# Evaluation of the needs for prosthetic restorations of front teeth in a group of children and adolescents

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**Summary**

**Prosthetic treatments for children represent a challenge for the paediatric dentist due to the various characteristics of the growing arches and developing teeth that must be taken into account.**
**Aim. To evaluate the needs for prosthetic treatment in the front of the jaws in a group of young patients, as well as the causes and consequences of these needs.**
**Material and methods. 250 patients recruited from the Pedodontics clinic (123 boys), aged 7 to 18 years (12.00 – 2.96 years), were examined in terms of missing or severely destructed front permanent teeth needing prosthetic treatment. Data was registered and processed using SPSS software for Windows.**
**Results. 12.8% of the subjects needed prosthetic treatment of front teeth. 2.7% of the teeth taken into account needed prosthetic treatment, from which 48.2% were central incisors, 36.1% were lateral incisors, and 15.7% were canines. No correlation was found between the age of the patients and the needs for prosthetic treatment. Most of the teeth needing prosthetic treatment had either massive crown destruction (57.8%) or were missing (41.0%). Untreated caries was the most common cause of the missing or destructed teeth (36.1%), followed by congenitally missing teeth (28.9%), traumatic injuries (20.5%), and development abnormalities (14.5%). Space alterations were noticed exclusively in the maxilla, for 25.4% of the upper front teeth needing prosthetic treatment, due to mesial drifting of the adjacent teeth.**
**Conclusions. Caries prevention programs and early treatment of dental trauma could reduce early needs for prosthetic treatment of upper front teeth. Early restoration of missing/destructed permanent teeth is recommended in order to prevent space alterations.**

## Introduction

Previous studies have shown that growing patients sometimes need prosthetic treatment. Although the severely destructed or missing tooth needing prosthetic restoration is often the first permanent molar [1], current practice shows that permanent front teeth can also need prosthetics at early ages. Reported causes for such needs are untreated caries, dental trauma and less frequently tooth development abnormalities. At the time of their emergence on the arch, permanent front teeth have not yet completed their root development. Full root development is achieved after another 2 to 3 years. During this interval, the immature tooth can be subjected to various aggressions such as caries or trauma, the latter affecting up to 1/3 of the children aged 8 to 10 years [2, 3, 4]. In such cases, failure to provide the treatment of choice in due time can lead to severe crown destruction, root development arrest or even premature tooth loss and therefore to early need for prosthetic restorations. When the need for prosthetic treatment occurs at early ages, appropriate care must be provided promptly in order to minimize unwanted consequences such as alterations of space conditions due to subsequent migrations of adjacent/opposite teeth.

## Aim

Given the above, we found it useful to evaluate the needs for prosthetic treatment in the front of the jaws in a group of young patients, analyzing at the same time the causes and consequences of the occurrence of these needs.

## Material and methods

The study group consisted of 250 patients (123 boys), aged 7 to 18 years (mean age 12 – 2.96). The minimum age of 7 was chosen due to the fact that upper central incisors usually erupt around this age. The 18 years age limit was chosen as it represents the maximum age of pedodontics patients. Age and sex distribution of the study group are given in *Figure 1*. The subjects were examined at their first visit to the clinic in terms of missing or severely destructed front permanent teeth needing prosthetic restoration. The missing teeth category included both extracted and congenitally missing teeth. It needs also to be pointed out that in the needing prosthetic restorations situations we also included those cases of missing teeth that could well be treated by orthodontic migration of adjacent teeth (given the young age of the subjects).

Identification of front teeth needing prosthetic treatment was done by corroboration of clinical and x-ray examination and followed by recording of: 1. dental status (severely destructed/missing/other); 2. cause for the need of prosthetic restoration (caries/trauma/other); 3. subsequent space alterations (if any). Data was stored and processed using SPSS for Windows software, version 10.0.

## Results

Thirty-two patients (12.8%) of the study group needed prosthetic treatment in the front area of the jaws. Percentages of subjects needing prosthetic restorations of the front teeth (FT) are given for each age group in *Figure 2*. The proportions of boys and girls needing prosthetic treatment in the front of the jaws were different: 12.2% of all the examined boys exhibited such needs, compared to 9.6% of the girls.

Of the 3000 FT taken into account (upper and lower incisors and canines), 83, representing 2.76%, needed prosthetic restorations. The front

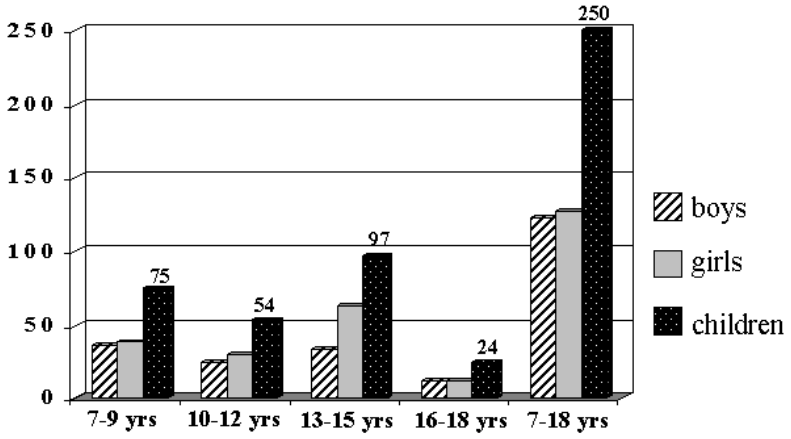


**Figure 1. Age and sex distribution of the study group (n=250 subjects)**

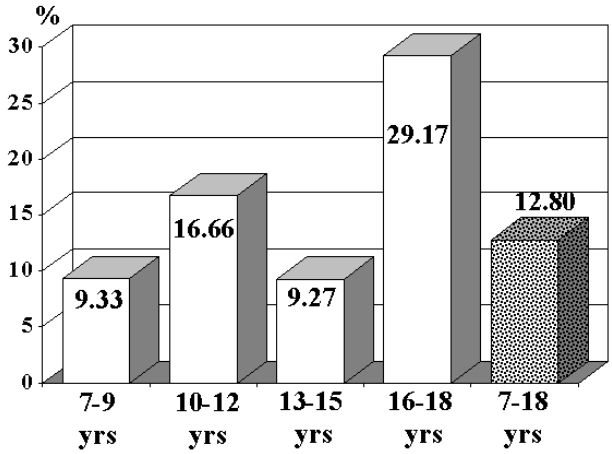


**Figure 2. Patients needing prosthetic restorations of the FT - percentages for each age group**

teeth needing prosthetics were, in the following order: central incisors (CI) 48.2%, lateral incisors (LI) 36.1% and canines (C) 15.7% *(Figure 3).*

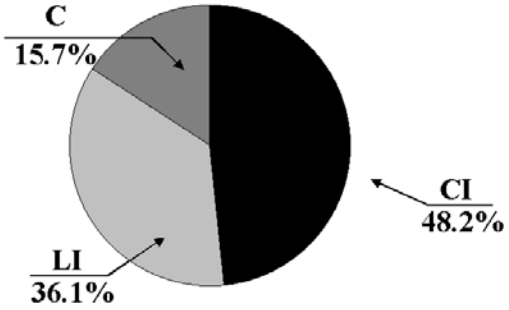


**Figure 3. Front teeth needing prosthetic restorations (n=83)**

In the upper jaw, 63 of the front teeth needed prosthetics (4.2% of all upper front teeth taken into account), while the corresponding figure for the mandible was 20 (1.3%). Half (54%) of the upper front teeth (UFT) needing prosthetic restoration were central incisors (UCI), followed by lateral incisors (ULI) (33%) and upper canines (UC) (13%) *(Figure 4a).* In the lower arch, lateral incisors (LLI) were most affected (45%), followed by central incisors (LCI) with 30% and canines (LC) with 25% *(Figure 4b).*

Recorded status of the FT needing prosthetic restorations is given in *Table 1.*

The causes for the occurrence of early need for prosthetic treatment were: untreated caries (36%), congenitally missing teeth (29%), dental trauma (20.5%) and tooth structure abnormalities (14.5%) *(Figure 5a).* These causes were represented differently in the two jaws, as shown in *Figure 5b.* While in the maxilla untreated caries represented the most common cause for the need of prosthetic treatment (46.7%), followed by trauma (23.8%), the lower front teeth were more

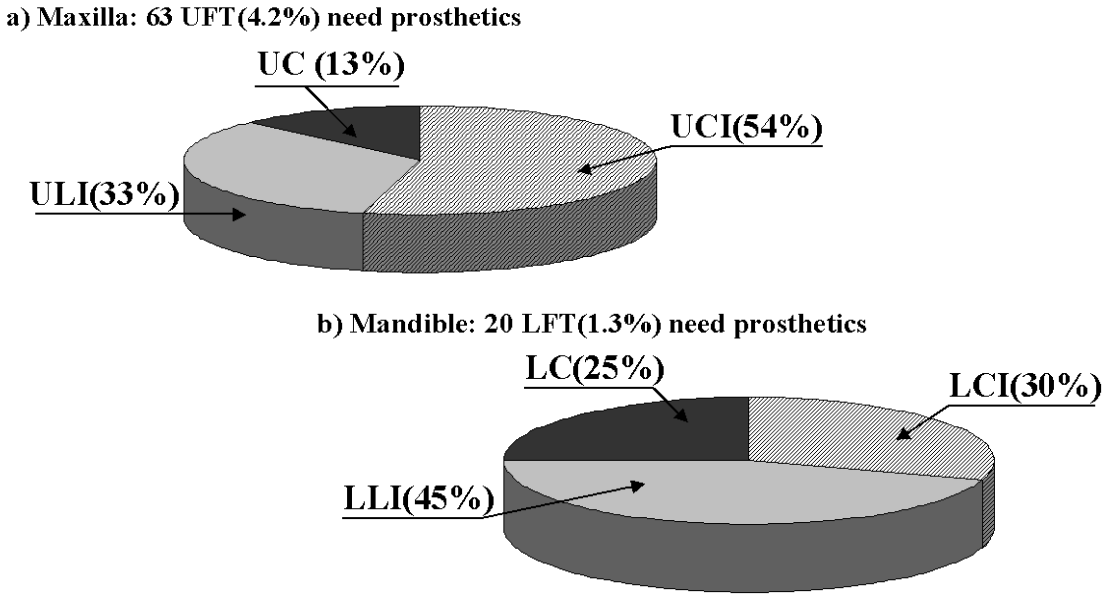


**Figure 4. Percentages of FT needing prosthetic restorations**

**Table 1.** Status of the FT needing prosthetic restoration

| Teeth | Status | |
|---|---|---|
| | Teeth with massive crown destruction (%) | Absent teeth (%) |
| UFT (*) | 66.7 | 31.7 |
| LFT | 30.0 | 70.0 |
| Total | 57.8 | 41.0 |

(*) *the difference up to 100% is given by teeth with physiognomy alterations due to structure abnormalities (1.6%)*

frequently affected by congenital absence (60%) or structure abnormalities (30%).

*Figure 6* gives an overall image of the causes of the occurrence of the need for prosthetic restorations for each group of teeth.

Concerning the causes that led to the occurrence of the need for prosthetics in the front of the jaws in different age groups, it needs to be pointed out that 66% (6 cases of a total of 9) of the trauma were found in children aged 7 to 10 years, while 77% (10 cases of 13) of the caries-related causes were found in the over 11 years age groups.

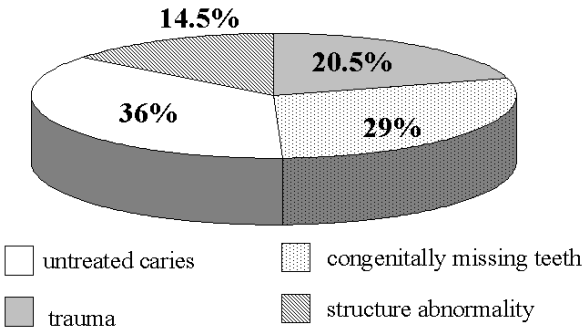


**Figure 5a. Causes for the occurrence of the needs for prosthetic restoration (proportions from the 83 FT needing prosthetic restoration)**

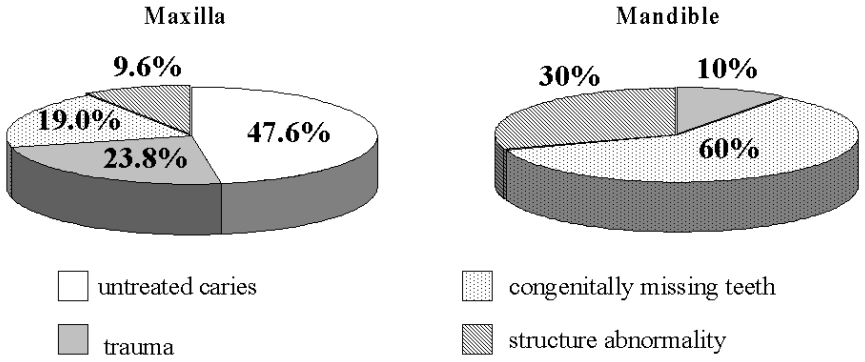


**Figure 5b. The causes for the occurrence of the needs for prosthetic restoration have different proportions for the two jaws**

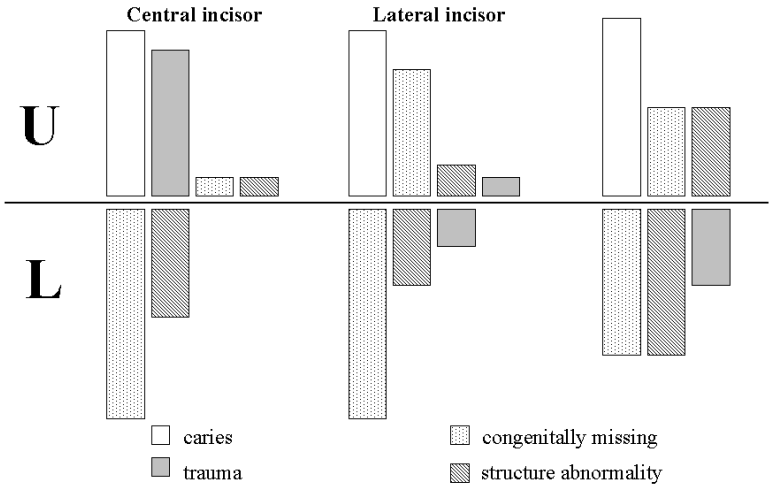


**Figure 6. Causes for the occurrence of the need for prosthetic restoration for each group of teeth**

The main cause for the occurrence of the need for prosthetic restorations was different for the two sexes. While in 60% of the boys dental trauma was responsible for the severe crown destruction/missing FT, in girls the main cause (66%) was represented by untreated caries. Again, three quarters (75%) of the trauma causing needs for prosthetic restoration of front teeth in boys were found in the 7 to 10 years age group.

Space alterations as unwanted consequences of postponing treatment in the front teeth were only found in 25% of the cases of UFT needing prosthetic restorations *(Figure 7)*. No such problems were found in the lower arch.

**Figure 7. D.L., male, age 12: 1.1 fractured at the age of 8, left untreated until the age of 12; subsequent space closure by mesial drifting of adjacent teeth.**

## Discussion

The above results show that the need for prosthetic treatment in the front region of the jaws occurs relatively early; almost 1/10 (9.33%) of the children aged 7 to 9 years needed prosthetic restoration of front teeth. No correlation was found between the age of the subjects and the need for prosthetic restorations in the front of the jaws. However, for the 16 to 18 years old age group, the proportion of subjects needing prosthetic restoration of the front teeth rises to almost one third (29%).

The causes that led to early need for prosthetic restorations of the front teeth were, in order: untreated caries (36%), congenitally missing teeth (29%), trauma (20.5%), and structure abnormalities (14.5%). Comparing the proportions of these causes for the two jaws it can be seen that untreated caries and trauma were the most frequent causes for early need of prosthetic restoration in the upper front teeth (46.7% and 23.8% respectively), while the lower front teeth were more commonly affected by congenital absence (60%) or structure abnormalities (30%). The overall proportion of front teeth needing prosthetic restorations is 3 times higher in the maxilla compared to the mandible (4.2% versus 1.3%). Given that congenitally absent teeth are actually very seldom treated by prosthetic means, untreated caries and trauma remain the main causes for the need for prosthetic restorations in the front of the jaws in children and adolescents, and the upper front teeth are far more affected by such needs that the lower ones.

Concerning the causes for the occurrence of early need for prosthetic restorations in the front of the jaws, differences were found for various age groups, as well as between the two sexes. In this respect, 3/4 (77%) of the caries-related causes were found in subjects over 11 years of age, while 2/3 (66%) of the trauma were found in the 7 to 10 years age group. The latter finding is consistent with previous ones [2, 3, 4, 5]. Andreasen [2] appreciates the 8 to 10 years age group as the most commonly affected by traumatic injuries of the teeth while Law, Lewis and Davis (quoted by Bratu [10]) consider the 8 to 11 years age group as the most prone to trauma of the upper front teeth, 75% of the UFT traumatic injuries affecting this particular age group.

The results of the present study concerning dental trauma reinforce previous reports demonstrating that permanent incisors can frequently be affected by trauma (mainly crown or crown-root fractures [2, 4, 6]) before the completion of root development. Sometimes particularly in cases with pulp involvement appropriate management of the fractured tooth implies postponing of the final restoration until the completion of root development, either by apexogenesis or by apexification. In such cases unwanted space alterations can be avoided by the use of temporary crown restorations or reattachment of the fractured fragment [7, 8].

Concerning differences between sexes, the main cause responsible for early need for prosthetic restoration of front teeth in boys was dental trauma (60% of the severe crown destruction/missing FT), while in girls the main cause for such need was untreated caries (66% of the FT needing prosthetic restoration). Differences between sexes regarding the main cause for the

occurrence of the need of prosthetic treatment are obviously due to the behavioral characteristics of children of the two sexes: boys are usually more prone to play accidents and therefore to dental trauma.

Moreover, the majority (75%) of trauma causing needs for prosthetic restoration of front teeth in boys was found in the 7 to 10 years age group. For the whole study group, 6.5% of the boys and 0.07% of the girls were affected by severe dental trauma, needing prosthetic restorations. Andreasen reported for the general population a proportion of 12-33% boys affected by dental trauma compared to 4-19% for girls. The relatively high difference of figures between our results and those of Andreasen may be given by the fact that we only took into account those traumatic injuries that were severe enough to impose prosthetic management.

Comparisons between the present study and former ones conducted in our country are difficult to make, mainly because of the fact that most previous reports refer to missing teeth rather than to teeth needing prosthetics, the latter including, beside extracted teeth, both severely destructed teeth and teeth that need to be extracted. Thus, Zarnea et al [9] reported for children and adolescents from a general population a proportion of 0.1% subjects in which dental trauma led to the loss of front teeth.

However, the present study as well as previous ones [9, 10] revealed untreated caries in children and adolescents as an important cause for the occurrence of early need for prosthetic treatment in children and adolescents.

The high prevalence of untreated caries in the front teeth, despite the evident alteration of physiognomy that they cause, show little concern of patients and family on the matter of dental health. This may be due in part to the lack of information concerning caries complications and the consequences that these may have on the overall health status of the individual, as well as on the social impact of a severely altered appearance. Another reason for postponing caries and even trauma treatment in immature teeth is unfortunately given by general dentistry practitioners reticence for providing treatment for teeth with open apices. Last, but nevertheless important, is the economic aspect: parents often choose not to take their children to the dentist s in the absence of actual pain due to the costs that dental treatments may imply, particularly in private dental offices, ignoring the fact that early treatment of dental caries or fractures would cost less than the complex treatment of subsequent complications [11,12].

Untreated caries were found to cause needs for prosthetic management mainly after the age of 11. This can be explained by the fact that decay needs a certain period of time before it can cause destruction important enough to require prosthetic restoration or tooth extraction.

Space alterations as unwanted consequences of untreated massive crown destructions/early extractions were only found in the maxilla, occurring in 1/4 of the cases of UFT needing prosthetic restorations. The fact that migrations only occurred in the upper jaw may be due in part to the structure of the upper alveolar bone structure that permits rapid drifting of teeth. On the other hand, given the bone plasticity characteristic in the growing child, the relatively small proportion of cases where space alteration occurred is probably due to the short amount of time that had passed between the extraction/crown destruction and the visit to the dentist [13], regardless the actual motivation of the visit (subjects in the study group did not necessarily come to the clinic to have their front teeth treated).

## Conclusions

Early need for prosthetic restoration of front teeth in children and adolescents is a reality, as it occurs very early, soon after the emergence of these teeth. As caries and trauma remain the main causes for such needs, caries prevention programs for schoolchildren, regular dental check-ups and early and appropriate management of traumatic injuries of the teeth could help reducing the need for prosthetic treatment in the front of the jaws in young patients. In this respect, on one hand parents need to be made aware of the importance of early treatment of both decay and trauma. On the other hand, general dentistry practitioners need to overrule their reticence in dealing with young permanent teeth and to either provide appropriate treatment in due time or provide emergency treatment and refer the patient to a specialist.

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