FREQUENCY OF ELLI'S CLASS 4 FRACTURE IN MALES AND FEMALES AGED 10-17 YEARS

ABSTRACT:

INTRODUCTION: Children nowadays are exposed to the world from a much earlier age than their forefathers, rendering them more vulnerable to multiple trauma risk factors such as falls, injuries, peer battle, and so on. Depending on where the tooth is fractured, different physical and clinical findings are present. Take note of the extent of the fracture as well as the patient's age. For obvious fractures, the Ellis classification was created. Ellis 4 fractures leads to non vitality of a tooth.

MATERIALS AND METHODS: Data was collected from the patient who visited the outpatient of a private dental institution and following parameters like gender, Children with elli's class 4 fracture in the age group of 10-17 years was recorded. 47 patient details were analyzed between September 2022 to December 2023 which fulfilled the inclusion and exclusion criteria were included in the study. This data was statistically analyzed using SPSS version 23.

RESULTS: Predominantly 74.47% of males and 25.53% of females had ellis class 4 fracture in relation to the tooth number 11 i.e upper right central incisor. An attempt was made to collect data in a prospective manner and to include a wide range of ages in the population. Only 38.30% of the patients belonged to the age group of 14-17 years. 53.19% of the Ellis class 4 fractures happened only after the root formation was completed. Most patients with Ellis class 4 (Non vital) had fracture seen in their teeth which was Ellis class 1 fracture which only involves the enamel (44.68%).

CONCLUSION: So, from our study we can conclude that ellis class 4 fracture was predominantly seen in tooth number 11 which was around 53.19% and males were most affected which was around 74.47%.

Keywords: Dental trauma, Elli’s class 4 fracture, Endodontists, Root canal treatment, Tooth coloured restorations, innovative.

INTRODUCTION:

Physical damage to the teeth, gums, alveolar bone (the bone that contains the tooth sockets), or soft tissue of the mouth, including the lips and tongue, is referred to as dental trauma(1). A dentist should examine any injuries to the mouth or teeth, especially if a tooth or teeth has become loose or has been damaged(2,3). More serious injuries, such as split teeth, may necessitate the extraction of the tooth entirely(4). Teeth that have become dislodged (luxated) should be stabilized by a dentist, and root canal treatment may be required. Root canal treatment may not be necessary for children under the age of 12 because their teeth are still developing and may be able to heal on their own(5). You should see your dentist or an endodontist right away; if you get treatment within 30-40 minutes, you have a good chance of saving the tooth; if you wait any longer, your chances of saving the tooth are slim to none[Citation error]. Dentists treat a wide range of tooth problems, and if you've had dental trauma, your dentist will most likely be your first port of call. Endodontists are dentists who specialize in treating tooth injuries and saving them using advanced skills and techniques(6).

Children nowadays are exposed to the world from a much earlier age than their forefathers, rendering them more vulnerable to multiple trauma risk factors such as falls, injuries, peer battle, and so on(7). Traumatic dental injuries in the primary dentition are linked to permanent succedaneous tooth sequelae, with malformation occurring in 25 to 69 percent of instances(8).

Depending on where the tooth is fractured, different physical and clinical findings are present. Take note of the extent of the fracture as well as the patient's age. For obvious fractures, the Ellis classification was created[Citation error]. This can happen before or after root formation is finished, and the effects could include pulp necrosis or inflammation. A damaged tooth that has

lost some or all of its structural integrity is referred to as a class IV Ellis fracture[Citation error]. Cold packs applied to the injured area can help to reduce pain and swelling before beginning specific dental treatment for fracture restoration(9,10). When a tooth fracture extends into the dentin, the exposed dentinal tubules can be covered with glass ionomer cement or a permanent restoration can be made using composite resins or other tooth-colored restorative materials(11). Pulp capping or partial pulpotomy are used to treat tooth fractures involving the pulp of developing teeth(1). Root canal treatment is used to treat tooth fractures involving the pulp of mature teeth. Without involving the pulp, crown root fractures can be treated by removing the crown root fragment and then restoring the apical tooth fragment(12).

The objective of this present study is to investigate the frequency of Class 4 ellis fracture in the age group of 10-17 years according to their gender. There were no studies conducted previously on the gender association with Ellis class 4 fracture.

MATERIALS AND METHODS:

This is a prospective study that took place in a private dental clinic in a South Indian population. The information was gathered from the dental hospital's outpatient department from September 2022 and December 2023.

Study sample size:

The total sample size was 47, where 35 were males and 12 were females. All the cases were collected in specified time and from patients with Ellis class 4 fracture under the age group of 10-17 years were included and were verified. I selected Maxillary central incisors for my study which was the most commonly involved area.

Final Data evaluation:

The data collected was compiled in a Microsoft excel spreadsheets. The age was categorized into 13-14 years, 15-16 years and 17-18 years. It was analyzed using SPSS software version 23 with chi-square test. The Pearson correlation and the chi-square test were used. Statistical significance was described as a p-value of more than 0.05.

RESULTS and DISCUSSION:

Predominantly 74.47% of males and 25.53% of females had ellis class 4 fracture **(fig:1)**. Patients in the age group of 10-13 years experienced ellis class 4 fracture was 61.70% and 14-17 years 38.30 **(fig:2)**. 46.81% of the children's experienced Ellis class 4 fracture before root formation and 53.19% met with Ellis class 4 fracture after the root formation**(Fig:3)**. Around 44.44% of the children who experienced Ellis class 1 fracture with the tooth becoming non vital, 22.22% experienced Ellis class 2 fracture, 14.81% experienced Ellis class 3 fracture and 18.51% didn't experience any fracture **(Fig:4)**. Most commonly involved tooth was upper right central incisor-11, which was around 57.69% and 42.31% of the upper left central incisors were involved with Ellis class 4 fracture **(fig:5)**. Major 46.81% of the males and 14.89% of the females belong to the age group of 10-13 years where the p= 0.521, which was statistically insignificant **(fig:6)**. 53.19% of males and females met with Ellis class 4 fracture after the root formation was complete, p= 0.001, statistically significant **(fig:7)**. 18.52% of the children with Ellis class 4 fracture did not undergo any fracture of the tooth, p= 0.663, statistically not significant **(fig:8)**. The majority of males and females coming with Ellis class 4 fractures involved Upper right central incisors which was 53.2%, p= 0.530, which was statistically not significant **(fig:9)**.

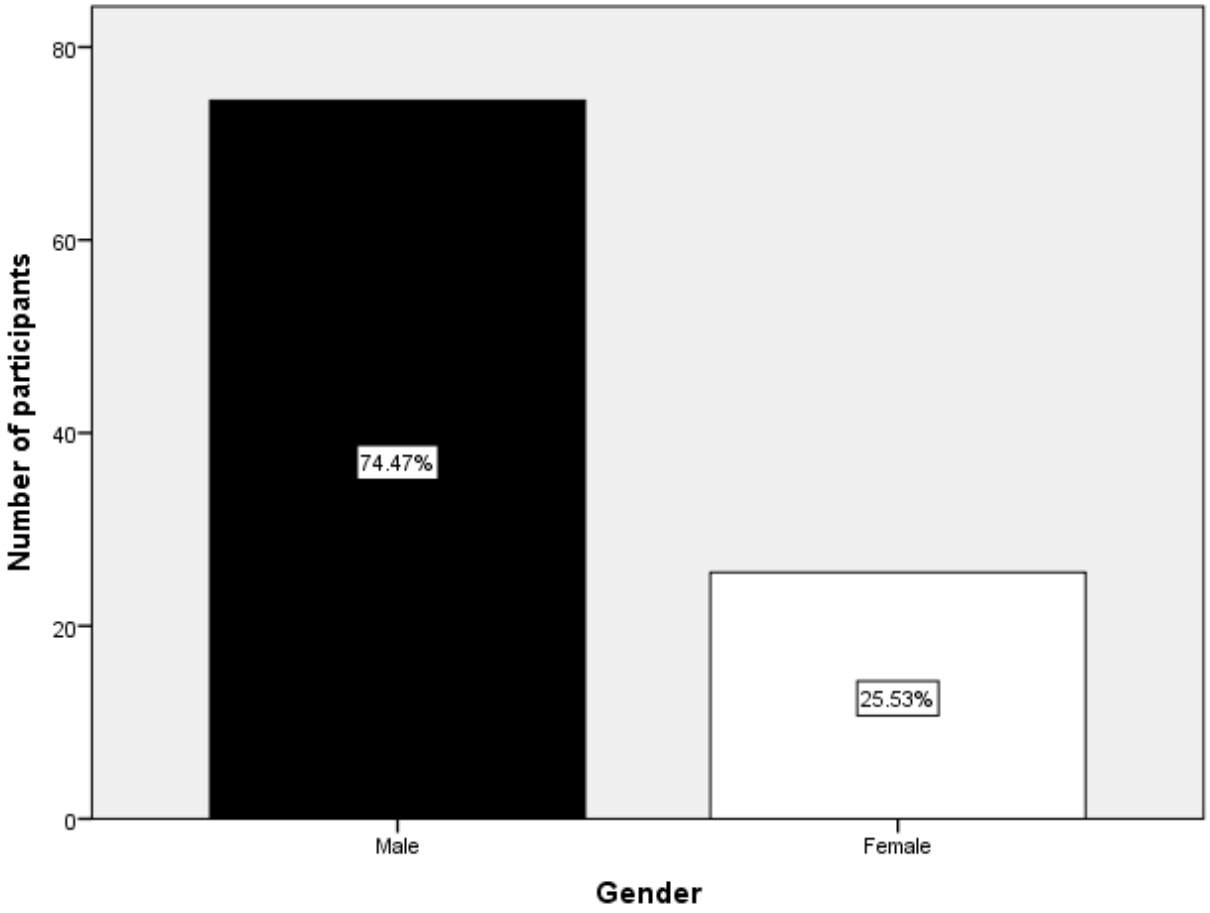

Figure: 1: Gender bar distribution.

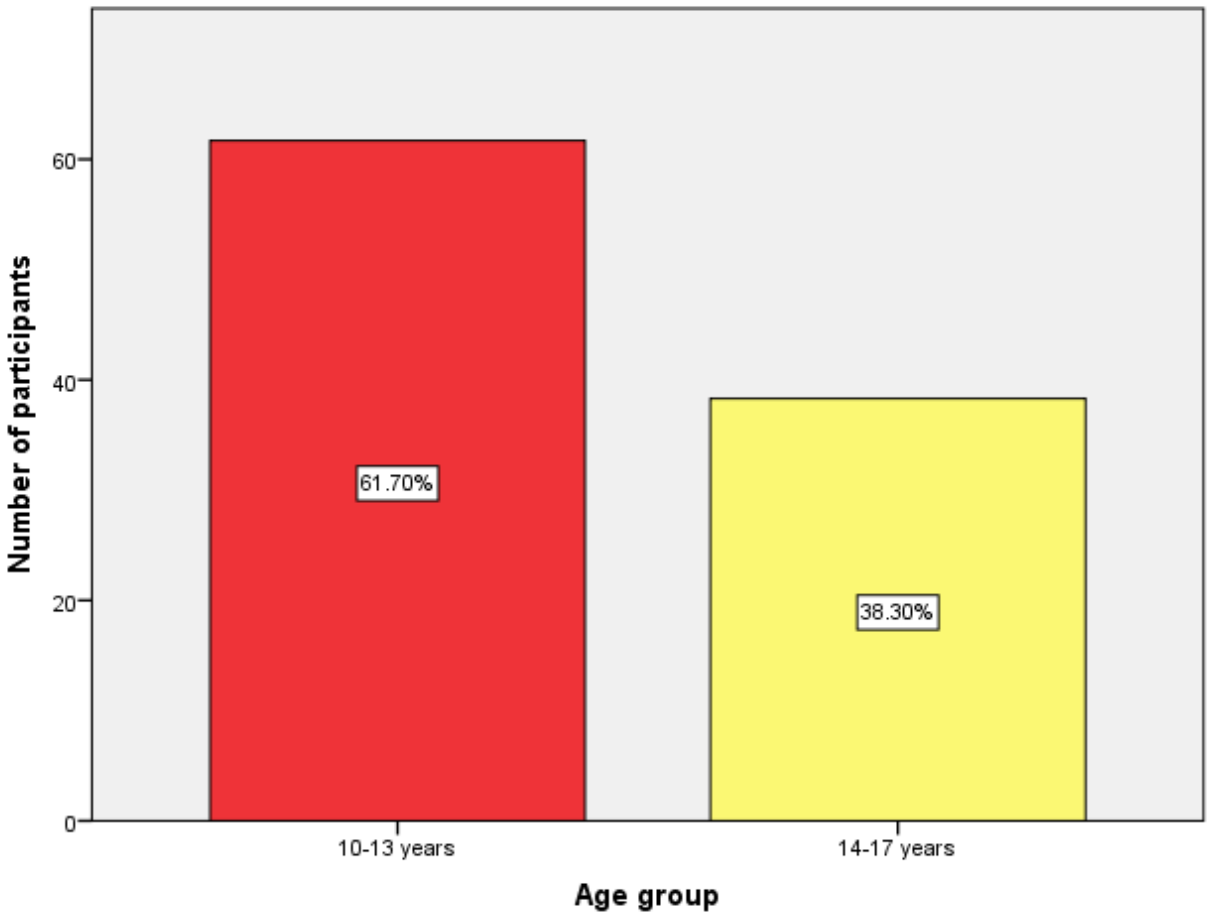

Figure: 2: Age group distribution.

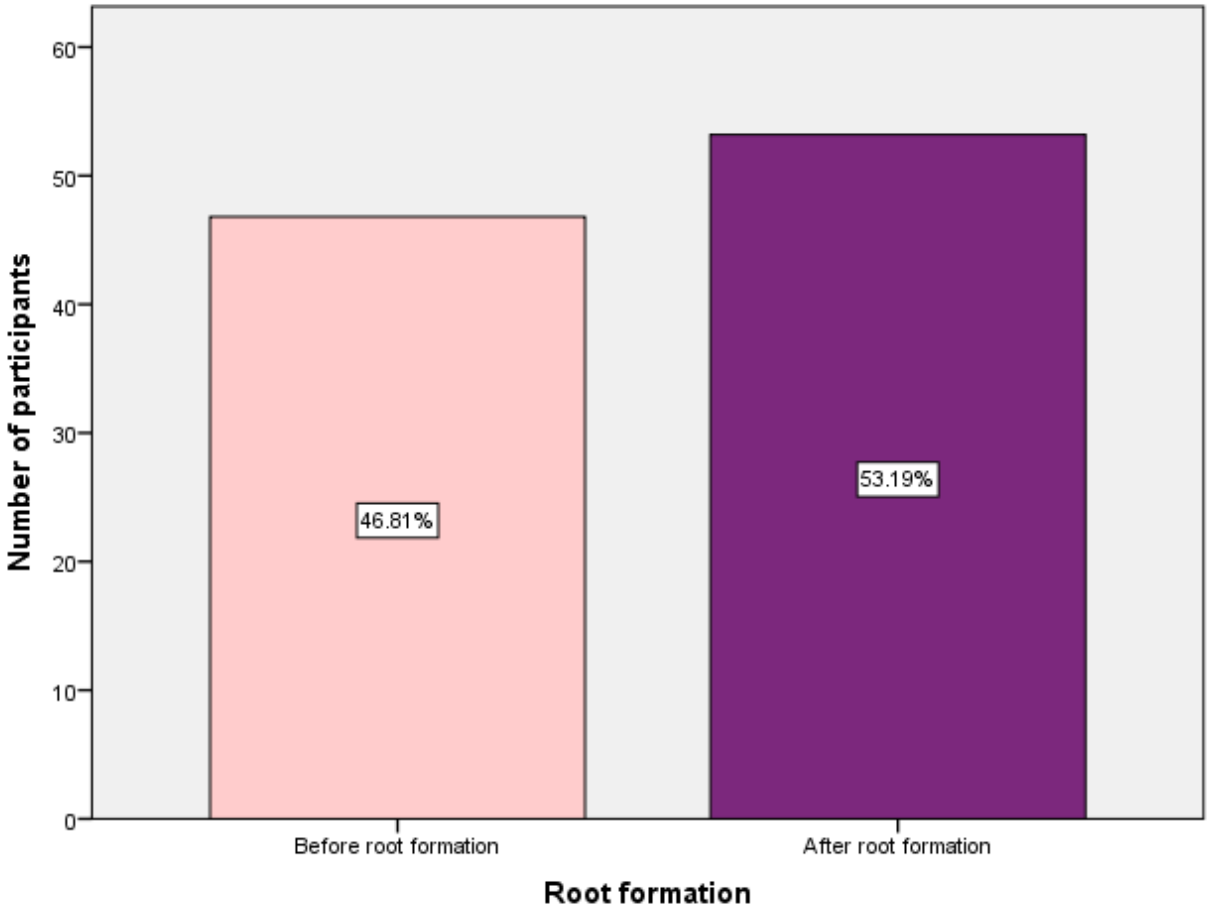

Figure: 3: Ellis class 4 fracture relationship with the root formation.

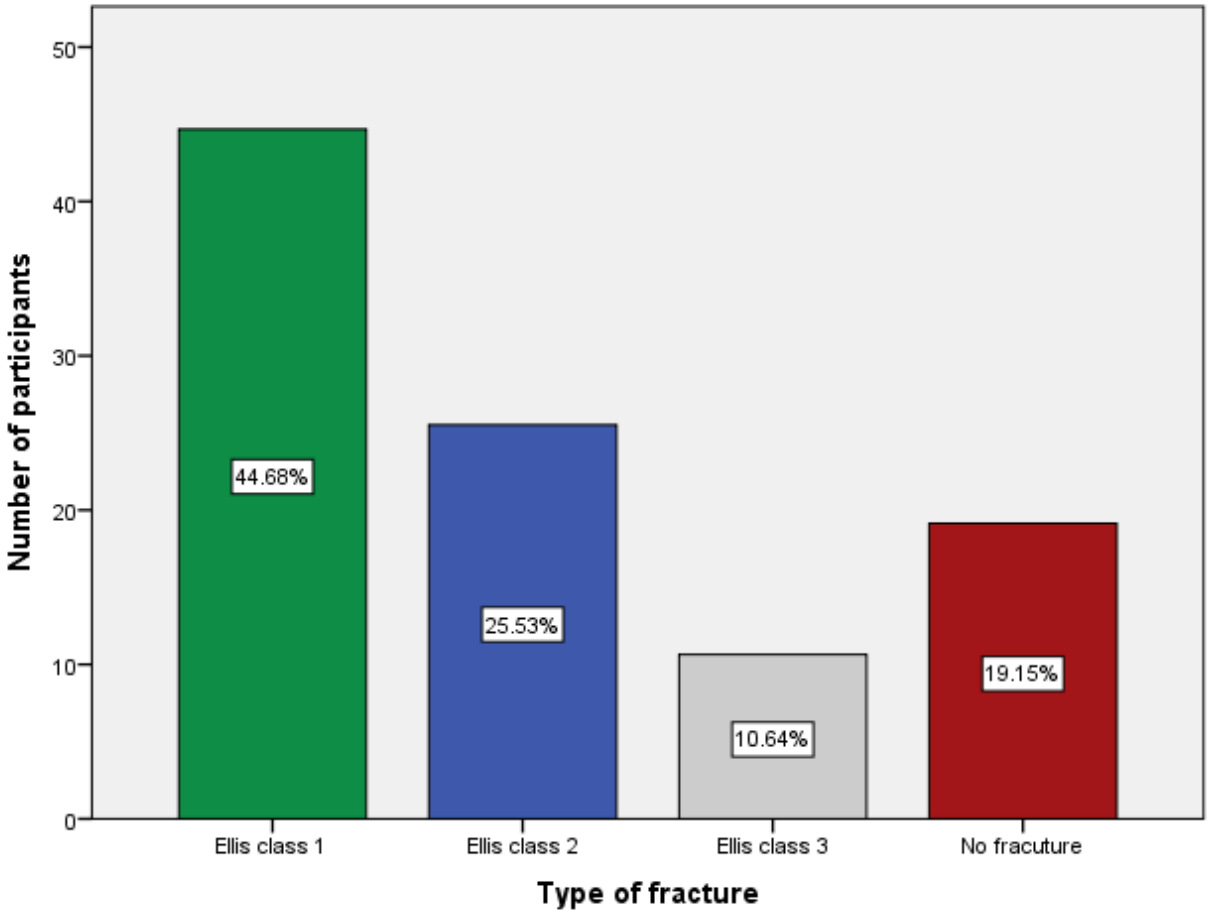

Figure: 4: Types of fractures involved in patients coming with non vital teeth (Ellis class 4 fracture).

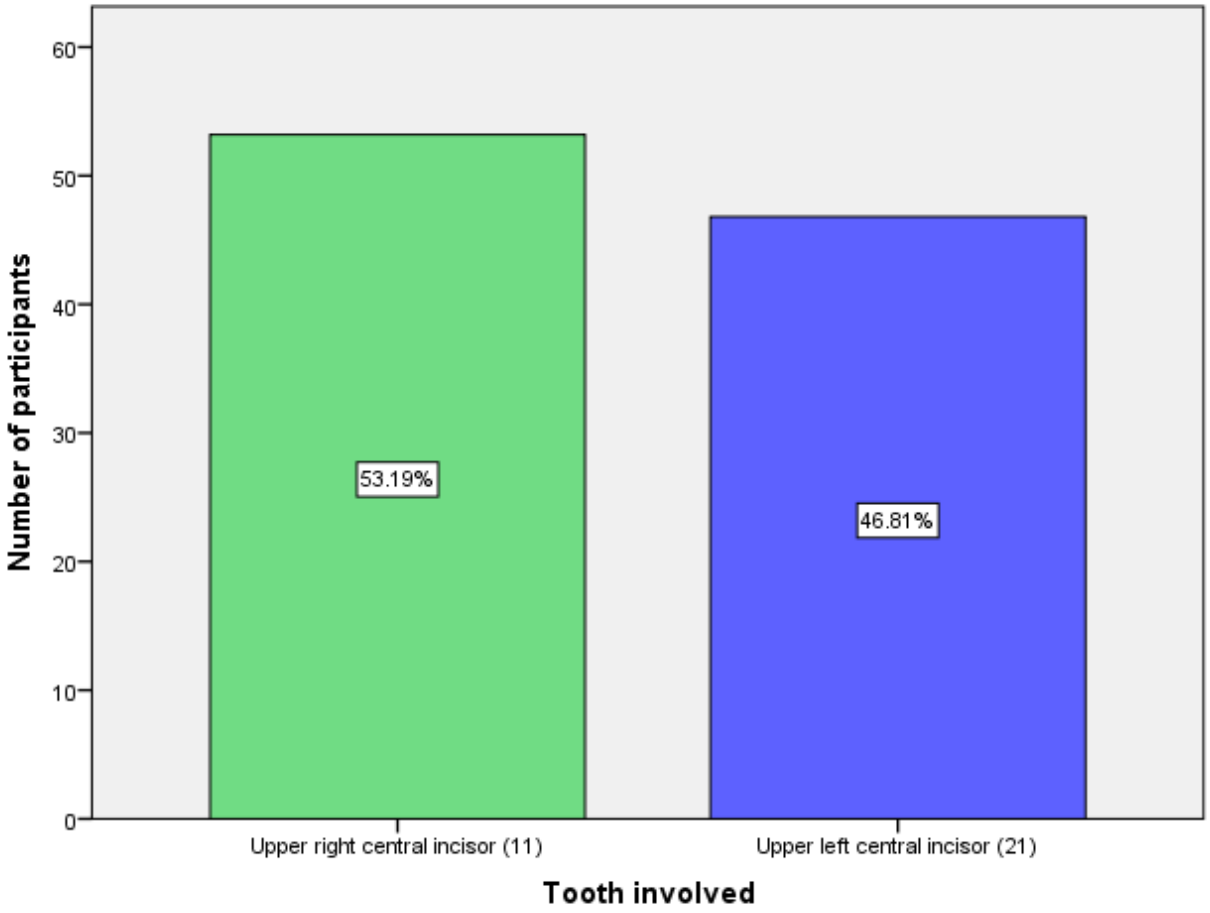

Figure: 5: Distribution of teeth involved with Ellis class 4 fracture.

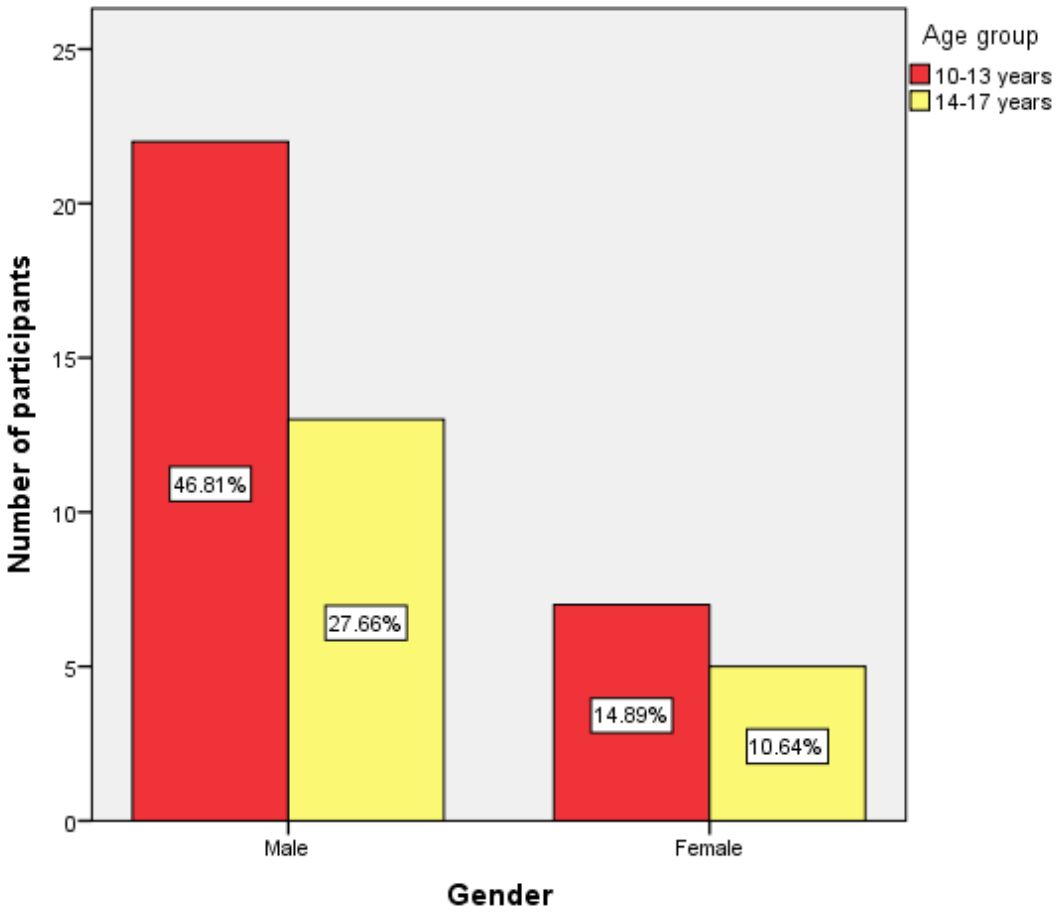

Figure: 6: Gender vs Age group correlation graph.

Gender	10-13 years	14-17 years	Total	Chi square test	p value
Male	22	13	35	0.77	0.521
Female	7	5	12		
Total	29	18	47		

Table : 1: Gender and Age cross tabulation.

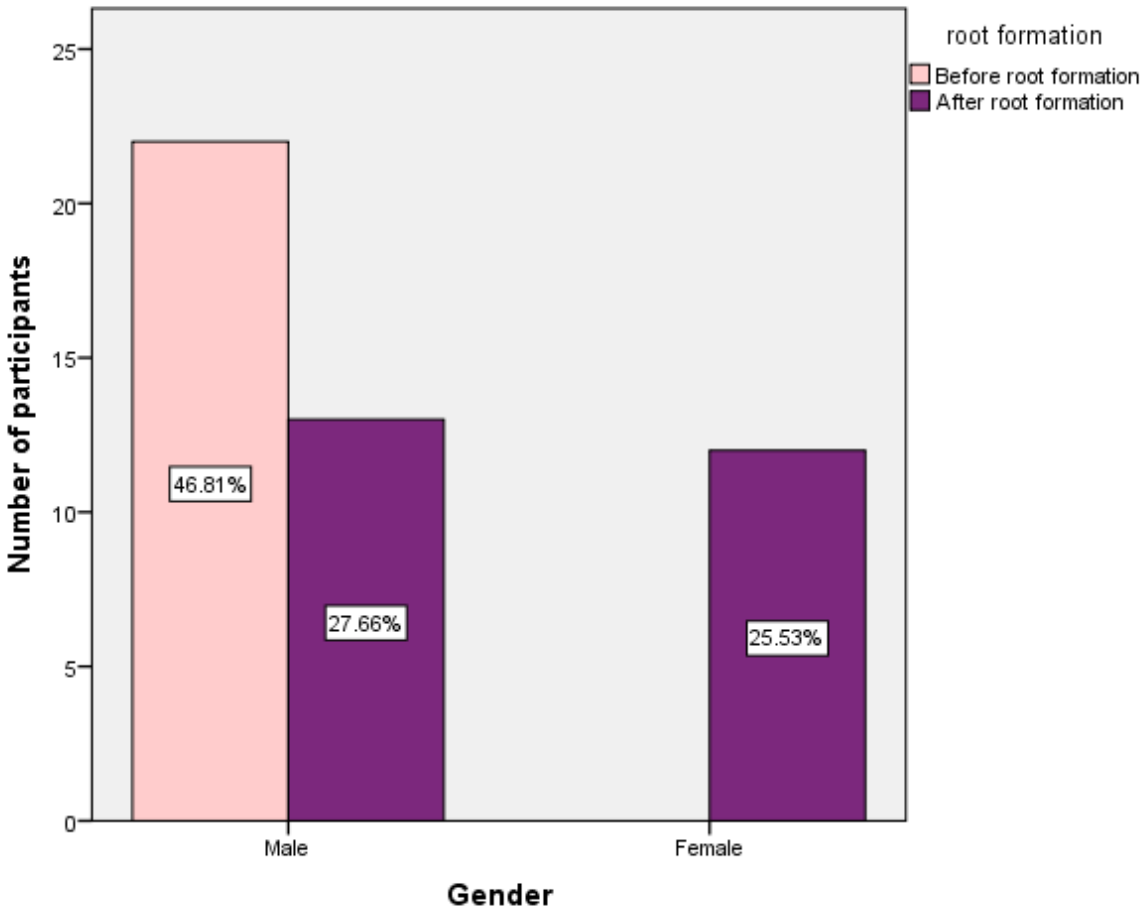

Figure: 7: Gender vs Root formation correlation graph.

Gender	Before root formation	After root formation	Total	Chi square test	p value
Male	22	13	35	14.181	0.001
Female	0	12	53		
Total	22	125	47		

Table: 2: Gender and root formation cross tabulation.

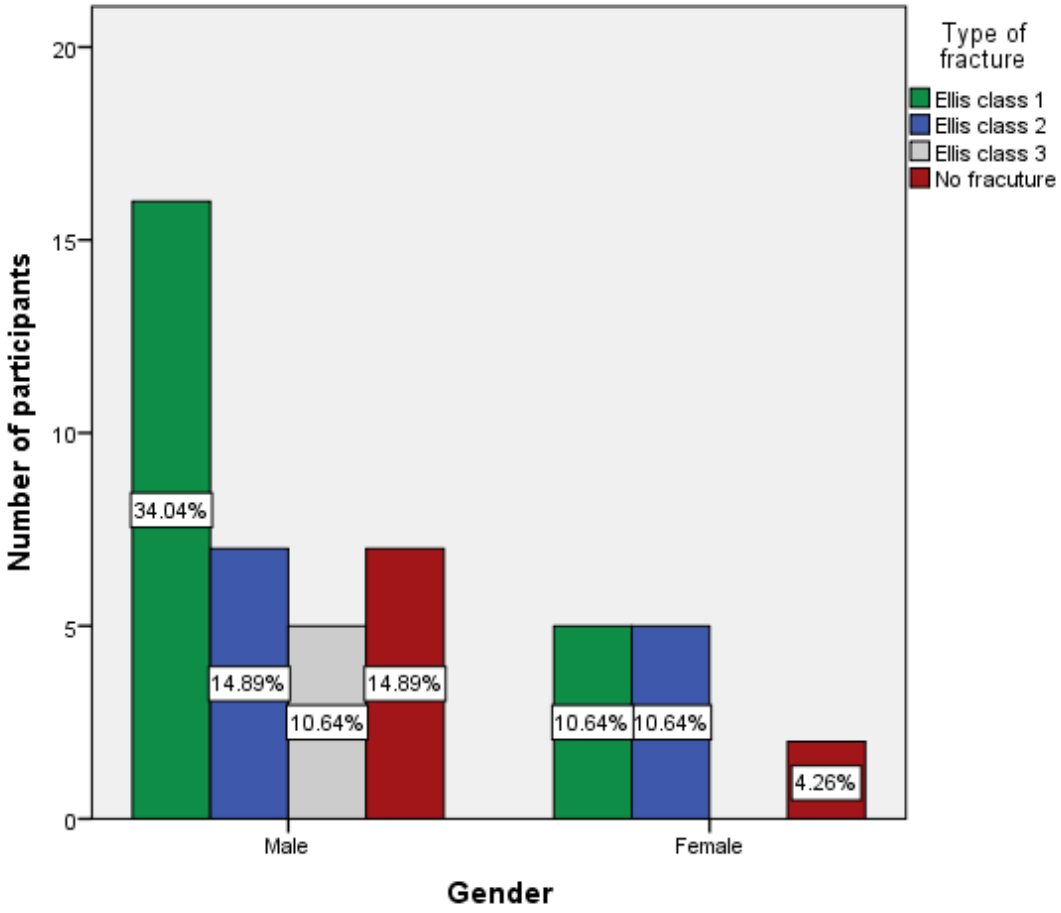

Figure: 8: Gender vs types of fracture correlation graph.

Gender	Ellis class 1 fracture	Ellis class 2 fracture	Ellis class 3 fracture	No fracture	Total	Chi square test	p value
Male	16	7	5	7	35	3.442	0.328
Female	5	5	0	2	12		
Total	21	12	5	9	47		

Table: 3: Gender and type of fracture cross tabulation.

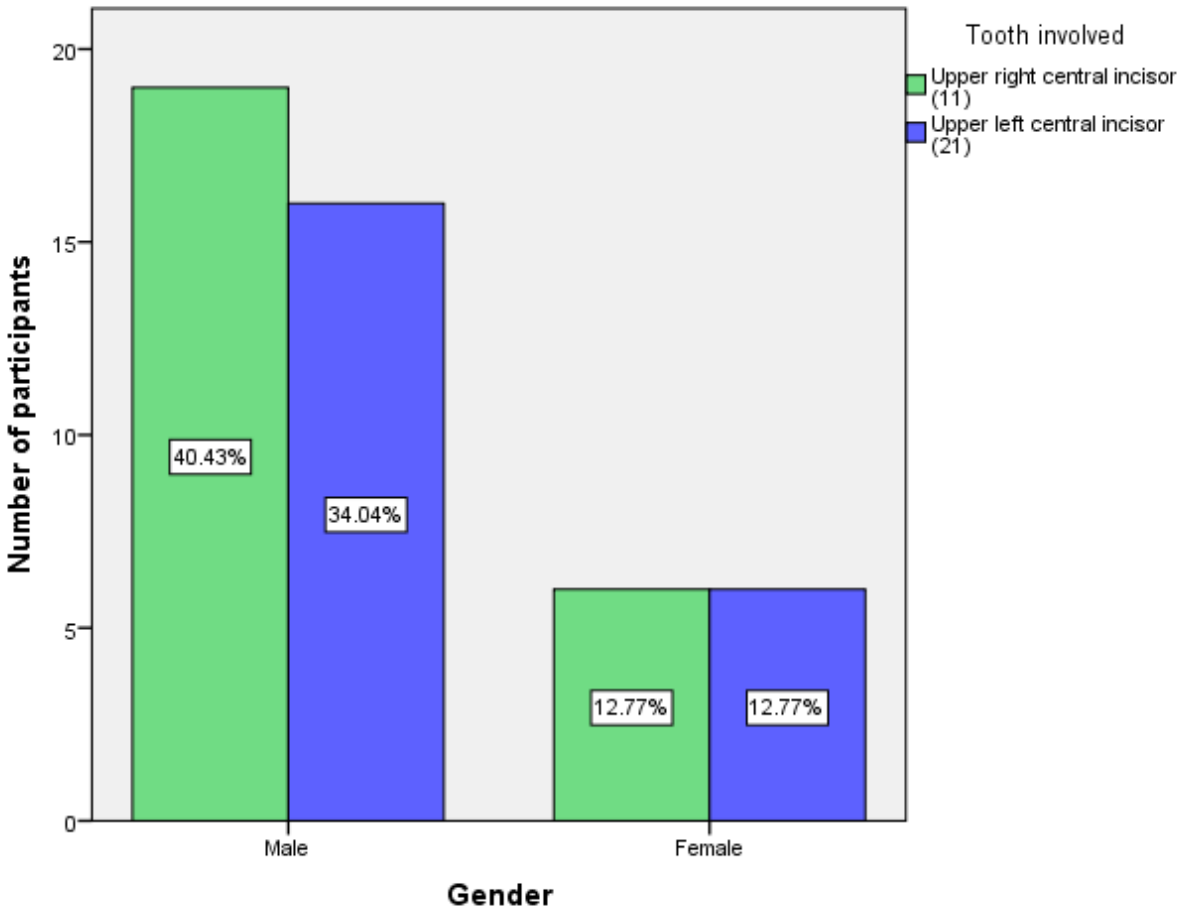

Figure: 9: Gender vs Teeth involved correlation graph.

Gender	Upper right central incisor	Upper left central incisor	Total	Chi square test	p value
Male	19	16	35	0.066	0.530
Female	6	6	12		
Total	25	22	47		

Table: 4: Gender and tooth involved cross tabulation.

Teeth are unable to heal on their own. The goal of providing treatment is to keep the tooth and its pulp healthy. Consult your dentist to determine the best course of action for you[Citation error]. The treatment will be determined by the extent of the tooth damage. Among the possibilities are: A crown is like a cap which covers the tooth. To begin, a temporary crown will be placed to ensure that the problem is corrected(13). A permanent crown will be fitted at some point. If you have a small chip in the surface of your tooth, a dental veneer is a thin covering that is placed over it. If the pulp is severely damaged, a root canal may be required(14). A root canal removes the damaged pulp and replaces it with a new filler. We can also reduce the chances of teeth getting fractured by following the various precautions given here like, Chewing on hard objects like ice, hard candy, popcorn kernels, or pens is not a good idea which can be avoided(15). The maxillary incisors are the teeth that break the most often in both the primary and permanent dentition. Teenagers are primarily responsible for tooth injuries since they play contact sports. Parents should receive thorough education about these disorders and how to handle dental trauma in the event that it arises during routine dental checkups(16). Children who participate in contact sports should take preventive precautions, such as wearing mouth guards and helmets, to lessen the impact of trauma in the event of an injury. An Ellis class IV fracture is a non-vital tooth that has experienced stress and may or may not have lost crown structure. Acute pulpal inflammation and the possibility of microorganisms entering dentinal tubules are both increased by severe dental injury. In this case, the open cavity has been left untreated for a very long time, which causes more dentin demineralization. More of the contaminated soft dentin was removed during the shaping and cleaning of the root canal. When participating in sports or recreational activities, wear a mouthguard to your kid. Don't encourage your kid to cut things with your teeth or open plastic bags with your teeth. Do not let your child clench or grind their teeth(17). If your child has a habit of grinding your teeth during night time, inform your dentist, so that he/she can give you a remedy for that. Previously done studies say that children’s in between the age group of 9-12 years are likely to fracture their teeth which was around 70% because of the following reasons like falls and collisions, due to emotionally stressful situations, presence of illness, inappropriate usage of teeth, oral piercing, at times iatrogenic injuries, road traffic accidents, risks in getting exposed to various sports and few intentional dental injury trauma’s are more common in this age group which is in turn the reason for Ellis class 4 fracture(18). In another

study there was an association of Ellis class 1 fracture in children's age group of 6-12 years which says that central incisors were mostly involved similar to our study sample where it was most common in upper right central incisors which was 53.19%.(19) In our study it is the children in the age group of 10-17 years i.e around 47.06%, affected by this ellis class 4 fracture. Ellis class 2 fracture association with age group of 13-17 years was related in a study where it was told that 29.41% of teeth involved with Ellis class 2 fracture was 29.41%(20). In our study we have done an association of Ellis class 4 fractures in patients reported to OP in between the age group of 10-17 years with their gender which was not done before.

CONCLUSION:

After considering the limitations of our study, An attempt was made to collect data in a prospective manner and included a wide range of ages in the population. Dental trauma in children is most commonly faced in young children who are still learning to walk and in adolescents who participate in sports. Orofacial injuries can cause pain, tooth loss, dysfunction, and a reduction in a patient's quality of life. From the study we can understand that ellis class 4 fracture was predominantly seen in the tooth number 11 which was around 53.19% and males were mostly affected as they take part in sports events more when compared to females. This study helps us in preventing the Ellis class 4 fracture which leads to non vitality of the tooth prior to the injury.

Ethical Approval:

As per international standard or university standards written ethical approval has been collected and preserved by the author(s).

Consent

As per international standards or university standards, patient(s) as well as parental written consent has been collected and preserved by the author(s).

LIMITATIONS:

Future studies need to be conducted on prevention of Ellis class 4 fracture.

SCOPE OF THE STUDY:

This study helped us in knowing the importance of evaluating the Ellis class 4 fracture in terms of gender which helps in early prevention and sometimes early loss of tooth becoming non vital and losing it.

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CONFLICT OF INTEREST: None declared

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