prevalence of different cleft types, cleft sidedness, and congenitally missing teeth in each cleft type.

Methods

The study conducted as a follow-up of the study done by Jamilian et al. [13] was carried out in accordance with the ethical standards set forth in the 1964 Declaration of Helsinki. Informed written consent was obtained from each patient and a parent or guardian. Two hundred two consecutive cleft lip and/or palate patients who were referred to orthodontic department of SBUMS from 2009 until 2011 were included in the study. Except for one subject who was excluded from the study, none of the subjects had other known syndromes. Subjects' distribution according to gender can be seen in Table 1. The final sample of 201 subjects included 131 males with the mean age of 12.3 ± 4 years and 70 females with the mean age of 12.6 ± 3.9 years. The patients' population was racially and ethnically similar. Lateral cephalograms, OPGs, and photos of patients which were taken for treatment were used for observational purposes of this study. Panoramic and/or periapical and occlusal radiographs of the patients were used to determine the presence or absence of the teeth.

Two observers analyzed the records of the patients at the same time. The results of their observations were blinded to each other. No differences were found between the assessments.

The Statistical Package for Social Sciences, Version 20 (SPSS Inc. Chicago, IL, USA) was used to analyze the data. *T* test, Chi-square, and binomial tests were used to analyze the data and *P* value was set at $P < 0.05$.

Results

Two hundred one consecutive cleft patients including 131 males and 70 females were examined and classified according to their cleft type. Observation of the records showed that the majority of patients suffered from cleft lip and palate (148 subjects), while only three of the subjects suffered just from cleft lip. Further distribution of the subjects according to the type of cleft can be seen in Table 2. Cleft lip patients were not included in the statistical analysis due to the very low number of patients. Although there was a higher tendency for male dominance in the unilateral cleft lip and alveolus and unilateral cleft lip and palate patients, Chi-square test showed that there was no relationship between patients' sex and the affected side (Table 3) In addition, binomial test showed that the patients suffering from unilateral cleft lip and palate had higher incidence on the left side ($P < 0.001$) (Table 4). As can be seen in Table 5, the incidence of missing teeth in cleft side is higher than the non-cleft side of both unilateral cleft lip and alveolus and unilateral cleft lip and palate subjects.

Table 1 Gender distribution of samples

Gender	*N* (%)	Age (year) Mean ± SD
Male	131 (65.2)	12.3 ± 4
Female	70 (34.8)	12.6 ± 3.9

Discussion

This study showed that unilateral and bilateral cleft lip and palate followed by unilateral cleft lip and alveolus were more common than other types of cleft in Persian population. Moreover, the incidence of cleft was significantly higher on the left side of unilateral cleft lip and palate patients. The findings of this study are similar to studies of other races. Fraser [14] reported the prevalence of left-sided clefts to be 66.6 %, and Wilson [15] reported it as 60 %. Kim and Baek [3] also found that patients had a significantly higher incidence on the left side than on the right. Their results showed that the prevalence of left-sided clefts in the unilateral cleft lip and palate patients was 67.4 %. While they did not find any significant difference in the distribution of cleft sidedness in unilateral cleft lip and alveolus patients.

Similar to the results of our study, hypodontia was found to occur more frequently on the cleft side than on the unaffected side [16]. Shapira et al. [17] also found that hypodontia of both the maxillary lateral incisors and second premolars were more frequent on the left side, which also had a higher frequency of clefting. In current study, substantially more missing teeth were detected in non-cleft side of unilateral cleft lip and alveolus patients. Similarly, Baek [5] and Kim also found considerably lower prevalence of hypodontia in the non-cleft side of these patients.

Ranta [18] reported that the upper lateral incisors are the most commonly missing teeth in the cleft area, followed by the second premolars in cleft lip and palate patients. These findings are similar to the findings of the current study for cleft lip and palate and cleft lip and alveolus patients. This finding has been explained by the proximity of the cleft to the lateral incisor region, which may strike and divide the primordial tissue related to the developing lateral incisor field [16].

One of the limitations of the current study which affects generalizing the results is the small number of patients. Further multi-center studies with a larger sample size and different races would definitely improve the literature. Future multidisciplinary studies focusing on genetic aspects of cleft patients in order to justify the higher prevalence of left-sided cleft are required.