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**Association Of Age And Gender In Children Undergoing Extraction Of First Permanent
Molar And First Premolar - A Retrospective Study**

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ABSTRACT

Dentition Affected By Dental Caries With Pulpal Involvement Either Requires Endodontic Or Exodontic Management. Permanent Teeth Involving Endodontic Management Loses Its Vitality And Strength And Those Involving Exodontic Management Are Completely Absent For The Rest Of The Life Of The Patient.

Aim : The Aim Of The Study Was To Assess The Association Of Age And Gender In Children Undergoing Extraction Of First Permanent Molar And First Premolar.

Materials And Method : A Total Of 89000 Cases Were Reviewed Between June 2019 To March 2020 To Collect Data On Children Who Underwent Premolar Extractions And Children Who Underwent Molar Extractions. A Total Of 161 Case Sheets Were Finally Reviewed For Gender And Age Variations In Children With First Premolar Extractions And With First Permanent Molar Extractions. The Data Obtained From Dental Treatment Records Were Added In MS Excel. Data Was Analysed Using SPSS Software And Chi Square Test Was Done.

Results : 64.47% Of Children Who Were Males Underwent Extraction Of First Permanent Molar While 61.18% Of Children Who Were Females Underwent Extraction Of First Premolar (P = 0.001). 51.32% Of Children Between 15-17 Years Of Age Underwent Extraction Of The First Permanent Molar While 64.71% Of Children Between 12-14 Years Of Age Underwent Extraction Of The First Premolar (P=0.04). Higher Number Of Children Who Were Males Underwent Extraction Of The First Permanent Molar Predominantly, While Females Underwent Extraction Of The

First Premolar. Higher Number Of Children Between 15-17 Years Of Age Underwent Extraction Of The First Permanent Molar Predominantly While Children Between 12-14 Years Of Age Underwent Extraction Of The First Premolar

Key Words: Age, Extraction, First Permanent Molar, First Premolar, Gender

1. INTRODUCTION

The Primary Purpose To Why A Pediatric Dental Patient Is Offered A Dental Treatment Is To Ensure The Primary And Permanent Teeth Are Protected From Getting Prematurely Lost. Due To The Fact That There Are Chances For Some Teeth To Be Involved Within The Stimulus And Improvement Of The Dental Arches, Assist In Normal Occlusal Relationship, Sustain Aesthetics, Contributing In The Improvement Of Speech Development And Efficient Mastication. In Addition, It Enriches The Development Of Life Quality (Chen, 2002). The Successors Come Into Occlusion With The Help Of The Deciduous Teeth And Due To Their Early Loss May Cause Delay In The Eruption Of The Permanent Successors, Tilting Or Drifting. Which Will Impact The Positioning Of The Adjacent And Succedaneous Teeth, Ultimately That Will Result In Malocclusion. Furthermore, Due To The Incidence Of Tooth Loss, There Will Be An Increase In Problems Such Mastication, Aesthetics And Speech. This Will Result In Complications, Psychological Wise And Social Disturbances. (Esan *Et Al.*, 2009)

One Of The Most Infectious Diseases Of The World Would Be None Other Than Dental Caries. (Jeevanandan, 2017a; Subramanyam *Et Al.*, 2018) According To Various Global Dental Statisticians, Nearly “90% Of School Children Have Dental Caries”. (Ozdemir, 2013; World Health Organization, 2013), (Somasundaram *Et Al.*, 2015) At An Earlier Stage First Permanent Molar Emerges Raising The Higher Probability Of Dental Caries And “Possible Premature Extraction Before 15 Years Of Age” (Panchal, Jeevanandan And Subramanian, 2019). The Key Important Factor Of The Tooth Lies Within Maintaining The Normal State Of Masticatory Function And Dentofacial Harmony. (ADA Division Of Communications, Journal Of The American Dental Association And ADA Council On Scientific Affairs, 2006) With Knowledge And Experience, When A Badly Decayed First Permanent Molar Case Emerges Multiple Aspects Needs To Be Taken Into Consideration. For Example, Degree Of Pulp Maturation, Severity Of Dental Pain, Level Of Crown Destruction, Phases Of The Developing Dentition, Patient’s Ability To Withstand Long Treatment Under Local Anaesthesia And The Attitude Of The Child’s Parent(S) (Ravikumar, Jeevanandan And Subramanian, 2017), (Christabel And Gurunathan, 2015; Packiri, Gurunathan And Selvarasu, 2017; Nair *Et Al.*, 2018). Premolars Are Commonly Extracted For Children During Their Adolescents To Aid In Orthodontic Management. Both Males And Females Are Equally Involved In Orthodontic Management To Improve Their Looks And Smile (Elsheikh And Ali, 2015). Extraction Of The First Permanent Molar Most Likely Is Instinctively Decided Based Upon The Outcome Of The Treatment Procedure. (Shekelle *Et Al.*, 1999) Extraction Of Permanent Teeth At A Younger Age Would Be A Complete Loss Forever. The Lost Tooth Wouldn’t Be Replaced By A Succeeding Tooth As In Primary Teeth (Williams And Hosila, 1976). The Reasons For Extraction Vary From Dental Caries, Unrestorable Teeth, Periodontal Problems, Traumatic Dental Injuries, Root Stumps, Furcal Involvement And Also For Orthodontic Purposes. Absence Of A Permanent Tooth Would Lead To Space Loss, Supra Eruptions, Mesial Migrations And Also Pose A Threat To Adjacent Teeth. This Would Affect The Functionality Of The Teeth, Disruption In Speech And Also Has An Impact On Mastication (Phulari, 2011), (Case, 1964), (Tweed, 1966). Although The Reasons And Prevalence Of Extraction Of Permanent Teeth Are Commonly Studied, The Association With Gender And Age Group Are Less Commonly Studied. Previously Our Team Has A Rich Experience In Working On Various Research Projects Across Multiple Disciplines The (Somasundaram *Et Al.*, 2015; Hafeez And Others, 2016; Krishnan *Et Al.*, 2018) (Choudhari And Thenmozhi, 2016; Dhinesh *Et Al.*, 2016; Gurunathan And Shanmugaavel, 2016; Sneha And Others, 2016; Govindaraju And Gurunathan, 2017; Kumar And Rahman, 2017; Felicita And Sumathi Felicita, 2018; Saravanan *Et Al.*, 2018; Vijayakumar Jain *Et Al.*, 2019; Wu *Et Al.*, 2019; Palati *Et Al.*, 2020; Paramasivam, Vijayashree Priyadharsini And Raghunandhakumar, 2020). The Key Objective Would Be To Assess The Association Of Age And Gender In Children Undergoing Extraction Of First Permanent Molar And First Premolar.

2. MATERIALS AND METHODS :

This Retrospective Study Was Conducted Under A Hospital Based University Setting. Ethical Approval For This Study Was Granted By The Institute’s Ethical Committee (Ethical Approval Number: SDG/SIHEC/2020/DIASDATA/0619-0320). Consent To Use Treatment Records For Research Purposes Were

Obtained From Patients/Guardians At The Time Of Patient Entry Into The University For Dental Needs. The Retrospective Data Were Collected By Obtaining And Analysing The 89000 Dental Case Records Of The University From June 2019 To March 2020. The Inclusion Criteria Were Children At And Below The Age Of 17 Years, Children Who Underwent Extractions Of First Premolar, Children Who Underwent Extraction Of First Permanent Molar, Complete Photographs And Written Records Regarding The Tooth That Has Been Extracted. The Exclusion Criteria Were Patients Above 17 Years Of Age, Incomplete And Censored Dental Records And Absence Of Photographic Evidence Of Extraction And Clinical Findings.

The Selected Case Sheets Were Examined By Three People: One Guide And One Researcher. The Patients' Case Sheets Were Reviewed Thoroughly And Cross Checking Of Data Including Digital Entry, Removal Of Data Records Of The Same Patient Involved In Multiple Extractions And Intra Oral Photographs Was Done By An Additional Reviewer And As A Measure To Minimise Sampling Bias, Samples For The Group Were Picked By Simple Random Sampling. Digital Entry Of Clinical Examinations And Intra Oral Photographs Of Selected Subjects Were Assessed And Details Of The Patient And The Tooth Extracted Were Collected. The Examiner Was Trained To Add The Collected Data By Tabulation Using Excel Software. Data Analysis Was Done Using SPSS PC Version 23.0 (IBM;2016) Software For Statistics. Chi-Square Test Was Performed To Assess The Association Of The Extraction Data With Age And Gender.

3.RESULTS AND DISCUSSION

The Final Study Samples Included 161 Children Among Which, 76 Children (47.2%) Underwent Extraction Of Permanent First Molar And 85 Children (52.8%) Underwent Extraction Of First Premolar (Figure 1). The Final Sample Consisted Of 50.93% Children Who Were Males And 49.07% Children Who Were Females (Figure 2). Among The Children, 57.14% Were 12-14 Years Of Age And 42.86% Were 15-17 Years Of Age (Figure 3). On Comparing The Association With Gender Of The Patient And The Tooth Extracted, 64.47% Of Children Who Were Males Underwent Extraction Of First Permanent Molar While 61.18% Of Children Who Were Females Underwent Extraction Of First Premolar (Figure 4). This Difference In Association Was Statistically Significant ($P = 0.001$). On Comparing The Association With Age Group And The Tooth Extracted, 51.32% Of Children Between 15-17 Years Of Age Underwent Extraction Of The First Permanent Molar While 64.71% Of Children Between 12-14 Years Of Age Underwent Extraction Of The First Premolar (Figure 5). This Difference In Association Was Statistically Significant ($P = 0.04$).

Based On The Results Of The Present Study, A Higher Number Of Children Who Were Males Underwent Extraction Of The First Permanent Molar. This Could Be Due To The Reason That Male Children Have Improper Oral Hygiene Habits And Higher Cariogenic Diet Intakes. This Could Have Led To The Unrestorable Status Of The Tooth Leading To Its Extraction. (Jeevanandan, Ganesh And Arthilakshmi, 2019),(Panchal, Jeevanandan And Subramanian, 2019) This Was Supported By Saber (Saber *Et Al.*, 2018), Where In His Study , He Stated That Mandibular Permanent Molars Were Most Extracted Teeth.

The Present Study Shows A Higher Number Of Children Who Were Females Underwent Extraction Of The First Premolar. The Reason Could Be Due To The Fact That Females Are More Concerned About Their Esthetic Facial Appearance. This Would Be A Factor To Undergo Orthodontic Facial Corrections Which Would Have Required The Extraction Of Premolars For Requirement Of Space. Such Extraction Of Sound Teeth For The Purpose Of Orthodontic Treatment Is Called Therapeutic Extraction.(Phulari, 2011).

The Results Of The Present Study Shows A Higher Number Of Children Between 15-17 Years Of Age Underwent Extraction Of The First Permanent Molar. The Reason Would Be The Improper Oral Hygiene Habits And Cariogenic Diet Intake Making The Tooth Unrestorable Leading To Extraction. (Jeevanandan, Ganesh And Arthilakshmi, 2019),(Panchal, Jeevanandan And Subramanian, 2019) Proper Diagnosis And Planning Before Treatment Is Necessary To Avoid Any Mishaps (Packiri, Gurunathan And Selvarasu, 2017),(Christabel And Gurunathan, 2015) .

The Current Study Shows A Higher Number Of Children Between 12-14 Years Of Age Underwent Extraction Of The First Premolar. This Could Be Due To The Point That These Children At This Age Group Are Undergoing Adolescents Which Made Them Concerned Over Their Esthetic Appearances. This Would Be A Factor To Undergo Orthodontic Facial Corrections Which Would Have Required The Extraction Of Premolars For

Requirement Of Space.(Gurunathan And Shanmugaavel, 2016),(Somasundaram *Et Al.*, 2015),(Subramanyam *Et Al.*, 2018)

Preservation Of Primary Teeth In The Dental Arch Is Important To Guide The Eruption Of The Permanent Teeth In The Optimal Position.(Packiri, Gurunathan And Selvarasu, 2017),(Christabel And Gurunathan, 2015) Preservation Of Permanent Teeth Is Also Essential For Proper Alignment And Function Of The Hard And Soft Tissues Around It. (Govindaraju, 2017). Grossly Decayed Primary Teeth Which Are Extracted Before Exfoliation Causes Space In The Dental Arch Which Causes Malocclusion If Space Maintainer Was Not Given. Bacteria Play A Vital Role In The Initiation And Progression Of Pulpal And Periodontal Disease(Jeevanandan, 2017b). Untreated Dental Caries Eventually Lead To Pulpitis And Periapical Periodontitis Which Is Treated By Means Of Root Canal Procedure Or Extracted Leading To Space Loss And Malalignment Which Would Require Orthodontic Management (Govindaraju, Jeevanandan And E. M. G. Subramanian, 2017a),(Jeevanandan And Govindaraju, 2018) However Maintenance Of Proper Oral Hygiene Would Minimise Such Complications And Preserve The Primary Dentition Minimising The Orthodontic Needs (Govindaraju, Jeevanandan And E. Subramanian, 2017),(Lakshmanan *Et Al.*, 2020),(Ramakrishnan And Shukri, 2018),(Govindaraju, Jeevanandan And E. M. G. Subramanian, 2017b).Our Institution Is Passionate About High Quality Evidence Based Research And Has Excelled In Various Fields (Pc, Marimuthu And Devadoss, 2018; Ramesh *Et Al.*, 2018; Vijayashree Priyadharsini, Smiline Girija And Paramasivam, 2018; Ezhilarasan, Apoorva And Ashok Vardhan, 2019; Ramadurai *Et Al.*, 2019; Sridharan *Et Al.*, 2019; Vijayashree Priyadharsini, 2019; Chandrasekar *Et Al.*, 2020; Mathew *Et Al.*, 2020; R *Et Al.*, 2020; Samuel, 2021)

The Advantage Of The Study Was That This Was One Of The Few Studies That Assess The Association Of Age And Gender With Extraction Of First Permanent Molars And First Premolars. Although This Study Has A High Internal Validity, The Limitations Of Reduced Sample Size, Geographic And Ethnic Limitations Of The Study Sample Would Reduce The Overall External Validity Of The Study. However The Future Scope Would Be To Perform The Study With Larger Sample Size And Varied Ethnicities To Get A Broader Perspective On Understanding.

4.CONCLUSION :

Within The Limitations Of The Study, Children Who Were Males Underwent Extraction Of The First Permanent Molar Predominantly, While Females Underwent Extraction Of The First Premolar, Which Was Statistically Significant. Also Children Between 15-17 Years Of Age Underwent Extraction Of The First Permanent Molar Predominantly While Children Between 12-14 Years Of Age Underwent Extraction Of The First Premolar, Which Was Statistically Significant.

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6.CONFLICTS OF INTEREST:

The Authors Declare That There Are No Conflicts Of Interest.

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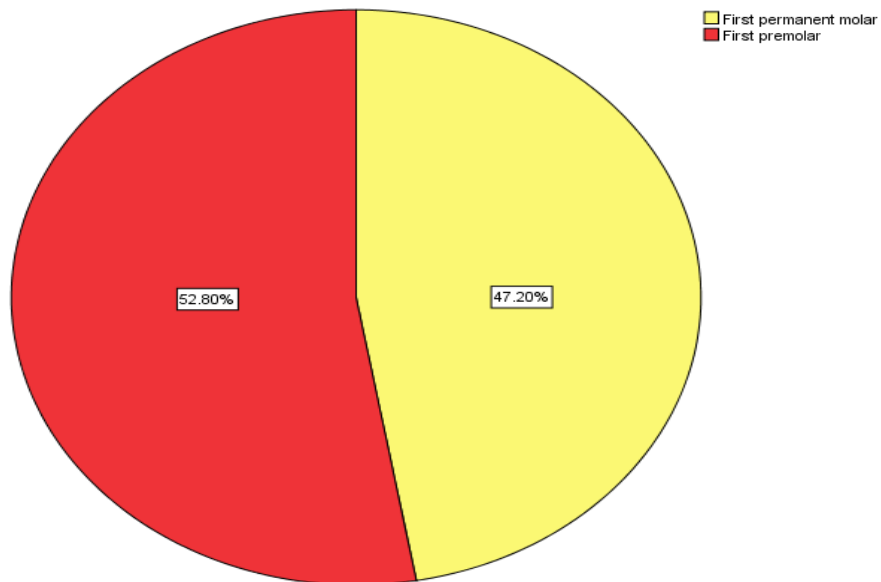


Figure 1: Pie Chart Representing The Distribution Of Study Samples Based On The Tooth Extracted. 47.2% Children Underwent Extraction Of Permanent First Molar (Yellow) And 52.8% Children Underwent Extraction Of First Premolar. (Red)

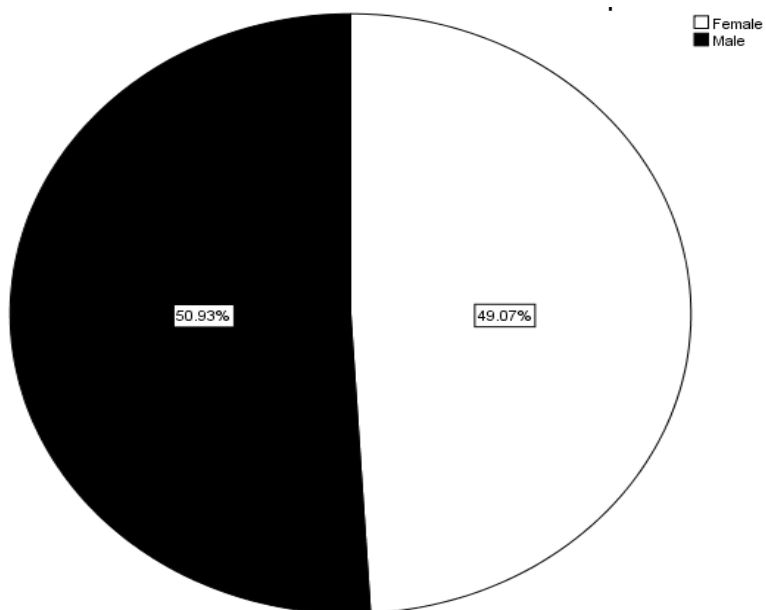
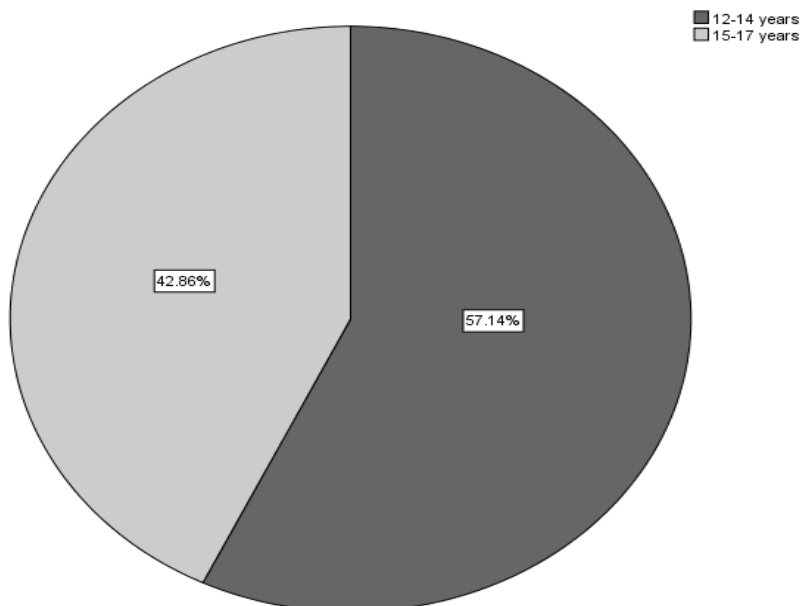


Figure 2: Pie Chart Representing The Distribution Of Study Samples Based On Gender. Among The Children, 50.93% Were Males (Black) And 49.07% Were Females (White).



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Figure 3: Pie Chart Representing The Distribution Of Study Samples Based On Age. Among The Children, 57.14% Were 12-14 Years Of Age (Dark Grey) And 42.86% Were 15-17 Years Of Age (Light Grey).

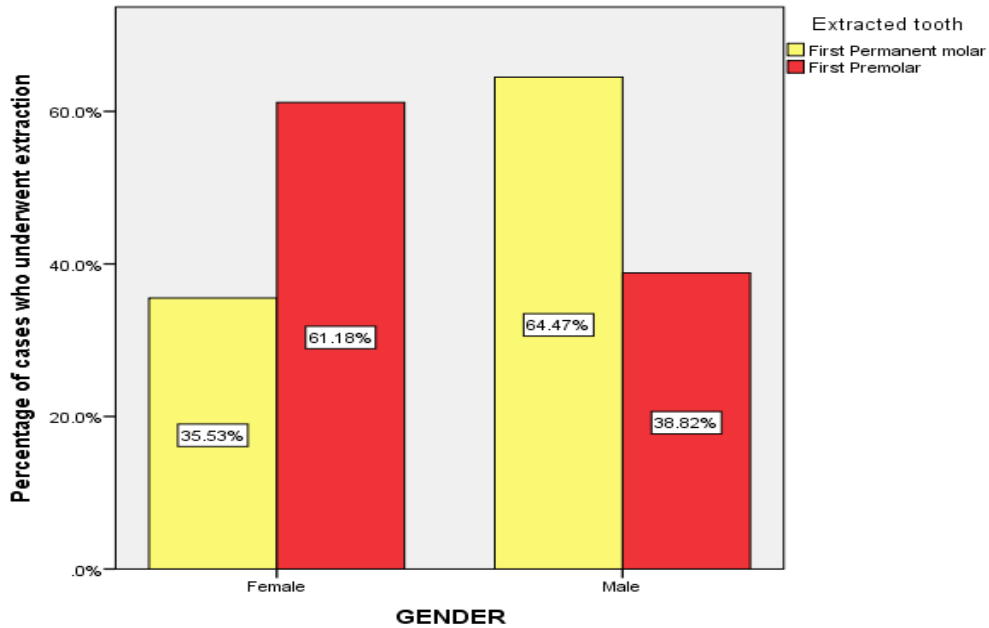


Figure 4: Bar Graph Representing Association Between Gender Of The Child Patient And The Tooth Extracted. X-Axis Represents The Gender Of The Child And Y-Axis Represents The Percentage Of Cases Who Underwent Extraction In Different Teeth Regions: First Permanent Molar And First Premolar. Higher Percentage Of Children Who Were Males (64.47%) Underwent Extraction Of The First Permanent Molar (Yellow) While Higher Percentage Of Children Who Were Females (61.18%) Underwent Extraction Of First Premolar (Red), Which Was Statistically Significant (Chi-Square Test; P = 0.001 - Statistically Significant).

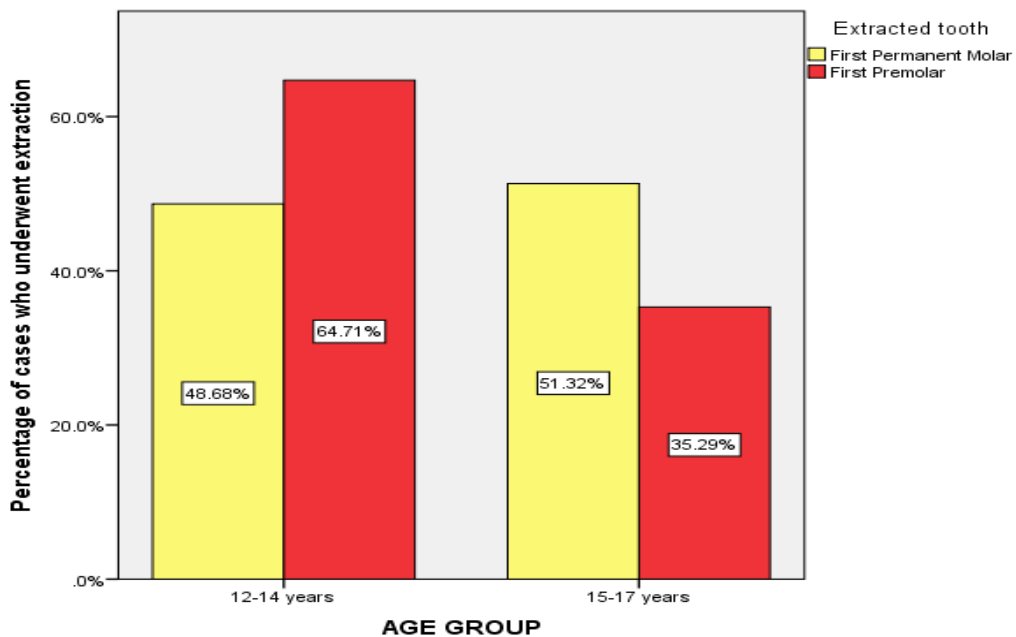


Figure 5: Bar Graph Representing The Comparison Of Association With Age Of The Child Patient And The Tooth Extracted. X-Axis Represents The Age Group Of The Child And Y-Axis Represents The Percentage Of Cases Who Underwent Extraction In Different Teeth Regions: First Permanent Molar And First Premolar. Higher Percentage Of Children Between 15-17 Years Of Age (51.32%) Underwent Extraction Of The First Permanent Molar (Yellow) While Higher Percentage Of Children Between 12-14 Years Of Age (64.71%) Underwent Extraction Of The First Premolar (Red), Which Was Statistically Significant (Chi-Square Test; $P = 0.04$ - Significant).