Second Molar Substitution: A Survey of Dental Specialists

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Background

- First permanent molars are commonly affected by caries and hypomineralization, requiring various and often multiple treatments to restore them[1,2,3,4,5]
- Hypomineralization causes these teeth to become more susceptible to rapid development of caries and fracture[6]
- Second molar substitution, or first permanent molar replacement, is a treatment modality utilized in dentistry to address first permanent molars with guarded to poor prognoses[2]
- Research has been done regarding the success of second molar substitution with varying results[4]
- Treatment planning and execution requires a multidisciplinary team approach involving other dental specialists [2, 3, 4]
- Pediatric dentists, endodontists, orthodontists, and oral and maxillofacial surgeons are integral in the use of second molar substitution [4]

Objective

- This survey aims to determine if the concept of second molar substitution is being taught to pediatric dentists, orthodontists, and endodontists in their residency programs.
- Additional goals are to identify if and how these specialists are incorporating this treatment modality in their practices.

Materials & Methods

- A survey consisting of 19 total questions was distributed via email in spring/summer of 2022 to active members of the American Academy of Pediatric Dentistry, the American Association of Endodontists, and sample of the American Association of Orthodontists.
- Questions included demographics regarding specialty, residency program location, type of training on the concept of second molar substitution, as well as specific scenarios regarding treatment planning extraction of hypomineralized first permanent molars.
- The scenarios regarding extraction of hypomineralized first permanent molars assessed treatment planning with the following conditions: a single affected tooth (maxillary and mandibular) as well as two affected teeth (maxillary, mandibular, right side, and left side).
- Content validity was assessed by a panel of pediatric and endodontic faculty and current residents.
- Descriptive statistics and bivariate analysis were calculated with a significance level of 0.05

Results

(940 Completed Surveys):

- 87.2% of respondents had heard of the concept “second molar substitution” or “first molar replacement”.
- 68.0% of respondents were aware of this concept and introduced during their residency training
- 32% were introduced to this concept somewhere other than residency.
- 80.2%-93.6% would treatment plan extraction of only the affected tooth or teeth in the scenarios listed.
- There was a significant difference in the responses between specialties in their recommendation for 2nd molar substitution based on clinical characteristics other than the affected tooth (P<0.001).

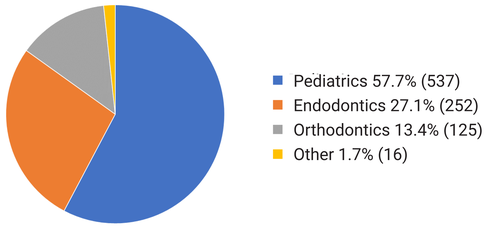

Figure 1. Respondents by Specialty Training

Table 1. Residency Graduation Year

Prior to 1975	1976-1985	1986-1995	1996-2005	2006-2015	2016-present
2.2% (20)	6.6% (61)	14.6% (135)	18.6% (172)	24.9% (231)	33.2% (308)

Table 2. Regions defined by AAPD, AAE, and AAO

Region	Northeastern	Southeastern	North Central	Southwestern	Western
Residency Training	28.3% (263)	15.9% (148)	26.8% (249)	13.5% (125)	15.5% (144)
Current Practice	21.0% (194)	19.8% (183)	21.1% (195)	15.6% (144)	22.3% (206)

Table 3. Current Position

Resident/Fellow	Full Time Faculty	Adjunct Faculty	Private Practice	Public Health/ FQHC/VA/ Military	Other
10.3% (97)	7.6% (71)	9.8% (92)	76.5% (719)	4.4% (41)	2.0% (19)

Table 4. 2nd Molar Substitution Taught in Residency Training (by Specialty)

Specialty	Pediatrics	Endodontics	Orthodontics	Other
Part of Residency Training	69.3% (390)	15.3% (86)	15.3% (86)	0.2% (1)

Table 5. Indications Taught Regarding Second Molar Substitution (Select All)

Indications	Respondents
Carious, hypomineralized first permanent molar	56.2% (520)
Carious, normally developed, non-restorable first permanent molar	79.9% (750)
Carious, restorable, endodontically involved first permanent molar	41.6% (391)
Carious, restorable first permanent molar requiring full coverage crown	19.9% (187)
Non-carious, hypomineralized/hypoplastic, symptomatic first permanent molar	26.3% (247)
Non-carious, hypomineralized/hypoplastic, asymptomatic first permanent molar	8.4% (79)
Other	4.6% (43)

Table 6. Factors in Choosing Second Molar Subtitution

	Pediatrics	Endodontics	Orthodontics	Other	P-value
Occlusal Analysis	67.7% (350)	69.4% (111)	86.7% (98)	90.9% (10)	<0.001
Angulation of 2nd Molars	71.7% (385)	46.0% (116)	75.2% (94)	62.5% (10)	<0.001
Presence of 3rd Molars	68.0% (365)	38.1% (96)	73.6% (92)	43.8% (7)	<0.001
Root Development of 2nd Molars	87.2% (468)	53.6% (135)	72.0% (90)	56.3% (9)	<0.001
Absence of 3rd Molars	31.6% (166)	19.9% (49)	50.4% (59)	25% (4)	<0.001
2nd Molar Furcation Development, Erupted Clinically	57.5% (309)	24.2% (61)	21.6% (27)	31.3% (5)	<0.001
2nd Molar Furcation Development, Soft and Bony Tissue Impacted	22.5% (121)	18.7% (47)	24.0% (30)	18.8% (3)	0.558

Conclusions

- The majority of respondents were pediatric dentists followed by endodontists and orthodontists.
- Respondents, including current residents, were aware of the concept “second molar substitution” or “first molar replacement”.
- The majority were made aware of this concept during their residency training.
- In all treatment planning scenarios, the majority would treatment plan extraction of only the affected tooth or teeth.
- There are significant differences between specialties in their recommendation for second molar substitution based on clinical characteristics other than the affected tooth such as occlusal analysis, angulation of 2nd permanent molars, stage of development of 2nd permanent molars, and presence of the 3rd permanent molar.

Limitations

- Oral and Maxillofacial Surgery was not included in this study despite their specialty playing an integral role in second molar substitution/first molar replacement due to the ability to survey the members.
- Multiple specialty areas do not account for general dentists who may see the patient initially.
- Does not identify the treatment planning of non-respondents.

Acknowledgement

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References

Available upon request