

## Study of Distribution and Prevalence of Dental Anomalies in Hama Governorate in Syria - Radiographic Study

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### ABSTRACT

#### Summary

The aim of this study was to determine the prevalence, gender and jaw distribution of selected dental anomalies in Hama Governorate in Syria. It also aims to compare our result with another study in the world.

#### Material and Methods

In this cross-sectional study, panoramic radiographs, in which 600 Syrian Subjects (206 males and 394 females) The sample was collected from three private facial, oral and maxillofacial imaging centers in Hama Governorate, for persons between the ages of 12 and 40 years from the visitor of these centers during the period 2018 until the end of 2020. dental anomalies including hypodontia, impaction (excluding third molars), supernumerary teeth, peg shaped laterals, hypercementosis, taurodontism and transposition were evaluated in the study.

#### RESULTS

The most prevalent dental anomaly was found to be transposition then impaction then hypodontia then peg shaped lateral incisor then hypercementosis. Only hypodontia showed statistically significant difference between males and females. Taurodontism and supernumerary teeth were the least prevalent anomaly.

#### CONCLUSION

The study's findings provide insights into the prevalence of dental anomalies Hama Governorate. Both epidemiologically and clinically, this knowledge can be useful to tackle the dental anomaly issue.

Key Words: Radiography; Dental Anomaly; Cross-sectional; distribution; prevalence

## INTRODUCTION

Congenital absence of teeth is one of the common conditions in society, which in the effect on development of occlusal and in the beauty of the smile in particular, And the face in general, especially if the injury is in the anterior region, and most of these cases cannot be detected early except through the participation of both clinical and radiological examination, As well as investigating the causes of absence to rule out other causes such as trauma and extractions due to necrosis, periodontitis or extractions for orthodontic reasons. Early detection of absence also contributes to giving the patient the

possibilities of treatment, compensation and restoration, all through planning a comprehensive, multi-disciplinary treatment. [4]

Both primary and permanent teeth can be affected by irregularities in number, size, and shape, The same applies to the structure of hard dental tissues. This diversity can be determined by genetic factors or due to environmental factors that affect locally or systemically. [2]

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Several systems have been used to classify dental disorders, and each has its benefits, the most common classification classifies developmental disorders into:

Developmental Anomalies in number

Developmental Anomalies in size

Developmental Anomalies in shape

Developmental Anomalies in color

Developmental Anomalies in structure

What distinguishes this classification is that the groups in it are related to the stage of dental development during which the dental disorder is believed to have occurred.[3] prevalence missing teeth occurring in 3.49% - 25.7% of individuals according to Various studies . Dilaceration, an anomaly of tooth shape, has also been widely studied, occurring at a reported prevalence of 0.5% - 21.11%. Tooth impaction is also a common finding in patients; numerous studies have reported the prevalence of impacted teeth.[4] Another developmental anomaly of tooth shape is dens invaginatus, occurring at a prevalence of 0.4%-10.9% [5] [6] Impacted teeth play a significant role in the etiology of different types of malocclusions. The permanent maxillary canines develop close to nasal cavity, far from the dental arch and, therefore, have the longest eruption path compared to other permanent teeth. In about 1.5% of population, the canines show an ectopic eruption path towards the palate. [7] Sisman et al.[1] he and his colleagues searched the files of 2413 orthodontic patients in Turkey, and the absence rate was 7,45%, and in the upper dental arch more than the lower one, and similar between right and left. Goren et al . [8] studied the absence of teeth in a sample of 18-year-olds on Panoramic photo Absence was 43,8 %, including the third molars, but 5,3 %, excluding the third molars . Among them, %4,2 have the absence of the lower second premolars and 1.1% have the absence of the maxillary lateral incisor . The absence of the lower third molars was 22.1 % more than the absence of the upper third molars 16,4 %, And the absence of bilateral lower third molars 7.6% and the absence of bilateral upper third molars 4.9% and the absence of the four third molars 3. 4%.

## MATERIAL AND METHODS

In this cross-sectional study, panoramic radiographs, in which 600 Syrian Subjects from Hama Governorate (206 males and 394 females) were evaluated the following dental anomalies :

Structural anomaly (hypercementosis).

Positional anomalies (transposition and impaction)

Shape anomalies (peg shaped laterals and taurodontism)

Number anomalies (hypodontia and supernumeraryteeth)

The sample was collected from three private facial, oral and maxillofacial imaging centers in Hama Governorate , for persons between the ages of 12 and 40 years from the visitor of these centers during the period 2018 until the end of 2020.

All of the following were excluded from this study:

Any digital panoramic radiograph showing that the patient suffers from syndrome in some or both jaws or Any digital panoramic radiograph that shows that the patient has suffered a trauma or a fracture of the jaws, or has installed fixation wires for the jaws or splints or Any digital panoramic radiograph with poor resolution, unclear, or distorted.

Informed consent was taken from each patient to use their data for research purposes. The panoramic radiographs were screened at optimum lighting conditions and standard screen resolutions. The researchers evaluated the radiographs as well as one neutral investigator evaluated the records of the total sample to diagnose and tabulate the dental anomalies.

## DATA ANALYZE

Statistically analysed by SPSS, Version 20 for descriptive analysis and frequency values we use Chi square test. to evaluate the error of identification of each dental anomaly we use Kappa statistics. The level of significance was set at 95% confidence interval. A p-value of <0.05 was considered to be statistically significant.

## RESULTS

In this study we evaluated 600 digital panoramic images for Syrian patients from Hama Governorate,. The sample number was 600, 206 males and 394 females, in percentage terms, respectively (34.3%) and (65.7%) As shown in Table 1 . Table 1 shows the prevalence and gender distribution of dental abnormalities included in this study, These dental anomalies are (Hypodontia , Impaction , Supernumerary teeth, Peg-shaped Lateral Incisor , Hypercementosis , Taurodontism , Transposition ).

**Table1:** Prevalence and gender-wise distribution of Dental Anomalies in from Hama Governorate

Developmental Anomaly	Gender n (%)		Prevalence n (%) N = 600 (%)	P value
	Male n=206 (34.3%)	Female n=394 (65.7%)		
Transposition	116 (29.1%)	54 (26.2%)	170 (28.3%)	0.105
Impaction	90 (22.8%)	50 (24.2%)	140 (23.3%)	0.139
Hypodontia	94 (23.8%)	32 (15.5%)	126 (21%)	0.019*
Peg-shaped Lateral Incisor	36 (9.1%)	14 (6.8%)	50 (8.3%)	0.497
Hypercementosis	12 (3%)	8 (3.8%)	20 (3.3%)	0.515
Taurodontism	5 (1.2%)	7 (3.4%)	12 (2%)	0.388

Supernumerary teeth	6 (1.5%)	4 (1.9%)	10 (1.6%)	0.315
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\* Statistical significant p<0.05

The prevalence of dental anomalies was observed in this study in order:

Transposition 28.3% , then Impaction 23.3% (without third molar) , then Hypodontia 21% , then Peg-shaped Lateral Incisor 8.3% , then Hypercementosis 3.3% , then Taurodontism 2% , and Supernumerary teeth 1.6%. Among the studied dental anomalies only, there were statistically significant differences between the gender (p <0.05).

Figure .1: shows the prevalence of dental anomalies according to gender among the residents of Hama Governorate

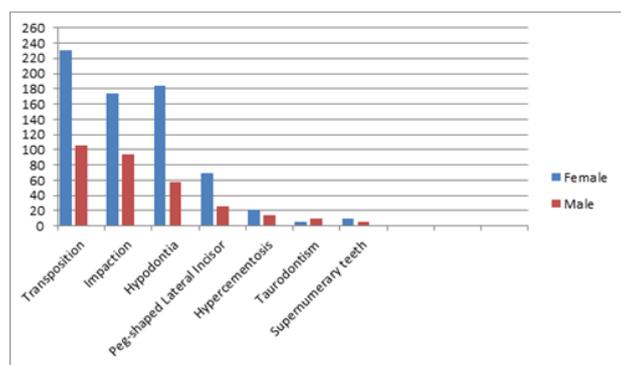


Fig. (1) Gender wise prevalence of Dental Anomalies in Hama population.

Transposition It was more prevalent anomalies, in females 29.1% and males 26.2%. Supernumerary In males 1.9% , taurodontism in females 1.2% , are the least common anomalies

While at the level of the jaws, the lower jaw had an increased spread of Supernumerary teeth and Transposition in females , Taurodontism In females and Hypercementosis in males The upper jaw showed a wider spread of the remaining dental anomalies, as shown in Table 2

Table 2-Arch-wise gender distribution of selected Dental Anomalies in Hama Governorate .

Developmental Anomaly	Gender distribution (n)	Maxillary arch n	Maxillary arch n (%)	Mandibular Arch n	Mandibular Arch n (%)
Transposition	Male (54)	23	-42.50%	31	-57.40%
	Female (116)	59	-50.80%	57	-49.10%
Impaction	Male (50)	29	-58%	21	-42%
	Female (90)	29	-75.50%	22	-24.40%

Hypodontia	Male (32)	26	-81.20%	6	-18.70%
	Female (94)	52	-55.30%	42	-44.60%
Peg shaped Lateral Incisor	Male (14)	14	-100%	0	0%
	Female (36)	36	-100%	0	0%
Hypercementosis	Male (8)	3	-37.50%	5	-62.50%
	Female (12)	2	-16.60%	10	-83.30%
Taurodontism	Male (7)	4	-57.10%	3	-42.80%
	Female (5)	0	0%	5	-100%
Supernumerary teeth	Male (4)	1	-25%	3	-75%
	Female (06)	5	-83.30%	1	-16.60%

## DISCUSSION

We conducted this study to study and evaluate the prevalence of dental anomalies and their distribution among the population of Hama Governorate The aim of this study was counting the number of dental disorders to find and provide new and modern solutions to treat such cases. Dental developmental disorders are a common condition in dental clinics and are frequently encountered, and when treating them we need wise planning and participation from several dental Treating these dental disorders takes longer and higher financial costs, which poses a financial challenge for parents and for the doctor's time. [9] Transposition is the ectopic eruption of tooth not in its normal position , A change in the location of the teeth, especially adjacent ones, or the development of the tooth and its eruption in another place of the tooth.[10] Etiological factors leading to transposition include interchange of developing tooth buds, high bone density and trauma , altered eruption , genetics, the presence of retained primary teeth or pathologies .[11] 12] prevalence of transposition In this study was 28.3% which is much higher and in contradiction to other studies performed in local and non- local populations. In similar studies around the world, Afify reported a transposition prevalence of 0.7% among residents of the western region of Saudi Arabia.[4] In Study of Papadopoulos et al [13] it was found that the prevalence rate of transposition in general was 0.33%, while in Greece the prevalence rate according to Study of Hatzoudi et al was about 0.09% and according to Study of Chattopadhyay et al[11] in India the prevalence results were 0.40% while in Study of Laptook[12] in Germany it was 0.13% . And by gender, we did not have statistically significant differences in this study, and this corresponds to study [13] where there were no statistically significant differences between the gender and is consistent with a study of [14] in Saudi Arabia.For the transposition site, the

transposition was more common in the lower jaw in males 57.4% than in the upper jaw 42.5%. While in females, the distribution was approximately equal in the upper 49.1% and lower jaw 50.8%. Results of [13] indicated a higher transposition prevalence in the maxillary arch compared to the mandible. This is attributed to the difference in bone densities between the jaws, where a decrease in bone density in the upper jaw may lead to a transposition more than the lower jaw whose bone density hinders the transposition. Transposition is a rare phenomenon, but it is the most common dental anomaly in the community of this study, in addition to the absence of a specific gender predilection, but it appeared in the upper jaw by more than the lower jaw.

## IMPACTED

Teeth are defined as teeth embedded within the bone completely or incomplete growth in the jawbone or mucous for more than two years after the date of their physiological eruption time [16]. Impaction causes a decrease in the dental arch space and may cause presence of cyst or pathologies, extra teeth, or any kind of obstruction. Third molars are often impacted due to their physiological delayed eruption and insufficient dental arch space, followed by the upper canines due to their long path of eruption. [17] The impacted teeth may be asymptomatic or cause oral and dental problems. In our study the prevalence of Impaction among dental anomalies was reported 23.3%. Afify [4] study found that the Impaction prevalence rate among residents of the western region of Saudi Arabia was 29.1%. Also, study [5] found that the Impaction prevalence rate was 3.74% among the population of India and in a study on the population of Norway [18] the prevalence rate was 8.4% while it was 8.3% in Study [6]. Regarding gender, there were no statistically significant differences between females and males in this study, such as [14]. As for the distribution according to the jaw, the prevalence was greater in the upper jaw, in males the Impaction was found with a ratio of 58% upper jaw and 42% in lower jaw, and in females, the Impaction was found with a ratio of 75.5% in upper and 24.4% in lower jaw. Since in our study, transposition was the most common prevalent anomaly, and because there is a relationship between transposition and Impaction may be the cause of elevated maxillary impaction in this studied population. With this study, we took the case of Impaction, regardless of the affected teeth group, and it is one of the limitations of this study. In Hama Governorate community, we found that Impaction is the second most common anomaly with no gender differences and observed more commonly in the maxillary arch.

## HYPODONTIA

Also known as a congenital deficiency in the number of teeth that does not exceed six teeth, Oligodontia is the loss of six or more teeth, while Anodontia is the complete absence of teeth [19]. In this study, Hypodontia was ranked third in terms of prevalence, with a prevalence rate 21%. Similarly, study [4] found a prevalence of 25.7% of the population in the southern region of Saudi Arabia. As for the studies worldwide, they were: Asia has the highest prevalence rate of 16.2%, then Europe 15.7%,

then North America 7.8%, then Australia 6.4%, then South America 6.5% - [9]. As for the spread according to population distribution: Norway 6.6% [18], India 10.9% [5]. The most frequently missing teeth are usually the third molars, mandibular premolars and maxillary lateral incisors. [17] In this study, females showed a higher prevalence of hypodontia 23.8% compared to males 15.5%. Globally, females are affected more than males, at a ratio of 2:3, due to the small size of the jaws of females. In this study, Hypodontia was found mostly in males in the upper jaw 81.2% compared to the lower jaw 18.7%. In females, it was not significantly different in the upper 55.3% and lower jaw 44.6%. In a study conducted to evaluate which dental arches contain Hypodontia the most, the results were conflicting and inconclusive, while some studies showed statistically significant differences and some did not show these differences [20]. In conclusion, hypodontia is a common occurrence and it usually appears in females more and it may be associated with deformation in the shape of adjacent teeth. Its treatment is comprehensive and expensive, and it may pose a difficult challenge to the family and the doctor.

## PEG SHAPED LATERAL INCISOR

Teeth have a wedge-shaped and have a medial lateral incisor dimension smaller than the cervical dimension and a size smaller than the average sizes of normal teeth or any similar tooth or corresponding to the same group but in the opposite direction, Peg shaped teeth develop from a single lobe instead of four and their occurrence is predominantly genetically determined. [21] It can cause a cosmetic problem and it can be associated with some syndromes, in this study the prevalence of Peg-shaped Lateral Incisor was 8.3%. In general, its prevalence ranges from 1.3% for the white race, 1.4% for the black race, and 3.1% for the Mongolian people. In this study, there were no statistically significant differences between the sexes, unlike study [22], which found that females are more susceptible than males. Regarding the distribution of prevalence in the jaws, the prevalence in this study was for the upper jaw only, and no injury was reported to the lower jaw.

## Hypercementosis

Is cementum hyperplasia characterized by excessive deposits of cementum on the roots of the teeth or on the root of only one tooth [23]. Any tooth can be affected, but the premolars are the most affected due to several local causative factors, including force of bites, trauma, and periapical tissue diseases, as well as associated with systemic factors such as hyperthyroidism, acromegaly, vitamin A deficiency, Paget's disease and arthritis. [24] In this study, the results indicated a prevalence of 3.3% in the population of Hama Governorate, and these results are in line with the result of a study [56] which reported a similar prevalence in the population of Saudi Arabia [25]. In similar studies, prevalence was found to be 1.3% in Study [26] in Germany and in the UAE, the result was 10.2% in Study [28]. There were no statistically significant differences between the genders in this study, unlike study [25], which reported an increased prevalence in females. As for the jaws, the lower jaw was affected more than the upper jaw in males 62.5% and

females 83.3%. This contrasts with Study [25], which did not notice a difference between the jaws. Clinically, we may have to endodontically treat the tooth or extract the affected tooth after careful treatment planning.

## TAURODONTISM

is the condition in which the tooth trunk is elongated, the roots are proportionally shortened and floor of the pulp chamber is apically displaced, It is diagnosed by radiography [6] This is caused by failure of the diaphragm of the epithelial sheath of Hartwig to inversion at the appropriate horizontal plane [24] In this study, we found the prevalence of Taurodontism 2 % with no gender bias. In similar studies, Vani NV et al [30] prevalence of Taurodontism was found to be 2.8% in KSA, and in study [31] in Jordan it was 8%, while in Norway it was 6.2% according to Study [18] and in Study [28] in the Emirates it was 4.1%. In our study, the prevalence in males was more in the upper jaw 57.1%, while in females the prevalence was in the lower jaw only. This is a medical condition associated with several syndromes, and its treatment is a challenge for the doctor and a little complicated, and when treating it, the anatomical shape of the pulp canals must be taken into account. [31]

## SUPERNUMERARY TEETH

are the addition of one or more teeth to the teeth, it may be single or multiple, unilateral or bilateral, erupting or impacted , and it may be of a natural shape or anomalous shape and may be found in permanent and temporary teeth and is often detected clinically or radially [32] In this study the prevalence was 1.6% . in the world the prevalence was 1% according to a study [30] and in India [5] it was 2.4% .

With regard to gender, there were no statistically significant differences between the genders , and this is consistent with the results of a study [14] in Sweden and in contrast to the results of [15] which showed more teeth in males compared to females. Treating these teeth is a challenge, especially if they affect the occlusion or the aesthetic aspect, so we may have to take tooth extraction or appropriate prosthetic intervention, and we may need orthodontic treatments.

## CONCLUSION

This study assessed the spread of dental anomalies using panoramic images of a sample of the population in from Hama Governorate in Syria. Transposition was the most prevalent anomaly then followed by impaction, with no gender specific bias but most commonly observed in the upper jaw. Hypodontia was the third common anomaly, with an increase in females and maxillary predominance. Peg-shaped lateral incisors in the upper jaw only without gender bias. Hypercementosis was more in the lower jaw with no gender preference. Taurodontism and supernumerary teeth were less prevalent in this study. Regarding the relatively high prevalence of dental anomalies such as Transposition and Impaction, it is essential to consider these anomalies carefully in treatment decision-making.

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