

Dental developmental anomalies and pathology on maxillary occlusal radiographs - A retrospective study

Akhavan M, Swee GJ, Momeni Moghaddam M, Tessema H, Pagni SE, Loo CY

Tufts University School of Dental Medicine, Boston, MA

Introduction

The occlusal radiograph, commonly indicated in young children, is a helpful tool in revealing certain region-specific dental concerns in a timely fashion. Updated knowledge within this realm will help pediatric dental practitioners understand the predicted risks of complications and in turn, can help to prevent possible complications, plan for treatment at the appropriate time, improve the long-term prognosis and, in certain instances, allow less extensive intervention.

Objective

To identify the prevalence and types of dental abnormalities and pathologies detected on maxillary occlusal radiographs. An additional goal was to identify the factors that are associated with the presence of these conditions.



Methods

In this retrospective study, data were collected from electronic dental records of patients at Tufts University School of Dental Medicine. Maxillary occlusal radiographs of patients aged 0-7 years who received treatment from 07/01/2017 to 06/30/2022 were reviewed for the presence of dental abnormalities and pathologies categorized as infection-related, trauma-related, and eruption-related. Additional data recorded included age, gender, ethnicity, insurance, and frequency of recare.



Results

Radiographs of 1344 patients were reviewed. The mean age of the patients was 4.83 years old (± 1.27). A total of 690 (51.4%) had one or more of the conditions studied. The most common conditions were dental caries (46.5%), PDL enlargement (2.6%), ectopic position (2.4%), and external root resorption (1.9%), with no significant statistical difference between genders. Thirty-nine (2.9%) patients had a history of trauma. The most frequent sequelae from trauma were PDL enlargement (74.3%), external root resorption (43.5%), and root fractures (30.7%).

Chart 1: Patient Gender Demographics (N=1344)

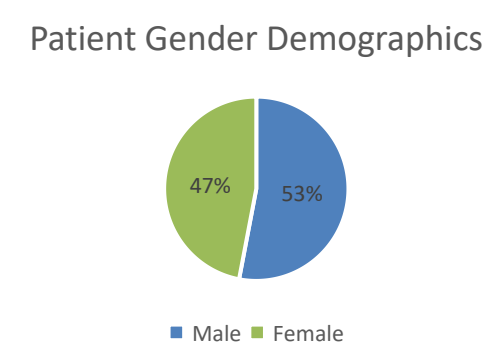


Chart 2: Patient Insurance Coverage Demographics (N=1344)

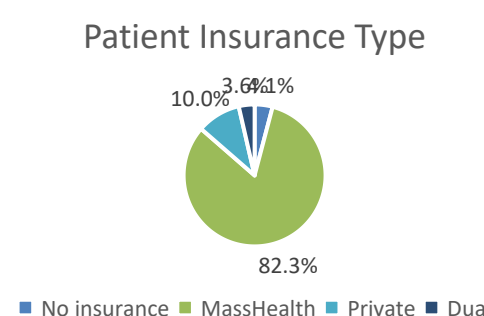


Chart 3: Patient Recare Frequency (N=1344)

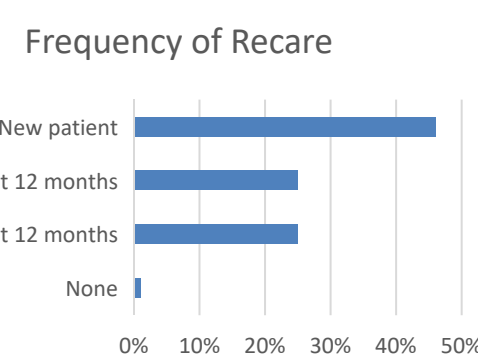
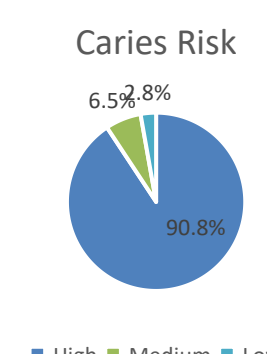


Chart 4: Patient Caries Risk Assessment (N=1344)



There was no statistically significant association between anomalies and gender ($p=0.356$). Furthermore, the diagnosis being infection related ($p=0.905$), trauma related ($p=0.927$) and eruption related ($P=0.105$) also had no statistically significant association with gender.

Table 5: Association of Gender with Clinical Sub-Diagnosis (N=1344)

Clinical Sub-Diagnosis	Gender		Correlation*	P-value**
	Male	Female		
Dental Caries	332	292	0.000	0.997
Pathological Conditions	12	9	0.01	0.710
Crown Fractures	2	2	0.030	0.900
Root Fractures	5	7	0.022	0.424
Impacted teeth	3	0	0.056	0.984
Congenitally Missing Teeth	6	3	0.023	0.514
Premature loss of teeth	4	3	0.006	0.999
Supernumerary teeth	21	4	0.080	0.602**
Mesiodens	12	4	0.021	0.013**
Ectopic Position	17	16	0.005	0.851
Crowded dentition	6	5	0.003	0.924
External root resorption	16	10	0.024	0.385
Internal root resorption	4	2	0.018	0.690
Metamorphic calcification	9	3	0.042	0.154
Dilaceration	1	1	0.002	0.999
Macrodonia	3	1	0.030	0.469
Microdonia	1	0	0.026	0.999
Fusion	2	2	0.003	0.900
Gemination	0	1	0.003	0.469
Amelious Cusp	3	2	0.008	0.999
PDL enlargement	21	15	0.017	0.528
Cleft Palate	5	6	0.014	0.609
Ankylosis	1	0	0.026	0.999

Supernumerary teeth ($p=0.002$) and mesiodens ($P=0.013$) both had a statistically significant association with gender.

Table 6: Association of Age of patient with Sub diagnosis. (N=1344)

Sub-Diagnosis	Correlation*	P-Value**
Dental caries	0.217	<0.001**
Pathological conditions	0.104	0.003**
Crown Fractures	0.106	<0.029**
Root Fractures	0.048	0.243
Impacted teeth	0.043	0.155
Congenitally missing teeth	0.039	0.905
Premature loss	0.050	0.190
Supernumerary teeth	0.086	0.086
Mesiodens	0.079	0.230
Ectopic position	0.164	0.002**
Crowded dentition	0.076	0.820
External root resorption	0.097	0.012**
Internal root resorption	0.043	0.321
Metamorphic calcification	0.091	0.008**
Dilaceration	0.055	0.862
Macrodonia	0.045	0.866
Microdonia	0.045	0.886
Fusion	0.078	0.029**
Gemination	0.074	0.124
Amelious cusp	0.037	0.749
PDL enlargement	0.190	0.002**
Cleft Palate	0.068	0.634
Ankylosis	0.074	0.134

There were statistically significant associations between age and the following sub-diagnoses:

- Dental caries
- Pathological conditions
- Crown fractures
- Ectopic position
- External root resorption
- Metamorphic calcification
- PDL enlargement

Results

Table 7: Correlation of type of insurance with Sub diagnosis categories. (N=1344)

Sub-Diagnosis	Type of Insurance				Correlation*	P-Value**
	None	Mass	Private	Dual		
Dental caries	17(1.3%)	550(40.9%)	41(3.1%)	17(1.3%)	0.126	0.018**
Pathological conditions	0(0.0%)	20(1.5%)	1(0.1%)	0(0%)	0.079	0.222
Crownfractures	0(0.0%)	3(0.2%)	1(0.1%)	0(0%)	0.122	0.088
Root fractures	1(0.1%)	9(0.7%)	1(0.1%)	1(0.1%)	0.264	0.083
Impacted teeth	1(0.1%)	4(0.3%)	0(0%)	0(0%)	0.065	0.375
Congenitally missing teeth	2(0.2%)	6(0.4%)	1(0.1%)	0(0%)	0.099	0.091
Premature loss	0(0.0%)	5(0.4%)	2(0.1%)	0(0%)	0.079	0.256
Supernumerary teeth	0(0.0%)	23(1.7%)	1(0.1%)	1(0.1%)	0.062	0.704
Mesiodens	0(0.0%)	19(1.4%)	1(0.1%)	1(0.1%)	0.076	0.533
Ectopic position	3(0.2%)	25(1.9%)	5(0.4%)	0(0%)	0.162	<0.001**
Crowded dentition	0(0.0%)	9(0.7%)	2(0.1%)	0(0%)	0.102	0.099
External root resorption	0(0.0%)	23(1.7%)	3(0.2%)	0(0%)	0.075	0.196
Internal root resorption	0(0.0%)	6(0.4%)	0(0%)	0(0%)	0.053	0.599
Metamorphic calcification	0(0.0%)	8(0.6%)	2(0.1%)	2(0.1%)	0.055	0.688
Fusion	0(0%)	4(0.3%)	0(0%)	0(0%)	0.085	0.153
Gemination	0(0%)	5(0.4%)	0(0%)	0(0%)	0.060	0.853
Amelious cusp	1(0.1%)	26(1.9%)	8(0.6%)	1(0.1%)	0.101	0.125
PDL enlargement	2(0.1%)	7(0.5%)	2(0.1%)	0(0%)	0.139	0.006**
Cleft Palate	2(0.1%)	7(0.5%)	2(0.1%)	0(0%)	0.139	0.006**

Type of insurance is often used as a surrogate for socioeconomic status (SES). In our study, there was a statistically significant association between type of insurance and dental caries, cleft palate, and ectopic position.

Discussion

- Associations observed between gender and supernumerary teeth are consistent with previous studies reporting that the incidence of supernumerary teeth is higher in male patients.
- Associations observed between age and sub-diagnoses are consistent with previous studies showing that an increase in age, increases the risk of dental caries and traumatic events.
- Associations observed between type of insurance and dental caries, cleft palate, and ectopic position are consistent with previous studies showing:
 - Lower SES is associated with increased dental caries.
 - Indicators of lower SES, such as lower maternal educational attainment and a lack of prenatal care, are associated with an increased risk of cleft palate.
 - Children with a higher SES have earlier tooth emergence compared to those with a low SES.

Conclusion

Dental caries represented the most common finding in the maxillary occlusal radiographs. PDL enlargement was the most frequent sequela from trauma. Due to the risk of dental anomalies following trauma in the primary dentition, follow-up examinations are highly recommended after injuries to the primary dentition.

References:

