

# Prevalence of Spacing Malocclusion in Local Population Visiting a Dental College

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## Abstract

**CONTEXT:** Malocclusion can be defined as one in which the arches do not line up properly in any of the planes or one in which the position of the teeth deviates from the norm. Spacing in adults might have been inherited, acquired, or functional factors. **OBJECTIVES:** The purpose of this study is to determine the frequency of spacing in a particular South Indian community. **MATERIALS AND METHODS:** Data from patients who visited a private teaching hospital served as the basis for this investigation. By looking over medical records, data was gathered, and the data was then analysed. **RESULTS AND DISCUSSION:** According to the current study, between the ages of 21 and 40, there were more men (60.6%) than women (39.35%). In the younger adult age group, previous dental extraction (35.89 percent) was the most frequent cause of spacing (21-40 years). Males outnumbered females (81.74 percent) in the age range of 41 to 60. (18.26 percent). It is clear that periodontitis (43 percent) accounted for the majority of spacing issues among adults (41-60 years). **CONCLUSION:** The study demonstrates the many etiologies of spacing in two various age groups. According to the data, patients between the ages of 21 and 60 most frequently had their teeth extracted for periodontitis and caries.

**Key words:** Spacing malocclusion, Etiology, Young adults, Elder patients

## Introduction

A malocclusion is characterised by an abnormal relationship between the arches in any plane or by irregularities in tooth position that go beyond what is considered normal. The term "malocclusion" literally means "bad bite." [1]. Although malocclusion does not pose a life-threatening risk, it can be seen as a matter of public health [2]. Normal tooth alignment benefits an individual's general well-being and personality in addition to their dental health. Among the most prevalent chronic dental problems in children are malocclusion as well as caries [3]. Across most nations, these factors have raised demand for orthodontic as well as restorative procedures. People often associate success in many different areas with having a pleasant smile. Throughout puberty and the head start of adulthood, dental aesthetics has been the subject of increased attention. The epidemiological data of misaligned teeth is crucial for determining the resources available for orthodontic services given the rising need for orthodontic therapy. Malocclusion is more common in certain populations, races, and age groups than others [3]. Variation between the different populations has been noticed, especially in crowding and sagittal, dental arch relationships. Literature states that, among the malocclusions that exist, crowding is the most common and is a consistent problem in children and adolescents. Spacing was found to be half as common as crowding [3].

Spacing among adults might have inherited, developed, or functional causes. Tooth size and arch length disparities, innately missing teeth, macroglossia, supernumerary teeth, microdontics, and hypertrophic frenulum in the upper lip are examples of inherited causes [4]. Detrimental and acquired causes include pathological abnormalities as macroglossia, missing teeth, delayed eruption of permanent teeth, and periodontal disorders [5]. Functional causes include detrimental factors. Spaces can be heritably caused by tooth size-arch length discrepancies, but the issue is with the structure of the jaws [6]. According to research, those with relatively large faces and jaws typically have spacing rather than crowding [7]. Numerous genetic [8] and environmental [9] factors have been linked to congenitally absent teeth. Innately missing teeth often have spacing that extends beyond the

edentulous region because surrounding teeth frequently erupt into the gap left by the missing tooth, as is the situation with impacted teeth.[10] Spacing become worse when existing teeth are smaller and have unusual conical shapes that compromise their appearance and function. [11] Innately absent teeth can be a syndromic characteristic or an individual clinical symptom. [12] The most frequently congenitally absent teeth are second mandibular premolars, followed by third molars and maxillary lateral incisors. [13], [14] Generalized spacing may occur as a result of small teeth. Localized spacing may also be brought on by little teeth and teeth with odd, small crowns..[15]–[17]

Numerous studies on the spacing and occlusion of the dentition have shown that human ethnicities, different ages, and cultural groupings exhibit different occlusal features. [18] Our team has extensive knowledge and research experience that has translated into high quality publications. [19],[20],[21],[22],[23],[24],[25],[26],[27],[28],[29],[30],[31]–[35] [36],[37],[38] This study aims at finding the prevalence of spacing in a specific South Indian population.

## Materials and Methods

The current study was a descriptive and retrospective study where the required data of the patients reported to the dental institution with spacing was collected by reviewing patients records and analysing the data of all patients. The study was set in a University which predominantly consisted of the South Indian Population. The pros of the study was that it included a varied population. The cons were that it had a very limited geographic area of coverage and small sample size. The ethical approval of the current study was obtained from the institutional ethical board . The selection of patients was from the list of out-patients of age group 21 to 60 years , who visited the clinics from Dec 2020 to march 2021 who were diagnosed with spacing due to various reasons . The data was obtained for the Dental Information Archiving Software which is a database of all treatments done to children who visited the pediatric department of the dental hospital with dental needs. The total data obtained was 8211 and the required sample size obtained from the data was 867 . The inclusion criteria was all patients of 21 to 60 years of age whose clinical examination revealed spacing of teeth. Exclusion criteria were all incomplete and censored data. The data was cross verified using photographs and reviewed by an additional reviewer to minimize error . The data has high internal validity and high external validity as well. The data was entered in a methodical manner and was tabulated in Microsoft excel sheet. The tabulated data was imported to SPSS software (IBM) for statistical analysis.

## Results and Discussion

Males were more prevalent than females between the ages of 21 and 40, according to the current study (60.6 % vs. 39.35 %) (Figure 1). The maxilla was where spacing was most frequently found in people in that age range (52.59 %) (Figure 2). The most frequent cause of spacing among younger adults (ages 21 to 40) was prior dental extractions (35.89%) (Figure 3).

Males outnumbered females in the age range of 41 to 60 (81.74 % to 18.26 %) (Figure 4). In the age range of 41 to 60 years, spacing was most frequently observed in both the maxilla and mandible (70.43 %) (Figure 5). In the adult age range (41-60 years), it is clear that periodontitis (43%) was the leading cause of spacing (Figure 8a-e) (Figure 6). Due to the varied sample sizes in each age group, it is not possible to compare the study's findings about the different etiologies of malocclusion between the age categories.

In the primary dentition, spacing is a common condition and a crucial characteristic since it predicts the successful growth of permanent teeth. The absence of these spacings indicates a high likelihood of crowding in the permanent dentition. [39], [40] Boys have more spacing than females do, and it is more prevalent in the maxilla than the mandible. [41] A common observation was that kids with any kind of primary dentition spacing had broader jaws. It is important to note that el-Nofely et al. (1989) discovered some link between spacing in both arches and tooth size as well as between spacing and jaw width in a population sample from Egypt. [42], [43] Steigman and Weissberg's epidemiological study from 1985 found that although 50% of patients with spacing had spaces in both arches, just 21.4% of the overall population had spacing in both arches. [44]–[46] Spacing was twice as common in the maxillary arch with the cause being either innately missing teeth or impaction of laterals, canines, or premolars. Maxillary anteriors have a higher prevalence of maxillary spacing. [47], [48] Boys were more likely

than females to have spacing in both arches in examinations of young populations. However, the incidence of spacing is the same in boys and girls older than 16 to 18 years of age.[49], [50]

Spacing can be inherited, acquired, or functional. Tooth size and arch size inequalities, innately missing teeth, macroglossia, excessively few teeth, undersized teeth, and hypertrophic upper lip frenulum are all hereditary conditions. [51], [52] Destructive oral habits are among the functional factors. Anatomical abnormalities, such as a big tongue, pathologic diseases, missing teeth, the delayed eruption of permanent teeth, and periodontal disease are examples of acquired causes.[53], [54] In the current study, the causes of spacing in both the groups (21-40 years and 41-60 years ) was found to be due to previous dental extractions followed by periodontitis. Prevalence of periodontitis as the second most common cause for spacing among 21-40 year old individuals may be due to the prevalence of aggressive periodontitis existing in individuals of age 30-40 years of age. The reason behind periodontitis being the second most common cause for spacing among 41-60 year old individuals may be due to chronic periodontitis which is caused due to poor oral hygiene and negligence of patients. Tooth size arch length discrepancy is the next most common cause for spacing among both the age groups. The determination of the amount of dental arch space deficiency is measured by the mesiodistal dimensions of the tooth and arch perimeter. In patients who have spacing due to tooth size arch length discrepancy, the MD dimension of the teeth are smaller and the arch perimeter is comparatively larger. Another most important reason for spacing are congenitally missing teeth (CMT) ,retained deciduous and impacted teeth. CMT or hypodontia is the most common developmental abnormality of teeth. The pathophysiology of CMT can include systemic disorders, infections, chemo, radiation treatment, or even abnormalities like Down syndrome. [10] The permanent teeth may also be positioned ectopically as a result of hypodontia. This is due to either a lack of nearby teeth to serve as guides during eruption or a lack of sufficient space for them to erupt into. Transposition of teeth is also seen more commonly in individuals with hypodontia. Another frequent cause of postponed tooth eruption is the absence of a permanent replacement, which prevents the primary teeth's roots from eroding normally. As a result, deciduous teeth may remain in place for up to 40 or 50 years. [55] Another frequent cause of gap among youngsters is oral habits. Repetitive habits such as thumb sucking, tongue thrusting, mouth breathing can cause localised spacing. Hypertrophic upper labial frenum is a very common cause for spacing between the two central incisors (Midline diastema).

From the results of the study, it is evident that dental extractions due to dental caries was found to be the most common cause of spacing among the young adults. Awareness about preservation of teeth is necessary among the public. If extraction of teeth is unavoidable, replacement must be done. The study calls for education among the public, for better awareness of dental health and to prevent early loss of tooth decay. Education about conservation of teeth with root canal treatment rather than extraction must be made. However, if there is inevitable loss of teeth, replacement with dental prosthesis must be considered.

Among the elder adult group, pathological migration was most prevalent calling for better education of periodontal health rehabilitation and pre prosthodontics orthodontics for occlusal integration after which dental prosthesis should be emphasised upon. However, the public must be made aware about veneers for functional approximate contact and aesthetics for anterior interdental spacing.

**Figure 1: Frequency of Gender of Patients Between 21-40 Years of Age**

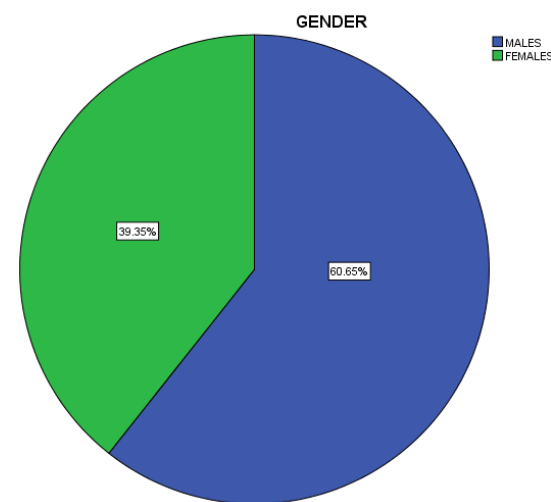


Figure 1 shows the frequency distribution of gender in patients of ages between 21-40 years. Blue represents males and green represents females. The figure shows that males (60.6%) were more in number than females (39.35%) between the ages of 21-40 years.

**Figure 2: Arches Where Spacing is Present in Patients Between The Ages 21-40 Years**

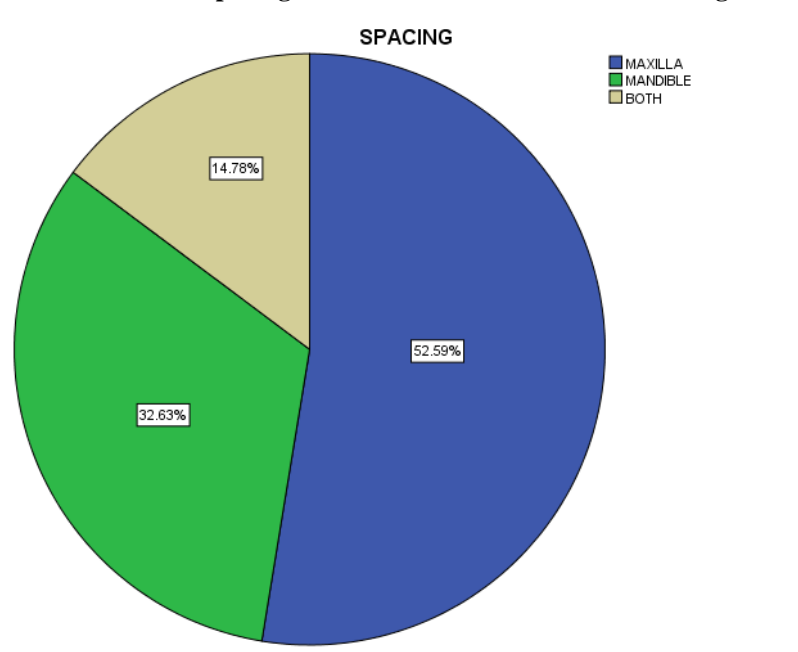


Figure 2 represents the arches where spacing is present in patients between the ages 21-40 years. Blue represents maxilla, green represents mandible and brown represents both maxilla and mandible. It is evident that spacing was most frequently present in the maxilla(52.59%).

**Figure 3: Etiology of Spacing of Spacing in Patients Between 21-40 Years of Age**

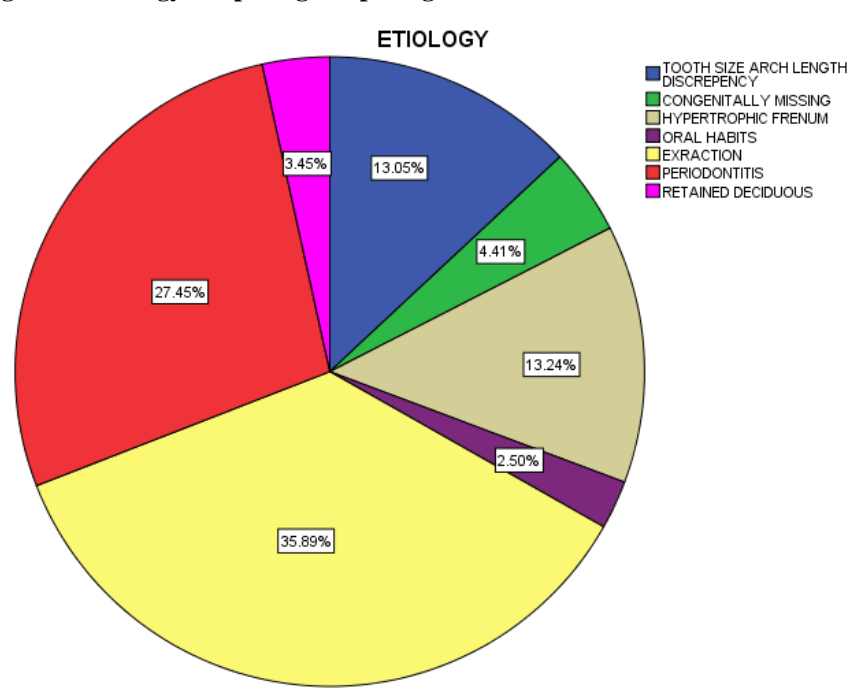


Figure 3 represents the etiology of spacing in patients between 21-40 years of age. Blue represents tooth size arch length discrepancy, green represents congenitally missing teeth, brown represents hypertrophic frenum, purple represents oral habits,yellow represents previous dental extractions red represents periodontitis,and pink represents retained deciduous. It is evident that dental extractions (35.89%) was the reason for spacing among the age group 21-40 year

**Figure 4: Frequency Distribution of Gender of Patients Of Age Between 41-60 Years of Age**

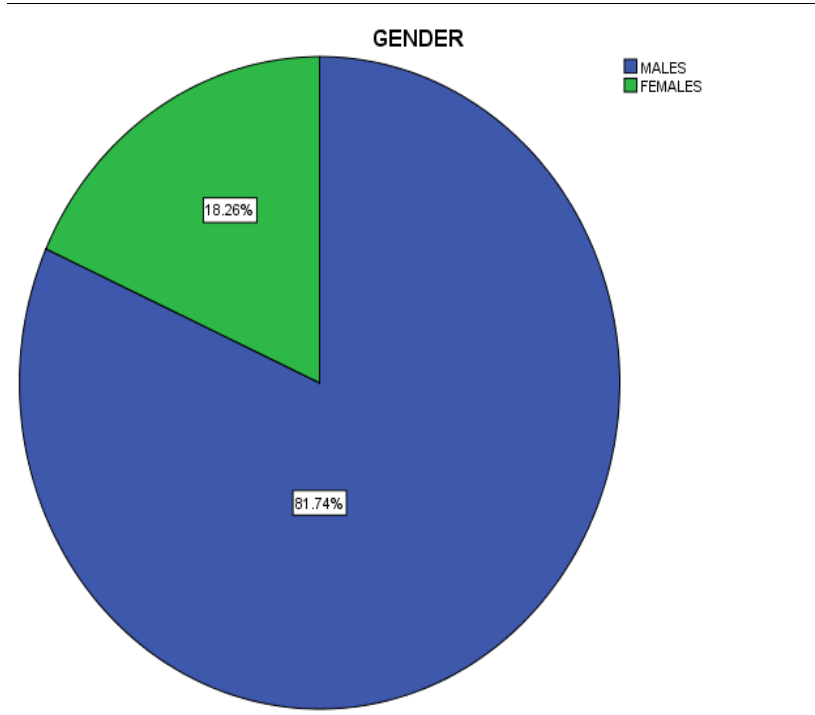


Figure 4 shows the frequency distribution of gender in patients of ages between 41-60 years. Blue represents males and green represents females. The figure shows that males (81.74%) predominant than females (18.26%) between the ages of 41-60years.

**Figure 5 : Arches Where Spacing is Present In Patients Between The Ages 41-60 Years**

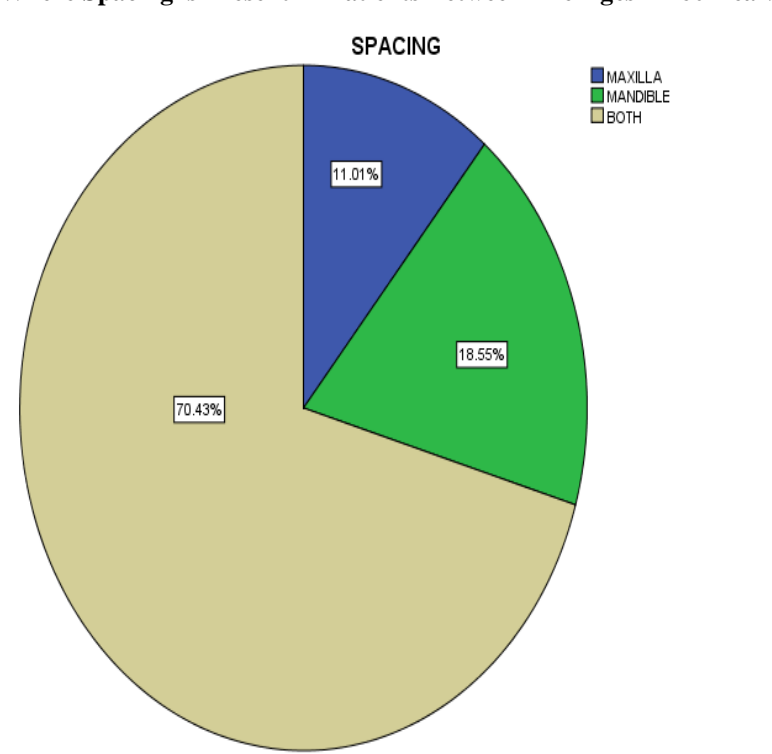


Figure 5 represents the arches where spacing is present in patients between the ages 41-60 years. Blue represents maxilla, green represents mandible and brown represents both maxilla and mandible. It is evident that spacing was present in both the maxilla and mandible (70.43%).

**Figure 6 : Etiology Of Spacing In Patients Between 41-60 Years of Age.**

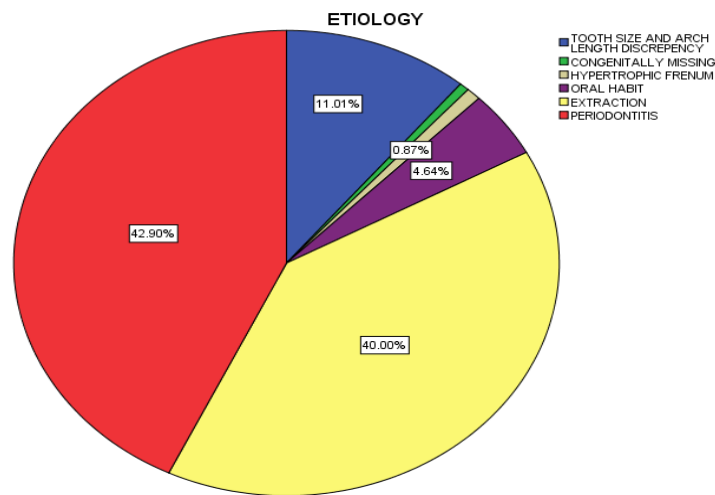


Figure 6 represents the etiology of spacing in patients between 41-60 years of age. Blue represents tooth size arch length discrepancy, green represents congenitally missing teeth, brown represents hypertrophic frenum, purple represents oral habits, yellow represents previous dental extractions and red represents periodontitis. It is evident that periodontitis (43%) was the mostly the reason for spacing in the age group 41-60 years.

**Figure 7a-7e : Spacing due to Macroglossia/ Tooth Size Arch Length Discrepancy**





**Figure 8a-8e: Spacing Due to Periodontitis**



### **Conclusion:**

The study reveals that females commonly present with spacing in young adult age groups and males in elder age groups. The most common etiology for spacing in younger age groups is previous dental extractions and for older age groups it is periodontitis.

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### **Conflicts of interest**

None declared.

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