, #04, #07, #08, #09, #13) and 'patients' (#05, #06, #11), of which #06 and #11 involved a military dental office. Two population-based studies assessed the groups by age (#02, #10), and another was a survey of young adults (#12).

### Data analyses

Data concerning the presence of oral and/or peri-oral piercings in the young adult population were extracted from 12 studies (Table 2). On average, 5.2% of the 9104 young adults that were questioned and/or examined had an oral and/or peri-oral piercing. Some studies presented the data separately for men and women. On the basis of this subanalysis, the presence of oral piercings was higher in women (5.6%) than men (1.6%).

In 12 studies, with a total of 10 948 evaluated participants, the prevalence of oral and/or peri-oral piercings was differentiated by anatomical site. The most common piercing was a tongue piercing, with a prevalence of 5.6%. The prevalence of lip piercings and cheek piercings was 1.5% and 0.1%, respectively. Study #12 reported 0.5% of 440 participants having two chin piercings, and study #04 reported that three of 927 participants had piercings in oral sites other than the lower lip or tongue. Nine studies (#04, #05, #06, #07, #08, #09, #10, #12 and #13) reported that some participants had oral piercings at more than one site. Study #05 explicitly stated that no jewellery was found in the uvula or on the upper lip.

## Discussion

Healthcare practitioners have taken an interest in the mainstreaming of body modification because of the corollary rise in adverse health risks (26). From a medical perspective, the use of body jewellery cannot be considered to be merely a harm-

Table 1. Age and description of the participants in the selected studies

No. of study	Reference	No. of participants	Type of participants	Gender	Mean age (SD) range in years
1	Armstrong <i>et al.</i> (17)	450	Students	–	–
2	Bone <i>et al.</i> (11)	1531*	Population-based sample of young adults†	♂871 ♀659	16–24 years
3	Deschesnes <i>et al.</i> (18)	2145	Students	♂1068 ♀1077	14.7 (1.51) years 12–18 years
4	Firoozmand <i>et al.</i> (19)	927†	Students	–	16 years 14–18 years
5	Garcia-Pola <i>et al.</i> (20)	2266†	Patients	–	25.1 (7.7) in patients with piercings
6	Levin <i>et al.</i> (21)	389†	Patients	♂210 ♀179	20.08 (1.1) years 18–24 years
7	Mayers & Chiffriller (22)	650*†	Students	♂266 ♀384	21.2 years
8	Mayers <i>et al.</i> (14)	446*†	Students	♂218 ♀228	21 years
9	Pearose <i>et al.</i> (23)	504†	Students	–	14–19 years
10	Skegg <i>et al.</i> (24)	966†	Population-based sample of young adults aged 26	♂494 ♀472	26 years
11	Slutzkey & Levin (25)	301	Patients	♂177 ♀126	18–22 years
12	Stieger <i>et al.</i> (26)	440†	Young adults	♂210 ♀230	24 (4.2) years
13	Ventä <i>et al.</i> (27)	234†	Students	♂50* ♀184*	20.6 (0.6) year

–, no information, no data presentation, or data extraction not possible.

\*Calculated by the authors of this systematic review.

†Participants with multiple piercings.

‡Including removed or repierced sites.

Table 2. Overview of extracted data from the selected studies describing gender distribution and prevalence related to the pierced location

No. of study	No. of participants	No. of piercees (%)	Gender number (%)		Piercing location number (%)		
			Male	Female	Tongue	Lip	Cheek
1	450	30* (6.7)	–	–	30* (6.7)	–	–
2	1531	141* (9.2)	–	–	100 (6.5)	41 (2.7)	–
3	2145	–	–	–	276* (12.9)	–	–
4	927†	33 (3.6)	18 (1.9)*	15 (1.6)*	26 (2.8)*	10 (1.1)*	–
5	2266†	18* (0.8)	–	–	3 (0.1)*	15 (0.7)*	0 (0)*
6	389†	47* (12)	–	–	39 (10)	8 (2.1)	–
7	650*†	33* (5.1)	4 (1.5)	29* (7.6)	31* (4.8)	2* (0.3)	–
8	446*†	33* (7.4)	5 (2.3)*	28* (12.3)	32* (7.2)	1* (0.2)	0 (0)
9	504†	49 (10)	–	–	38 (7.5)*	11 (2)*	3 (0.6)*
10	966†	21* (2.2)	6 (1.2)	15 (3.2)	21* (2.2)	–	–
11	301	34 (11.3)	–	–	–	–	–
12	440†	28* (6.4)	5* (2.4)	23* (10)	11 (2.5)	15 (3.4)	–
13	234†	8 (3.4)*	0 (0)	8 (4.3)*	7 (3)*	4* (1.7)	–
<b>Total</b>	<b>11 249</b>	<b>χ 5.2*</b>	<b>χ 1.6*</b>	<b>χ 5.6*</b>	<b>χ 5.6*</b>	<b>χ 1.5*</b>	<b>χ 0.1*</b>

–, No information, no data presentation, or data extraction not possible.

\*Calculated by the authors of this systematic review.

†Participants with multiple piercings.

Bold values indicate the overall (weighted) means.

less fashion trend because it can produce undesired local and general effects (28). For instance, up to 70% of individuals with a body piercing are estimated to develop subsequent health complications (26). The growing popularity of body

piercings, especially in young adults (8), is driven by a variety of factors, including the need to fulfil social demands, make a personal statement or enhance sexual appeal (29). Given the high prevalence of body modification in contemporary societies



and the associated health risks, it is important for medical providers to be aware of the prevalence of body modifications to better serve the healthcare needs of their patients. As a contribution to the literature, the present review summarizes the available evidence concerning the prevalence of oral and/or peri-oral piercings among young adults.

Although it would appear from the literature that most oral piercings proceed uneventfully, the severity of the short- and long-term complications, as summarized by Hennequin-Hoenderdos (12), makes the practice of oral piercing one that cannot be condoned (30). To estimate its impact on the everyday practice for the dental care professional, it is necessary to know the prevalence of intra- and/or peri-oral piercings. Several surveys have assessed their prevalence in young adults and reported a wide range. It has been suggested that the wide range is attributed to the factors such as the time and geographical location of the studies, as well as different participant groups and discrepancies in the definition of a piercing (11). This review provides a summary of the studies that are relevant to the focused question. The average prevalence of oral piercings reported in the included studies was 5.2%, with a higher prevalence in women. The data showed that the tongue (5.6%) was the most commonly pierced site, followed by the lip (1.5%). On the basis of three studies, the prevalence of cheek piercings was 0.1%. Less common locations were the lingual fraenum, the dorso-lateral tongue and the uvula. According to the existing literature, a uvula piercing is rare because there are inherent difficulties in performing the piercing, as well as the risk of nausea, throat irritation and/or dysphagia (31).

In two survey studies, which were not included in this review because they did not refer to absolute numbers or percentages, 96.9% (32) and 99.1% (33) of the responding dentists had seen or treated a patient with an intraoral or peri-oral piercing, respectively. In support of the findings of the present review, in both surveys, the dentists reported tongue piercings as the most common type, followed by lip piercings. More than three-quarters (77.5%) of the responders had seen complications that they believed were directly attributable to the piercing (33). Among dentists who saw patients with a piercing, 79% provided recommendations regarding possible complications to the oral structures. These recommendations included information regarding the dangers of infection and the risk of traumatic damage to the teeth and the gums, as well as oral hygiene associated with removal of the piercing (32).

Because of the possible dental and oral implications, follow-up visits are important for patients with oral piercings. If a patient presents with an intra- and/or peri-oral piercing, a dental care professional should examine the device (27) and the surrounding tissues for associated complications. Microbiological analyses of tongue piercing sites have shown that jewellery can serve as a reservoir for periodontopathogenic bacteria (34). Ziebolz *et al.* (34) reported that the longer the piercing had been in place and the worse the oral and piercing hygiene, the more pronounced was the shift from bacteria with a moderate periodontopathogenic potential to bacteria

with a high periodontopathogenic potential. Heavy smoking also seemed to have an effect, and the piercing material was found to play an additional role in plaque accumulation (35). Overall, these results emphasize the need to inform patients with oral piercings about their increased risk of bacterial infections. From a dental perspective, piercees can be advised on how to maintain good oral hygiene by cleaning and disinfecting their jewellery with appropriate materials (34).

### Limitations

The results presented in this review are based on cross-sectional surveys. They are considered to be diverse and representative (14). However, most studies surveyed adolescents and/or young adults using convenience samples, in which selection bias is likely to have had an influence on the findings (11). Although fairly large samples were recruited, sampling can contribute to selection bias, especially when sample selection was not truly randomized (as in study #02 (11)).

Most studies (#01, #02, #03, #06, #07, #08, #09, #11 and #12) on piercing prevalence collected data using questionnaires. As such, the likelihood of selection and information biases has to be taken into account. Therefore, caution must be exercised when attempting to extrapolate the present findings.

### Conclusions

In the populations that were studied, oral and/or peri-oral piercings were observed in a relatively small percentage (5.2%) of young adults. The prevalence was approximately four times higher in women than men, and the tongue appeared to be the most common site for an oral piercing. Dental care professionals are in an ideal position to offer information regarding safe piercings and to provide advice regarding oral hygiene, aftercare and possible complications.

### Practical implications

Patients present to their dental care professional wearing jewellery inserted into intra- and/or peri-oral tissues. Dental care professionals can play an active role in providing information to those who are planning to obtain oral and/or peri-oral piercings, and helping patients make informed decisions. If a patient presents with an oral and/or peri-oral piercing, a dental care professional should examine the device and the surrounding tissues for possible short- and long-term complications on the patient's general and/or oral health. Dental care professionals should treat possible complications and be prepared to remove the causative agent when required. Although serious complications are rare, the popularity of piercings and the risk of complications occurring long after the actual piercing may place a considerable burden on health services for many years. It is recommended that questions regarding piercings be included in medical questionnaires.



## Directions for further research

The delineation of the actual incidence of complications associated with oral and/or peri-oral piercings requires further research.

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## Conflict of interest

The authors declare that they have no conflict of interest.

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