

# Efficacy of a comprehensive dental education program regarding management of avulsed permanent teeth as a valid indicator of increased success rate of treatment of avulsion in a North Indian population

NAVNEET GREWAL, GENIEVIEVE D. SHANGDIAR<sup>1</sup>, GUMBER SAMITA

## Abstract

**Aims:** To assess whether educating the parents, teachers, and intermediate school children of Amritsar city about the emergency management of tooth avulsion was an effective method of increasing success rate of treatment of avulsion. **Subjects and Methods:** Self-administered questionnaires were prepared for 200 parents, teachers, and for intermediate school children to assess baseline knowledge. Sociodemographic distribution of the targeted group was carried out applying Kuppusswamy scale. Two months later, flip cards and posters were distributed to the selected sample followed by a reinforcement session conducted after 1 month in the form of slide presentations on dental trauma. After 3 months, reassessment performance was distributed to the same participants for reassessing any change in baseline knowledge. Further analysis of knowledge, attitude, and practices were carried out after 6 months. The scores based on Likert scale ranging 0-3 were obtained and put to statistical analysis to analyze efficacy of this program 12 months from baseline data. **Results and Conclusion:** Wilcoxon signed ranked test was applied to nonparametric data to study the knowledge before and after education was carried out. There was a significant change in the knowledge level of children, teachers, and parents after the campaign and teachers showed more positive change in the practice of emergency management of tooth avulsion, endorsing the fact that comprehensive dental education programs targeting school teachers and children can change the perspective of individuals toward treatment needs for dental trauma involving avulsion.

**Keywords:** Avulsion, emergency management, knowledge, reimplantation

## Introduction

Accidents involving anterior teeth are very common. The consequences may range from small tooth fractures to a complete dislocation of the tooth from its alveolus, characterizing a scenario of dental avulsion. According to Casthilo *et al.*,<sup>[1]</sup> approximately 10% of the population, in general, has experienced some kind of dental trauma. Of these, around 0.5-16% are reported cases of dental avulsion. Boys showed a higher prevalence of traumatic injuries as compared to girls in the ratio of 2:1. Because the peak age

for avulsion of permanent incisors is between 7 and 9 years, most research has focused on parents and school teachers as the groups most commonly supervising children of this age.

Immediate reimplantation is widely accepted as the most appropriate treatment for a traumatically avulsed permanent tooth; however, this is not most often feasible. It has been suggested to temporarily store avulsed teeth in a suitable storage medium.<sup>[2-4]</sup> Several studies have shown that reimplantation should be done as soon as possible ideally within minutes after trauma. If lay people do not feel comfortable to perform this procedure, they can place the tooth in a storage medium and consult the dentist immediately.<sup>[5]</sup>

The International Association of Dental Traumatology and American Academy of Pediatric Dentistry acknowledge that dental injuries could have improved outcomes if the public was aware of first aid measures and the need to seek immediate treatment. A number of studies have evaluated

Department of Pedodontics and Preventive Dentistry, Punjab Government Dental College and Hospital, Amritsar, Punjab,


<sup>1</sup>Department of Pedodontics, Hi-Tech Dental College and Hospital, Bhubaneswar, Odisha, India

**Correspondence:** Dr. Navneet Grewal,  
Department of Pedodontics and Preventive Dentistry, Punjab Government Dental College and Hospital, Amritsar, Punjab, India.  
E-mail: navgredent@hotmail.com

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Grewal N, Shangdiar GD, Samita G. Efficacy of a comprehensive dental education program regarding management of avulsed permanent teeth as a valid indicator of increased success rate of treatment of avulsion in a North Indian population. *Contemp Clin Dent* 2015;6:477-82.

| Access this article online  |                                    |
|---|------------------------------------|
| Quick Response Code:<br> | Website:<br>www.contemplindent.org |
|   | DOI:<br>10.4103/0976-237X.169859   |

the knowledge of parents regarding immediate management of traumatized teeth and found the knowledge level to be low.<sup>[6]</sup> Hence, it is important to improve their knowledge about the immediate and proper first-aid steps to be taken at the site of the accident.

Information in the form of a lecture given to school teachers and parents could be a way to increase their knowledge level.<sup>[2]</sup> Visiting schools, giving lectures, distributing leaflets, or making posters are all possible forms to help increase awareness of dental trauma management. A less resource demanding way to spread information is by giving out leaflets, which are not too expensive to print and can be easily distributed to many people.<sup>[3]</sup> By educating the parents, school professionals, and susceptible children mostly aged 7-12 years about the emergency procedures to be carried out this could be made possible. Hence, this study was conceptualized and designed to assess the knowledge level of emergency management of tooth avulsion in school teachers, parents or caretakers, and intermediate school children of Amritsar city and to educate the targeted subjects through an informative campaign on dental trauma and avulsion management. Further analysis of the efficacy of this campaign as a valid indicator of increased success rate of treatment of avulsion was also carried out over a period of 3 years.

## Subjects and Methods

Ethical clearance was obtained from the Ethical Committee of Baba Farid University of Health Sciences vide. Letter no: BFUHS/2K11/p-TH/5294 dated 27/06/2011 for carrying out this survey.

A randomized/cross-sectional study design was planned and cluster sampling of the targeted subjects was carried out from six intermediate schools wherein 200 children aged 7-12 years, 200 parents, and 200 teachers or sports coaches were involved.

The survey instruments used for this study were:

- Pretested self-administered questionnaires both in the spoken language and English for children, parents, and school teachers
- Flip cards and posters both in the spoken language and English
- Didactic material/slide projection on dental trauma
- Pretested questionnaire for assessment of the efficacy of the campaign.

### Step I

Informed consent was taken from the school authorities after explaining the nature of the study. Specific self-administered questionnaires based on preexisting models<sup>[7-9]</sup> were prepared in spoken language and English. The validity of the questionnaires was tested by two independent clinicians pertaining to the Oral Surgery and Trauma Care Department

of Punjab Government Dental College and Hospital and the other from the Department of Pedodontics and Preventive Dentistry, Government Dental College, Amritsar. This questionnaire was modified and then pretested on 10 parents and children visiting the Out Patient Department of Pedodontics/Oral Surgery and 10 teachers teaching in elementary schools other than those participating in the study. Two questionnaires were prepared-one for parents and school teachers and second for children aged 7-12 years with three-major sections as under:

- Questions pertaining to general knowledge of trauma other than dental
- Questions pertaining to general knowledge about the teeth and avulsion
- Questions pertaining to specific knowledge of tooth avulsion and reimplantation.

Each cluster sample was distributed respective performance for filling up during the first stage of the study. The scoring was based on a four-point Likert scale. For each section, three to five questions were designed to assess the participants' knowledge level. For each section, a knowledge score ranging from 0 to 3 was given, where 0 = no knowledge demonstrated, 1 = minor knowledge demonstrated, 2 = good, but not complete knowledge demonstrated, and 3 = complete knowledge demonstrated. Scores were calculated and analyzed for demographic differences. Descriptive statistics was used to describe and analyze the baseline data.

### Step II

Two months after Step I, flip cards and posters with the both in spoken language of the area and English were prepared regarding information about emergency management procedures for handling avulsed teeth on the basis of baseline data procured in Step I (as per guidelines for the management of traumatic dental injuries. II. Avulsion of permanent teeth by Flores *et al.* 2007).<sup>[10]</sup> The posters had simple, self-explanatory wordings and figures to facilitate understanding by all readers. The validity of these posters was pretested on 10 parents, 10 children, and 10 teachers other than those participating in the study by two different supervisors after having undergone group discussions on the matter of the poster with the relevant target groups. The flip cards were then distributed to the teachers, school children, and parents in the study sample as educational material.

The posters were put up in the medical room of the participating schools. These contained information about do's and don'ts of accidental tooth loss and procedures to be followed for immediate reimplantation, storage, and dental referral as soon as possible.

### Step III

A reinforcement session was conducted after 1 month with didactic material on dental trauma and its consequences,

importance of primary and permanent teeth, handling dental trauma at school and at home, and procedures to be followed after avulsion has taken place. The interactive sessions and re-orientation lecture with the participants on dental trauma and immediate reimplantation, washing of avulsed tooth, and storage of avulsed tooth were carried out during this step and the participants were encouraged to discuss their doubts and thoughts freely with the presenters. All parents, teachers, and students were addressed during this session.

#### Step IV

After 6 months, same performance given in Step I were distributed to the same participants for reassessing any change in baseline knowledge. General demographic data were collected, and scores noted for each subject on the evaluation forms based on four-point Likert scoring of 0 to 3.

#### Step V

A new pretested questionnaire based on previous assessment models<sup>[3,8,10]</sup> for analysis of the efficacy of the campaign as a valid indicator of increased success rate of treatment of avulsion were prepared both in spoken language and English. Two questionnaires were made one for parents and teachers and the second for school children aged 7-12 years with only two-major sections:

- Questions pertaining to general knowledge about the teeth and avulsion
- Questions pertaining to specific knowledge and practice of handling tooth avulsion and reimplantation.

The scores based on four-point Likert scale ranging from 0 to 3 were obtained and put to statistical analysis.

## Results

Sociodemographic distribution of parents and teachers according to age, sex, education level, occupation, and family income was done according to Kuppaswamy scale.<sup>[11]</sup> The mean age was between 27 and 35 years with only 8% of the group aged between 36 and 40 years. The age distribution of teachers showed a mean of 25-35 years with 9% of the group being between 39 and 47 years of age and 3-6% between 48 and 57 years. 60% of the parents had graduated up to high school with only 2.5% being illiterate. The majority of the parents belonged to lower middle class (62.5%) and upper lower middle class (29.5%). All the teachers had graduate honors/postgraduate training and belonged to the skilled worker domain with a maximum average of the upper lower middle-class level (69%) and upper middle-class level up to 31%. The observations were tabulated and subjected to statistical analysis by using SPSS version 17.0 (IBM, corporation, New York, USA) in order to draw a valid conclusion from data by evaluating results at  $P < 0.001$  level of significance.

Wilcoxon Signed Ranks Test was applied to nonparametric data [Tables 1-3]. To study the change in knowledge before

**Table 1: Change in knowledge of children before and after education (based on four-point Likert scale)**

| Sections | Ranks          | n   | Significance |
|----------|----------------|-----|--------------|
| A        | Negative ranks | 6   | ≤0.001***    |
|          | Positive ranks | 157 |              |
|          | Ties           | 37  |              |
|          | Total          | 200 |              |
| B        | Negative ranks | 1   | ≤0.001***    |
|          | Positive ranks | 181 |              |
|          | Ties           | 18  |              |
|          | Total          | 200 |              |
| C (1)    | Negative ranks | 1   | ≤0.001***    |
|          | Positive ranks | 187 |              |
|          | Ties           | 12  |              |
|          | Total          | 200 |              |
| C (2)    | Negative ranks | 2   | ≤0.001***    |
|          | Positive ranks | 184 |              |
|          | Ties           | 12  |              |
|          | Total          | 200 |              |

\*\*\*Highly significant ≤0.001; <0.01= Significant at 1% significance level; <0.05= Significant at 5% significance level; NS= Non significant

**Table 2: Change in knowledge of teachers before and after education**

| Sections | Ranks          | n   | Significance |
|----------|----------------|-----|--------------|
| A        | Negative ranks | 2   | ≤0.001***    |
|          | Positive ranks | 118 |              |
|          | Ties           | 69  |              |
|          | Total          | 189 |              |
| B        | Negative ranks | 4   | ≤0.001***    |
|          | Positive ranks | 151 |              |
|          | Ties           | 34  |              |
|          | Total          | 189 |              |
| C (1)    | Negative ranks | 6   | ≤0.001***    |
|          | Positive ranks | 165 |              |
|          | Ties           | 18  |              |
|          | Total          | 189 |              |
| C (2)    | Negative ranks | 5   | ≤0.001***    |
|          | Positive ranks | 164 |              |
|          | Ties           | 20  |              |
|          | Total          | 189 |              |

\*\*\*Highly significant ≤0.001; <0.01= Significant at 1% significance level; <0.05=Significant at 5% significance level; NS=Non significant

and after the educational campaign and the results were put to statistical analysis. On the basis of Wilcoxon Signed Ranks Test which gave negative rank showing negative change in knowledge, positive rank showing positive change in knowledge and ties showing no change in knowledge, the results were evaluated with  $P < 0.001$  level of significance

and found to be highly significant for all sections of the questions.

Analysis of the efficacy of the campaign as a valid indicator of increased success in handling dental trauma was done 15 months after baseline data were procured in children [Table 4], parents and teachers. Out of 189 teachers who had filled the self-administered questionnaire, 2% of teachers came across tooth dental trauma leading to avulsion and scores were evaluated on the basis of four-point Likert scale [Table 5]. For section A-score was 3, section B (1) score was 2, and section B (2) score was 3 indicating a positive change in the practice of emergency management of tooth avulsion. Out of 200 parents [Table 6], who had filled the self-administered questionnaire 1% came across tooth avulsion cases, and scores were evaluated on the basis of four-point Likert scale. For section A-score was 2, section B (1) score was 2, and section B (2) score was 2 indicating a positive change in the practice of emergency management of tooth avulsion.

## Discussion

The main factors that influence the success of treatment of an avulsed tooth are: Extra-alveolar period and storage solution, both critical to the maintenance of viable cells present on the radicular surface. What happens in most of the cases is that the tooth is reimplanted after a long extra-alveolar period when cellular damage has already occurred. Hence, the prognosis is unfavorable and may ultimately lead to the loss of the tooth.<sup>[5]</sup> Informing the public of what to do when a tooth is knocked out is exceedingly important for the

prognosis of the tooth.<sup>[3]</sup> Lieger *et al.* (2009)<sup>[11]</sup> in their study concluded that teachers who had gained information from educational posters could manage emergency procedures correctly. In this study, flip cards and posters were distributed to the teachers, as well as parents and children had a positive influence and posters.

To enhance the knowledge further, 1 month later other tools of information such as slide presentations and interactive seminars were carried out. These interactive sessions were carried out during parent-teacher meetings in schools so that the entire group of participants could be targeted with similar discussions and information. The lectures provided a good opportunity for a direct meeting between the lecturer and the receiving group with the possibility to raise questions and discuss issues pertaining to each group. An advantage of this method was the possibility to compare knowledge and its impact on all the three groups and to clear their doubts at that point of time. Al-Asfour *et al.*<sup>[3]</sup> in their study found that a 30-min lecture about tooth avulsion and reimplantation improved the teacher's knowledge to an adequate knowledge (score of 2) or complete knowledge

**Table 3: Change in knowledge of parents before and after education**

| Sections | Ranks          | n   | Significance |
|----------|----------------|-----|--------------|
| A        | Negative ranks | 1   | ≤0.001***    |
|          | Positive ranks | 115 |              |
|          | Ties           | 84  |              |
|          | Total          | 200 |              |
| B        | Negative ranks | 5   | ≤0.001***    |
|          | Positive ranks | 118 |              |
|          | Ties           | 7   |              |
|          | Total          | 200 |              |
| C (1)    | Negative ranks | 5   | ≤0.001***    |
|          | Positive ranks | 184 |              |
|          | Ties           | 11  |              |
|          | Total          | 200 |              |
| C (2)    | Negative ranks | 5   | ≤0.001***    |
|          | Positive ranks | 185 |              |
|          | Ties           | 10  |              |
|          | Total          | 200 |              |

\*\*\*Highly significant ≤0.001; <0.01=Significant at 1% significance level; <0.05=Significant at 5% significance level; NS=Non significant

**Table 4: Comparison of knowledge of children before and after education (n=200)**

|                                   | Preeducation (%) | Posteducation (%) |
|-----------------------------------|------------------|-------------------|
| Section A                         |                  |                   |
| 0=No knowledge                    | 6 (3.0)          | 0 (0)             |
| 1=Minor knowledge                 | 104 (52.0)       | 2 (1.0)           |
| 2=Good but not complete knowledge | 70 (35.0)        | 45 (22.5)         |
| 3=Complete knowledge              | 20 (10.0)        | 153 (76.5)        |
| Section B                         |                  |                   |
| 0=No knowledge                    | 71 (35.5)        | 2 (1.0)           |
| 1=Minor knowledge                 | 90 (45.0)        | 13 (6.5)          |
| 2=Good but not complete knowledge | 37 (18.5)        | 35 (17.5)         |
| 3=Complete knowledge              | 2 (1)            | 150 (75.0)        |
| Section C (1)                     |                  |                   |
| 0=No knowledge                    | 165 (82.5)       | 10 (5.0)          |
| 1=Minor knowledge                 | 31 (15.5)        | 18 (9.0)          |
| 2=Good but not complete knowledge | 4 (2)            | 74 (37.0)         |
| 3=Complete knowledge              | 0 (0)            | 98 (47.0)         |
| Section C (2)                     |                  |                   |
| 0=No knowledge                    | 123 (61.5)       | 8 (4.0)           |
| 1=Minor knowledge                 | 69 (34.5)        | 11 (5.5)          |
| 2=Good but not complete knowledge | 8 (4.0)          | 52 (26.0)         |
| 3=Complete knowledge              | 0 (0)            | 129 (64.5)        |

Comparison was based on four-point Likert scale wherein 0=No knowledge; 1=Minor knowledge; 2=Good but not complete knowledge; 3=Complete knowledge

**Table 5: Comparison of knowledge of teachers before and after education (n=189)**

|                                   | Preeducation (%) | Posteducation (%) |
|-----------------------------------|------------------|-------------------|
| Section A                         |                  |                   |
| 0=No knowledge                    | 0 (0)            | 0 (0)             |
| 1=Minor knowledge                 | 16 (8.5)         | 0 (0)             |
| 2=Good but not complete knowledge | 113 (59.8)       | 13 (6.9)          |
| 3=Complete knowledge              | 60 (31.7)        | 176 (93.1)        |
| Section B                         |                  |                   |
| 0=No knowledge                    | 21 (11.1)        | 1 (5.0)           |
| 1=Minor knowledge                 | 101 (53.4)       | 12 (6.3)          |
| 2=Good but not complete knowledge | 42 (22.2)        | 11 (5.8)          |
| 3=Complete knowledge              | 25 (13.2)        | 165 (87.3)        |
| Section C (1)                     |                  |                   |
| 0=No knowledge                    | 34 (18.0)        | 4 (2.1)           |
| 1=Minor knowledge                 | 123 (65.1)       | 11 (5.8)          |
| 2=Good but not complete knowledge | 31 (16.4)        | 43 (22.8)         |
| 3=Complete knowledge              | 1 (.5)           | 131 (69.3)        |
| Section C (2)                     |                  |                   |
| 0=No knowledge                    | 70 (37.0)        | 7 (3.7)           |
| 1=Minor knowledge                 | 84 (44.4)        | 12 (6.3)          |
| 2=Good but not complete knowledge | 35 (18.5)        | 44 (23.3)         |
| 3=Complete knowledge              | 0 (0)            | 126 (66.7)        |

Comparison was based on four-point Likert scale wherein 0=No knowledge; 1=Minor knowledge; 2=Good but not complete knowledge; 3=Complete knowledge

(score of 3). Similar findings were found in our study wherein the teacher's knowledge increased from score 0 or 1 to score 2 or 3. Moreover, a significant change was noticed from score 0 or 1 to score 2 or 3 in the knowledge of parents and children.

Change in knowledge before and after training was statistically analyzed by Wilcoxon Signed Ranks Test. Highly significant differences were found evaluating the knowledge of children, teachers, and parents before and after application of the module. The association between the level of knowledge and sociodemographic factors in children were also statistically evaluated. The change in knowledge, attitude, and practices (KAP) values was not affected by age or gender of the children.

In this study, the association between the level of knowledge and sociodemographic factors in teachers participating was found highly significant. Teachers between 23 and 42 years of age showed statistically highly significant difference with  $P < 0.001$ . Teachers in the 43-47 age group showed significant results for questions regarding general knowledge of trauma other than dental and previous information about emergency

**Table 6: Comparison of knowledge of parents before and after education (n=200)**

|                                   | Preeducation (%) | Posteducation (%) |
|-----------------------------------|------------------|-------------------|
| Section A                         |                  |                   |
| 0=No knowledge                    | 0 (0)            | 0 (0)             |
| 1=Minor knowledge                 | 19 (9.5)         | 2 (1.0)           |
| 2=Good but not complete knowledge | 128 (64.0)       | 32 (16.0)         |
| 3=Complete knowledge              | 53 (26.5)        | 166 (83.0)        |
| Section B                         |                  |                   |
| 0=No knowledge                    | 51 (25.5)        | 2 (1.0)           |
| 1=Minor knowledge                 | 112 (56.0)       | 15 (7.5)          |
| 2=Good but not complete knowledge | 37 (18.5)        | 10 (5.0)          |
| 3=Complete knowledge              | 0 (0)            | 173 (86.5)        |
| Section C (1)                     |                  |                   |
| 0=No knowledge                    | 51 (25.5)        | 4 (2.0)           |
| 1=Minor knowledge                 | 124 (62.0)       | 13 (6.5)          |
| 2=Good but not complete knowledge | 25 (12.5)        | 37 (18.5)         |
| 3=Complete knowledge              | 0 (0)            | 146 (73.0)        |
| Section C (2)                     |                  |                   |
| 0=No knowledge                    | 82 (41.0)        | 9 (4.5)           |
| 1=Minor knowledge                 | 110 (55.0)       | 13 (6.5)          |
| 2=Good but not complete knowledge | 8 (4.0)          | 38 (19.0)         |
| 3=Complete knowledge              | 0 (0)            | 140 (70.0)        |

Comparison was based on four-point Likert scale wherein 0=No knowledge; 1=Minor knowledge; 2=Good but not complete knowledge; 3=Complete knowledge

management in tooth injuries and highly significant results for questions regarding the extraoral time, washing of avulsed tooth, and storage medium. This could be related to the impact of our educational material such as flip cards and slide presentations and lectures which were given to them. However, only significant change in knowledge was seen with the increase in the age of teachers since 48-52 years showed more ties in questions pertaining to general knowledge of trauma other than dental.

The KAP values were also influenced by the teachers income wherein the teachers of upper middle and the lower middle socioeconomic scale showed highly significant results. Teachers with income <Rs. 3000/month showed only significant results for questions regarding general knowledge of trauma other than dental and previous information about emergency management in tooth injuries, extraoral time, washing of avulsed tooth, and storage medium. Highly significant results were seen in teachers with income >Rs. 3000/month.

In this study, the association between the level of knowledge and sociodemographic factors of parents such as age, educational

level, and income revealed highly significant changes in younger age group of parents (aged 25-40) and in educated parents with income between Rs. 3000 and 10000/month. Parents of lower socioeconomic group and semiskilled occupation did not show a significant change in KAP values.

Analysis of the efficacy of the campaign as a valid indicator of increased success in handling avulsion was carried out. In this study, out of 200 teachers who had filled the self-administered questionnaire at baseline, 12 dropouts occurred toward the end of the study. However, there were no dropouts in parents and their children. 2% of teachers came across tooth avulsion, and only 1% parents came across tooth avulsion and the scores were evaluated on the basis of four-point Likert scale. There was a positive change in the practice of emergency management of tooth avulsion by both the groups of participants. Mde *et al.*<sup>[12]</sup> in their study mentioned that knowledge on measures taken in cases of tooth avulsion was essential for people as the success rate of tooth reimplantation might increase if adequate procedures were performed.

The outcome of this study revealed that persistent education of school teachers and parents did to improve their perceptions toward immediate management of tooth avulsions. Out of the three groups, the teachers were found to be the key to educate the children about measures to be taken when confronted by dental trauma. The response of parents, however, varied according to socioeconomic factors. The children group was also highly receptive to the knowledge imparted to them during this program and showed an increase in their awareness about handling dental trauma if encountered during play.

#### Acknowledgments

We would like to thank the Principals and staff of Shri Ram Ashram School, Modern High School, S. L. Bhawan Public School, Police DAV Public School, DAV Public School and Navjot Public School. We would also like to express our appreciation to the cooperation offered by the children and their parents selected for the study.

#### Financial support and sponsorship

Nil.

#### Conflicts of interest

There are no conflicts of interest.

#### References

1. Castilho LR, Sundefeld ML, de Andrade DF, Panzarini SR, Poi WR. Evaluation of sixth grade primary schoolchildren's knowledge about avulsion and dental reimplantation. *Dent Traumatol* 2009;25:429-32.
2. Al-Asfour A, Andersson L. The effect of a leaflet given to parents for first aid measures after tooth avulsion. *Dent Traumatol* 2008;24:515-21.
3. Al-Asfour A, Andersson L, Al-Jame Q. School teachers' knowledge of tooth avulsion and dental first aid before and after receiving information about avulsed teeth and replantation. *Dent Traumatol* 2008;24:43-9.
4. Vergotine RJ, Govoni R. Public school educator's knowledge of initial management of dental trauma. *Dent Traumatol* 2010;26:133-6.
5. Pacheco LF, Filho PF, Letra A, Menezes R, Villoria GE, Ferreira SM. Evaluation of the knowledge of the treatment of avulsions in elementary school teachers in Rio de Janeiro, Brazil. *Dent Traumatol* 2003;19:76-8.
6. Zakirulla M, Togoo RA, Yaseen MS, Al-Shehri DA, Al-Ghamdi AS, Al-Hafed MS, *et al.* Knowledge and attitude of Saudi Arabian school teachers with regards to emergency management of dental trauma. *Int J Clin Dent Sci* 2011;2:25-9.
7. Mesgarzadeh AH, Shahamfar M, Hefzollasan A. Evaluating knowledge and attitudes of elementary school teachers on emergency management of traumatic dental injuries: A study in an Iranian urban area. *Oral Health Prev Dent* 2009;7:297-308.
8. Mori GG, Castilho LR, Nunes DC, Turcio KH, Molina RO. Avulsion of permanent teeth: Analysis of the efficacy of an informative campaign for professionals from elementary schools. *J Appl Oral Sci* 2007;15:534-8.
9. Santos ME, Habecost AP, Gomes FV, Weber JB, de Oliveira MG. Parent and caretaker knowledge about avulsion of permanent teeth. *Dent Traumatol* 2009;25:203-8.
10. Flores MT, Andersson L, Andreasen JO, Bakland LK, Malmgren B, Barnett F, *et al.* Guidelines for the management of traumatic dental injuries. II. Avulsion of permanent teeth. *Dent Traumatol* 2007;23:130-6.
11. Lieger O, Graf C, El-Maaytah M, Von Arx T. Impact of educational posters on the lay knowledge of school teachers regarding emergency management of dental injuries. *Dent Traumatol* 2009;25:406-12.
12. Frujeri Mde L, Costa ED Jr. Effect of a single dental health education on the management of permanent avulsed teeth by different groups of professionals. *Dent Traumatol* 2009;25:262-71.