# Prevalence of Impacted Canine and Associated Anomalies among Patients at King Fahad Hospital In Madinah – A Radiographic Study

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**Abstract:**

Introduction:

The impaction of tooth have been studied by many authors and various terminologies have been given in the literature to define impaction including delayed eruption, primary retention, submerged teeth, impacted teeth. According to Abron et al, impaction can be defined as a deceleration of the normal eruption process of the tooth and according to Lindauer et al, it can be defined as a impaction if it was not erupted after completion of the root development.

**Methods:**

A Radiographic Study study will include all orthopantomogram for the subjects aged 14 to 40 who presented to specialized dental center of King Fahad in Madinah from 2015 to 2017. The data will be collected in Excel sheet and analyzed by SPSS VER 20.

**Results:**

In this study 928 Orthopantograms (OPGs) for patients their ages range from 14 to 40 year, with Mean ± S.D of age was 21.5±7.5, were assessed for permanent canine impaction, 19.7% (183 ) had impacted canines and 80.3% were without impaction.

Conclusion:

The prevalence of canine impaction in a Madina city of Saudi Arabia was 5.35%, while no significant gender differences was observed

**Key Words:**

Canine, impaction , orthopantomogram

Introduction:

Impaction occur when teeth fail to erupt into normal functional occlusion within appropriate time. According to Abron et al, impaction can be defined as a deceleration of the normal eruption process of the tooth and according to Lindauer et al, it can be defined as a impaction if it was not erupted after completion of the root development or if the eruption of the contralateral tooth was there for at least 6 months with completion of root formation Impacted teeth are one of the most frequent dental anomalies. Impacted canine known to be the second most dental impaction after third molars.. Impacted tooth can associated with many other anomalies such as cyst, crowding, root resorption and malocclusion and can be symptomless. [1-3]

Teeth Impaction can be due to local factors such as loss of space due to tooth arch discrepancy, early loss of deciduous teeth, and mechanical obstruction. And can be due to systemic condition or genetic factor but the main cause unknown. Impacted tooth can be asymptomatic or symptomatic if it’s associate with infection. Bishara et al. suggested the following sequelae of canine impaction: - Labial or lingual mal positioning of the impacted tooth, -Migration of the neighboring teeth and loss of arch length, -External root resorption of

the impacted tooth as well as the neighboring teeth, -Infection particularly with partial eruption resulting in pain and trismus, Referred pain. However this study will focus on the canine impaction prevalence and its anomalies and pathological association.4-6

Prevalence of teeth impaction is varying from population to another. In 2003 (FCS Chu et al.) conduct a study about prevalence of impacted teeth and associated pathologies among Chinese population in Hong Kong and he found a high prevalence of impaction up to 28.3%. in 2012 Karman Bokhary Ayed et al. published a study that showed prevalence up to 18.7% of impacted teeth in Saudi population in Asir. 7-10

The prevalence of canine impaction in the southwestern region of Saudi Arabia was 5.35%, with a female preponderance and more palatal positions. The impactions occurred more unilaterally on the left side than on both sides. Several studies have reported the prevalence of canine impaction to be between 0.8 and 8.8% (Aydin et al., 2004, Chu et al., 2003, Fardi et al., 2011, Zahrani, 1993). In Saudi Arabia, some studies have reported prevalences in different parts of the kingdom (Abdul Bagi Mustafa, 2014, Alhammadi et al., 2018, Haralur et al., 2017, Zahrani, 1993); however, none has been conducted in the current study location.11-20

Methods:

All orthopantomograms for the subjects aged 14 to 40 who presented to specialized dental center of King Fahad in Madinah from October 2016 to October 2017 were retrieved. The data was collected in Excel sheet and analyzed by SPSS VER 20. Descriptive and inferential statistics was obtained. Chi-square test was used to measure the significance differences. P< 0.05 was considered as a significant difference. Ethical approval was obtained from the Research committee of the college

**Results:**

Canine impaction and Age:

In this study 928 Orthopantograms (OPGs) for patients their ages range from 14 to 40 year, with Mean ± S.D of age was 21.5±7.5, were assessed for permanent canine impaction, 19.7% (183 ) had impacted canines and 80.3% were without impaction.

Table 1 depicted that Mean ± S.D of age was 21.5±7.5, out of total 62 patients 45 % were male while 55% were female. % have UR location of impaction while 52%,3% and 2% have UL, LR and LL Location of Impaction respectively. 47% have H pattern while 53% have L pattern. Table 02 depicted in significant difference between gender and Location of Impaction (p=0521). Table 03 depicted in significant difference between gender and Pattern (p=0.38). Table 04 depicted in significant difference between Location of Impaction and Pattern (p=0.782). Table 05 depicted significant difference between Location of Impaction and Associated Pathology (p=0.001). Figure 1depicted the 5.2% Prevalence of canine impaction

Canine impaction and Gender :

Impacted permanent canines were observed in106 females(58%) while only 77 males (42%) had impacted permanent canines with female to male ratio (1.37:1.) ( figure 2)

Prevalence of maxillary and mandibular canine impaction:

Impacted permanent canines were found in 141 (77% ) cases in one quadrant while in 42 ( 23% ) patients in two quadrants. Among patients with single impacted canine the right maxilla (UR) was the location of impaction in 68 patients (48%) ,while in 63( 45%), 5 ( 3.5%) and 5 (3.5% ) patients the left maxilla (UL), the right mandible (LR) and the left mandible (LL) were the Location of Impaction respectively.For patients who were found with two locations of impacted canines the maxilla(UR and UL) was the location of impaction in 38( 90%) patients while in 4 (10%) patients left maxilla(UL) and left mandible mandible(LL) were the locations of impaction.

Pattern of canine impaction:

Out of 224 impacted permanent canines ,131(58.5%) permanent canines were found to be vertically impacted while 93(41.5) permanent canines were found to be horizontally impacted. ( figure 3)Anomalies and pathologies associated with canine's impaction

Root Resorbtion of adjacent teeth was the most common pathology associated with impacted canines and it was observed in 25 cases (11%), 19 cases(8.5%) have retained primary canines, 5 cases (2%) have cystic lesions associated with impacted canines and only 2 cases (0.5%) showed transmigration of impacted permanent canines both of them are exclusively in mandible.

**Discussion:**

The presence of maxillary canines supports the base of the alar and upper lip that is necessary for smiles and aesthetics. Furthermore, it provides canine guidance for mandibular movements. Our main objective of this study is to investigate the prevalence of canine impaction among patient attending at King Fahad Hospital in Madinah and find out the association of impacted canine with pathology and dental anomalies (Root resorption, cystic change and retained deciduous teeth). in contrast with our findings, Melha et al. reported a prevalence of 3.65%; while in the eastern region, a prevalence of 3.30% was reported. Our finding are matched the findings of BandarAlyami et al we also did not notice any significant gender differences when we compared gender with the other variables ( Pattern , location of Impaction). In our study impacted permanent canines were observed in106 females(58%) while only 77 males (42%) had impacted permanent canines with female to male ratio (1.37:1.) whicih is inline with BandarAlyami . [11-16]

The presence of maxillary canines supports the base of the alar and upper lip that is necessary for smiles and aesthetics. Furthermore, it provides canine guidance for mandibular movements an impacted tooth has been defined as a tooth that is thwarted from completely erupting into a natural functional position within the expected time frame, usually due to a lack of space, physical obstruction by another tooth, or a deviant eruption path. Our main of this study is to investigate the prevalence of canine impaction among patient at King Fahad Hospital in Madinah and find out the association of impacted canine with pathology and

dental anomalies (Root resorption, cystic change and retained deciduous teeth). Contrast with our study In Saudi Arabia, the prevalence of canine impaction has been reported for the eastern, central and northern regions with different figures. In Riyadh, Melha et al. reported a prevalence of 3.65%; while in the eastern region, a prevalence of 3.30% was reported.

The incidence of tooth impaction varies among various ethnic populations from 5.6% to 18.8%. For instance, the prevalence of impacted maxillary canines has been reported as 5.4% among Hungarian, 5.1% among Turkish, and 2.1% among Chinese orthodontic patients. A new classification has been proposed to classify the most frequently impacted maxillary canines. The upper canines are only second to the upper and lower third molars in frequency of impaction

Our finding are matched the findings of BandarAlyami et al [12] we also did not notice any significant gender differences when we compared gender with the other variables ( Pattern , location of Impaction)

We found that canines were the most commonly impacted teeth, which is in agreement with other studies. In our study, the presence of an impacted canine was found in 19.7% of cases, which is significantly higher than the 3.58% incidence reported by Aydin et al. In one study, 4.898 Saudi patients aged 13 years or older were examined, and the results indicated that 3.6% had at least one impacted cuspid . Another study analysed 1.858 children who presented for orthodontic treatment, and the results revealed 101 cases of impacted cuspids (5.43%) . The authors of the same study stated that the frequency of impacted canines was dependent on the population studied [17-19]

Many studies indicate a higher prevalence of supernumerary teeth amongst males. Contrary to the 2:1 ratio between males and females reported in Caucasians , in the present study the sex ratio was much lower, being 1.4:1 in favor of males. However, this is in accordance with the 1.3:1 ratio reported by Luten , 1.82:1 reported by Ferrés-Padró et al. and 1.2:1 reported by Salcido-García et al. [20-21]

**References:**


1. Aslan BI, Üçüncü N. Emerging Trends in Oral Health Sciences and Dentistry. InTechOpen; 2015. Clinical Consideration and Management of Impacted Maxillary Canine Teeth. [Google Scholar]
2. Lindauer SJ, Rubenstein LK, Hang WM, Andersen WC, Isaacson RJ. Canine impaction identified early with panoramic radiographs. J Am Dent Assoc. 1992;123:91–92. 95–97. [PubMed] [Google Scholar]
3. Nikiforuk G. Ectopic Eruption: Discussion and clinical report. J Ont Dent Assoc. 1948;25:243–246. [Google Scholar]
4. Bishara SE. Impacted maxillary canines: A review. Am J Orthod Dentofac Orthop.1992; 101(2): 159-171
5. Stewart, J. A. , G. Heo , K. E. Glover , P. C. Williamson , E. W. Lam , and P. W. Major . Factors that relate to treatment duration for patients with palatally

impacted maxillary canines. Am J Orthod Dentofacial Orthop 2001. 119:216–225. [15]

6. Zuccati, G. , J. Ghobadlu , M. Nieri , and C. Clauser . Factors associated with the duration of forced eruption of impacted maxillary canines: a retrospective study. Am J Orthod Dentofacial Orthop 2006. 130:349–356

7. Syed KB, AlQahtani FH, Mohammad AH, Abdullah IM, Qahtani HS, Hameed MS. Assessment of pain, swelling and trismus following impacted third molar surgery using injection dexamethasone submucosally: A prospective, randomized, crossover clinical study. J Int Oral Health 2017;9:116-21

8. Beirne OR, Hollander B. The effect of methylprednisolone on pain, trismus, and swelling after removal of third molars. Oral Surg Oral Med Oral Pathol 1986;61:134-8

9. Beirne OR. Evaluation dexamethasone for reduction of postsurgical sequel of third molar removal. J Oral Maxillofac Surg 1992;50:1182-3.

10. Patten JR, Patten J, Hutchins MO. Adjunct use of dexamethasone in postoperative dental pain control. Compendium 1992;13:580, 582, 584.

11. S.B. Melha, S. Alturki, G. Aldawasri, N. Almeshari, S.K.A. Almeshari Canine impaction among riyadh population: A single center experience Int. J. Oral Health Sci., 7 (2017), pp. 93-95

12. BandarAlyami, RamatBraimahb , SaeedAlharieth, Prevalence and pattern of impacted canines in Najran, South Western Saudi Arabian population. The Saudi Dental Journal Available online 15 October 2019
13. H.K. Al-Homsi, M.Y. HajeerAn evaluation of inter- and intraobserver reliability of cone-beam computed tomography- and two dimensional-based interpretations of maxillary canine impactions using a panel of orthodontically trained observersJ. Contemp. Dent. Pract., 16 (8) (2015), pp. 648-656

14. H. Al-Zoubi, A.A. Alharbi, D.J. Ferguson, M.S. ZafarFrequency of impacted teeth and categorization of impacted canines: a retrospective radiographic study using orthopantomograms Eur J Dent, 11 (2017), pp. 117-121
15. M.S. Alhammadi, H.A. Asiri, A.A. AlmashraqiIncidence, severity and orthodontic treatment difficulty index of impacted canines in Saudi population J. Clin. Exp. Dent., 10 (4) (2018), pp. 327-334

16. O.H. Alkadhi, A.A. Alfuraih, N.M. AjwaPrevalence of different impacted maxillary canine locations in a saudi population in Riyadh City

EC Dental Sci., 13 (2017), pp. 261-265

17. Fardi, Anastasia & Kondylidou, Athina & Bachour, Zaki & Parisis, Nikolaos & Tsirlis, Anastasios. (2011). Incidence of impacted and supernumerary teeth - A radiographic study in a North Greek population. Medicina oral, patología oral y cirugía bucal. 16. e56-61. 10.4317/medoral.16.e56.

18. Luten JR Jr. The prevalence of supernumerary teeth in primaryand mixed dentitions. J Dent Child. 1967;34:346-53.

19. .Ferrés-Padró E, Prats-Armengol J, Ferrés-Amat E. A descriptive study of 113 unerupted supernumerary teeth in 79 pediatric patients in Barcelona. Med Oral Patol Oral Cir Bucal. 2009;14:E146-52.
Bäckman B, Wahlin YB. Variations in number and morphology of permanent teeth in 7-year-old Swedish children. Int J Paediatr Dent. 2001;11:11-7. 18.
20. Salem G. Prevalence of selected dental anomalies in Saudi children from Gizan region. Community Dent Oral Epidemiol. 1989;17:162-3. 19.

21. Fardi A, Kondylidou-Sidira A, Bachour Z, Parisis N, Tsirlis A. Incidence of impacted and supernumerary teeth-a radiographic study in a North Greek population. Med Oral Patol Oral Cir Bucal. 2011 Jan 1;16 (1):e56- 61.

| Table 1 :Descriptive Statistics | | |
|---|---|---|
| Age ( Mean ± S.D) | 21.5±7.5 | |
| Gender | | |
| | Frequency | Percent |
| Male | 28 | 45% |
| Female | 34 | 55% |
| Location of Impaction | | |
| | Frequency | Percent |
| UR | 27 | 44% |
| UL | 32 | 52% |
| LR | 2 | 3% |
| LL | 1 | 2% |
| Pattern | | |
| | Frequency | Percent |
| H | 29 | 47% |
| V | 33 | 53% |
| Total | 62 | 100.0 |

Table 2 : Comparison between Gender and Location of Impaction

| | | Location of Impaction | | | | |
|---|---|---|---|---|---|---|
| | | UR | UL | LR | LL | Total |
| Gender | Male | 10 | 16 | 1 | 1 | 28 |
| | Female | 17 | 16 | 1 | 0 | 34 |
| Total | | 27 | 32 | 2 | 1 | 62 |

p= 0.521

| Table 3 : Comparison between Gender and Pattern | | | | |
|---|---|---|---|---|
| | | Pattern | | |
| | | H | V | Total |
| Gender | Male | 12 | 16 | 28 |
| | Female | 17 | 17 | 34 |
| Total | | 29 | 33 | 62 |

p= 0.38

| Table 4 : Comparison between Location of Impaction and Pattern | | | | |
|---|---|---|---|---|
| | | Pattern | | |
| | | H | v | Total |
| Location of Impaction | UR | 12 | 15 | 27 |
| | UL | 16 | 16 | 32 |
| | LR | 1 | 1 | 2 |
| | LL | 0 | 1 | 1 |
| Total | | 29 | 33 | 62 |

p= 0.782

| Table 5 : Comparison between Location of Impaction and Associated Pathology | | | | | |
|---|---|---|---|---|---|
| | UR | UL | LR | LL | Total |
| Root Resorbtion | 10 | 12 | 1 | 1 | 24 |
| Cystic/Tumor changes | 5 | 7 | | | 12 |
| Presence with retained decious teeth | 6 | 6 | | | 12 |
| Presence of Supenumerry Teeth | 2 | 5 | 1 | | 8 |
| Transposition | 4 | 2 | | | 6 |
| *p=0.001* | | | | | |

Figure 1:

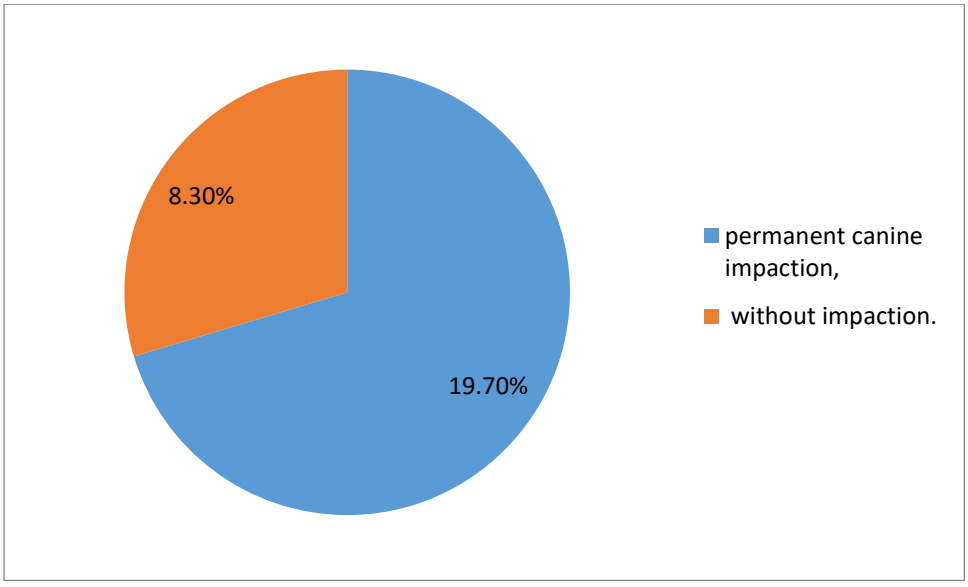

Figure 2:

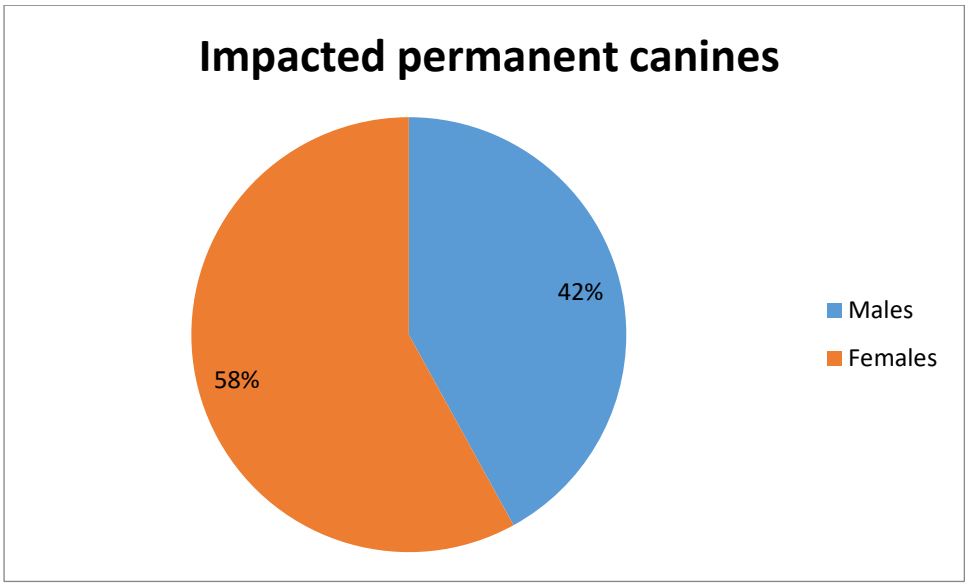


Figure 3: