

## Comparative Analysis of Brushing Techniques and Toothbrush Grips Between Rural and Urban Children

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### ABSTRACT

**Background:** Routine tooth brushing is the principal method of preventing many oral diseases, and perhaps the most important activity an individual can practice to reduce plaque build-up. It is generally known that toothbrushing by young children under age of 10 years are inefficient in toothbrushing due to lack of motivation and poor manual dexterity at this age. Present study was conducted to know whether the rural and urban children have similar or different oral hygiene practices regarding the toothbrushing technique, toothbrush grip and frequency of toothbrushing.

**Material and Methods:** Present cross-sectional study was conducted in 320 school children divided in to 2 groups' rural group and urban group. One hundred and sixty students from urban and same number of students from rural area in the 5-10-year age group and for whom parental consent was obtained to participate in the study, were included in the study from two schools which were willing to participate. Questionnaire regarding tooth brushing frequency was given to evaluate oral hygienic routines.

**Results:** in rural group mostly students brushed only once a day whereas in urban group there were students who brushed their teeth twice a day and some even thrice a day. The difference was significant statistically ( $P \leq 0.05$ ). In rural group distal oblique was followed by oblique grip, power grip, precision grip and spoon grip. Similarly, in urban group distal oblique grip was followed by oblique grip, power grip, precision grip, spoon grip. On comparison the data was not statistically significant.

**Conclusion:** Tooth brushing is more frequent in urban area children compared to rural area children. Dental public health improvements remain a fundamental need in rural area and that there is an opportunity to address this need through changes in tooth brushing behavior.

**Keywords:** Distal oblique grip, school-children urban group, tooth brushing.

### INTRODUCTION

The practice to keep the oral cavity clean and diseases free is called oral hygiene. The oral hygiene is maintained by regular teeth brushing and clean in

inter dental area. It is necessary to maintain the exercise of oral hygiene on the regular basis to prevent the dental problem.<sup>1</sup> Gum diseases,

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decaying of the tooth, gingivitis and Periodontitis are the most common type of the problem faced by the individuals. Hence forth the oral hygiene maintenance is the most important thing one need to do.<sup>2</sup>

Healthy teeth are not only necessary for proper chewing but they are also necessary for aesthetic purpose and also speak properly. Mouth is the mirror of the body and the gate way of the diseases of the body, so better the oral health better will be the body health.<sup>3</sup> To maintain the proper oral hygiene the teeth should be cleaned properly and made plaques free. Proper brushing and flossing is necessary. Visit to dentist should be schedule in every 6 months. Professional cleaning is recommended as normal tooth brushing won't completely prevent the calculus formation.<sup>4, 5</sup>

Routine tooth brushing is the principal method of preventing many oral diseases, and perhaps the most important activity an individual can practice to reduce plaque buildup. Controlling plaque reduces the risk of the individual suffering from plaque-associated diseases such as gingivitis, periodontitis, and caries – the three most common oral diseases.<sup>6</sup> The average brushing time for individuals is between 30 seconds and just over 60 seconds. Many oral health care professionals agree that tooth brushing should be done for a minimum of two minutes, and be practiced at least twice a day. Brushing for at least two minutes per session is optimal for preventing the most common oral diseases, and removes considerably more plaque than brushing for only 45 seconds.<sup>7</sup>

Toothbrushing can only clean to a depth of about 1.5 mm inside the gingival pockets, but a sustained regime of plaque removal above the gum line can affect the ecology of the microbes below the gums and may reduce the number of pathogens in pockets up to 5 mm in depth.<sup>8</sup>

Parents are the one who teach children about the oral hygiene practise. The level of motor skill development and the sequence of the muscular movements leads to the effective plaque removal. Due to poor manual dexterity and lack of motivation at the age of 10 years the tooth brushing technique is ineffective in removal of plaque. Despite of the

several recommended brushing techniques, there have been decline in oral hygiene status of young children, especially during transition of dentition.<sup>9</sup> Thus, proper oral hygiene in children can be attained with the interplay of proper brushing technique and repeated learning through appropriate communication means. Oral health knowledge is essential for proper oral hygiene and better oral health. Children living in rural areas and concomitantly of lower social economic status have lacunae in oral health awareness which is seen in their practices of oral hygiene habits.<sup>10</sup> So, the present study was conducted to know whether the rural and urban children have similar or different oral hygiene practices regarding the toothbrushing technique, toothbrush grip and frequency of toothbrushing.

## **MATERIAL AND METHODS**

Present cross-sectional study was conducted in 320 school children divided in to 2 groups' rural group and urban group. Ethical Approval was taken from the Institutional Human Ethics Committee before commencement of the study. Written expressed consent was taken from the parents. One hundred and sixty students from urban and same number of students from rural area in the 5-10-year age group, without any systemic diseases, with good cooperation, and for whom parental consent was obtained to participate in the study, were included in the study from two schools which were willing to participate. Children who were not systemically healthy, who had mental or physical disabilities, poor cooperation, oral soft tissue pathology, and for whom parental consent was not given to participate in the study were excluded from the study. At the beginning of the study, parents were provided with questionnaires devised to obtain information about the sociodemographic characteristics and oral hygiene behaviours of children. Once the forms were filled out, children brought their regular toothbrush and performed tooth brushing, while brushing they were observed and recorded with the help of a videocamera. Recorded videos were seen again and again for assessing brushing technique and toothbrush grip. Examination was done by two experienced dentists who were calibrated prior to the study. Questionnaire regarding tooth brushing frequency was given to evaluate oral hygienic routines.

Table 1: Comparison of urban and rural school children using different Tooth brushing technique.

Tooth brushing technique	Urban	Rural	P value
Horizontal	99	130	0.001*
Vertical	15	21	
Circular	14	9	
Horizontal + Vertical	20	0	
Horizontal + Vertical + Circular	12	0	

\* indicates statistically significance at  $p \leq 0.05$ , test applied chi-square test

Table 2: Comparison of urban and rural school children according to brushing frequency.

Frequency	Urban	Rural	P value
Once	84	135	0.05*
Twice	65	25	
Thrice	11	0	
None	0	0	

\* indicates statistically significance at  $p \leq 0.05$ , test applied chi-square test

Table 3: Comparison of urban and rural school using different grip types.

Tooth brush Grip	Urban	Rural	P value
Distal oblique	87	96	0.08
oblique	17	25	
Precession	15	20	
Power	21	13	
Spoon	5	4	
Others	15	2	

Statistically significance at  $p \leq 0.05$ , test applied chi-square test

### Statistical analysis

The data was coded and entered into Microsoft Excel spreadsheet. Analysis was done using SPSS version 15 (SPSS Inc. Chicago, IL, USA) Windows software program. The variables were assessed for normality using the Kolmogorov-Smirnov test. Descriptive statistics were calculated. Comparisons were done using chi-square test. Confidence level and level of significance were set at 95% and 5% respectively.

### RESULTS

Table 1 describes Comparison of urban and rural school children using different Tooth brushing. In the rural group 130 children used horizontal toothbrushing technique, 21 children used vertical and 9 children used circular method none of them used other methods while in urban group 99 used horizontal method, 14 used circular, 15 used

vertical, 20 used horizontal and vertical combination and 12 horizontal, vertical and circular combination. Data were statistically significant when comparison was made between two groups ( $P \leq 0.05$ ).

Table 2 illustrates Comparison of urban and rural school children according to brushing frequency. The result showed that in rural group mostly students brushed only once a day whereas in urban group there were students who brushed their teeth twice a day and some even thrice a day. The difference was significant statistically ( $P \leq 0.05$ ).

Table 3 describes Comparison of urban and rural school using different grip types. In rural group distal oblique was followed by oblique grip, power grip, precision grip and spoon grip. Similarly, in urban group distal oblique grip was followed by oblique grip, power grip, precision grip, spoon grip.

on comparison the data was not statistically significant ( $P>0.05$ ).

## DISCUSSION

During childhood there is maturation of the mental state and development of the personality. The children are found to be receptive of such manners during this time. The stems of improving the oral health like brushing and diet control start at the early age of the children. Tooth-brushing duration is an important variable for plaque removal efficacy.<sup>11</sup> The present study revealed that the brushing duration among the study population is still inadequate compared with other reported studies. Salivary flow rate is found to decrease during the night time as specially during the sleep. Reduced salivary flow leads to reduce buffering capacity and increase in the risk factor for the caries. Also there are evidence that supports that brushing with tooth paste having fluoride should be done prior going to bed.<sup>12</sup>

Proper brushing technique, frequency of tooth brushing and also proper grip are essential for the complete plaque removal and minimal the incidence of calculus formation, hence the present study was conducted to evaluate brushing technique, toothbrush grip and frequency of the toothbrushing in children.<sup>13</sup> Toothbrushing technique normally comprises vigorous horizontal, vertical, and/or circular movements. Horizontal scrubbing successfully removes the plaque from smooth outer and inner surfaces of the teeth; however, it is generally considered detrimental because vigorous scrubbing can encourage gingival recession and, with a dentifrice of sufficient abrasiveness and a hard textured toothbrush, can create areas of tooth abrasion.

In the rural group 130 children used horizontal toothbrushing technique, 21 children used vertical and 9 children used circular method none of them used other methods while in urban group 99 used horizontal method, 14 used circular, 15 used vertical, 20 used horizontal and vertical combination and 12 horizontal, vertical and circular combination. There was a significant difference between urban and rural children with regards to tooth brushing technique. ( $p\leq 0.05$ ) Several studies reported that horizontal scrubbing was the method of choice among young children and that they were

unable to use other tooth brushing methods. Mescher et al<sup>14</sup> reported that 6- and 8-year-old children had difficulty performing sulcular brushing and that hand function was age related. The development of motor skills associated with tooth brushing behavior in children seems to be age related. Horizontal scrubbing is a suitable technique, when motor skills development is considered.<sup>15</sup> In rural group mostly students brushed only once a day whereas in urban group there were students who brushed their teeth twice a day and some even thrice a day. The difference was significant statistically ( $P\leq 0.05$ ). This frequency for rural population is below the recommended tooth brushing frequency and even below the frequency reported from other countries where majority of the population, in all age groups, brush their teeth twice a day or more often.<sup>16</sup> Clinical trials have reported an association between brushing frequency and caries incidence. The caries incidence in subjects who brushed once a day was higher compared to those who brushed twice a day. While these data should be interpreted with some caution because of the association between brushing frequency and other health indicators such as social class and sugar consumption, it seems appropriate to recommend brushing twice daily. Such behavior sustains elevated concentrations of fluoride in plaque where it can inhibit dissolution of tooth mineral by acid. Brushing twice a day has been reported to significantly decreases the prevalence of caries compared to brushing only once per day. Similar beneficial effects of brushing twice daily have also been found in terms of gingival health. Whether grip type and brushing technique are closely related in their combined effect on plaque removal is an important point for clinicians. In rural group distal oblique was followed by oblique grip, power grip, precision grip and spoon grip. Similarly, in urban group distal oblique grip was followed by oblique grip, power grip, precision grip, spoon grip. on comparison the data was not statistically significant ( $P>0.05$ ). findings of the present study were in accordance with Beals et al.<sup>17</sup>, Mentis and Atukeren<sup>18</sup> and Das & Singhal<sup>19</sup>. Beals et al stated that distal oblique was used more than twice as frequently as any other group. Spoon group was relatively uncommon in their study. Spoon grip is more observed in small children than adults.

## CONCLUSION

Distal oblique is the most preferred grip by the children followed by power and oblique. Horizontal scrub method is commonly used by the children. Tooth brushing is more frequent in urban area children compared to rural area children. Dental public health improvements remain a fundamental need in rural area and that there is an opportunity to address this need through changes in tooth brushing behavior.

### CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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