

A study of manual toothbrushing skills in children aged 3 to 11 years

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The aim of the study was to evaluate toothbrushing management and ability of children in relation to age and gender. The study population consisted of 75 children and were divided into three equal groups as 3-5, 6-8 and 9-11 years of age. The grip type during toothbrushing was recorded on videotape. The most preferred grip types were distal (73%) followed by power (43%) and oblique grips (29%). There were a statistically significant differences between age groups and the grip types ($p < 0.001$) but no significant difference was seen between boys and girls in grip preferences ($p > 0.05$). The mean duration of toothbrushing was shorter in 3-5 years of age group (28 seconds) than the 6-8 and 9-11 age groups (35 and 47 seconds respectively).

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INTRODUCTION

Toothbrushing is essential in order to remove dental plaque for the control of dental caries and periodontal diseases. The high prevalence of caries and periodontal disease in the general population indicates that toothbrushing performance is inadequate.¹⁻¹⁰

Up to now, the toothbrush still remains the most efficient of all cleaning devices. Various designs of toothbrushes have been recommended to enhance the mechanical removal of dental plaque. A number of studies have been conducted examining toothbrushing time, but there are few studies about how people grip a toothbrush during a normal brushing session.^{1,11} Effective toothbrushing depends on technically correct toothbrush and on patient compliance. In order for hand brushing to be effective a certain degree of manual dexterity is required. This specially important in children since the dexterity of the child varies and increases according to his/her age.^{4,8,9} Younger adolescents use scrub technique more frequently and this technique requires less training and less manual dexterity. Parents should be advised that it may be necessary for them to brush the teeth of preschool children. Also, the

dentist should spend sufficient time to teach the parent how to brush a child's teeth.^{4,9}

Recommendations to emphasize duration of toothbrushing in dental health education is forthcoming. Manipulative skills are critical determinants of the effective plaque removal rather than the brush design or specific brushing efficacy.⁹

The aim of the study was to evaluate the toothbrushing management and ability of children in relation to age and gender.

MATERIALS AND METHODS

The study population consisted of 75 children, who attended our paediatric dental clinics. The children were divided into three equal groups as 3-5, 6-8 and 9-11 years of age. Two types of child-toothbrushes were chosen (Figure 1: Oral-B squish grip and Oral-B Mickey kids). Each child selected his/her favorite toothbrush and brushed his/her teeth under supervision of one instructor. The grip type during toothbrush-



Figure 1.

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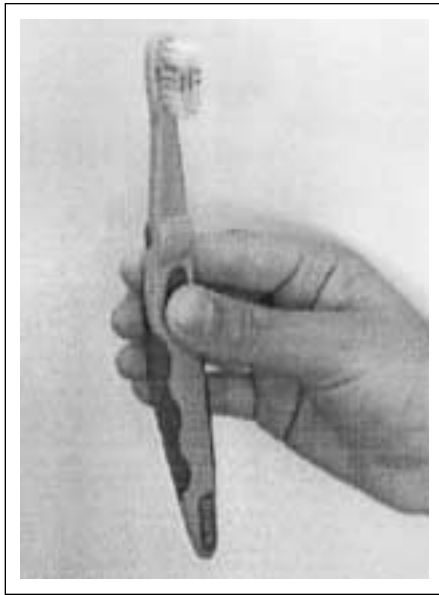


Figure 2. Precision grip.



Figure 3. Oblique grip.

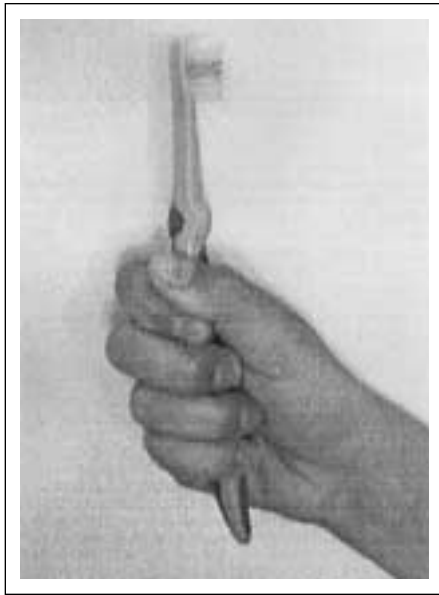


Figure 4. Power grip.

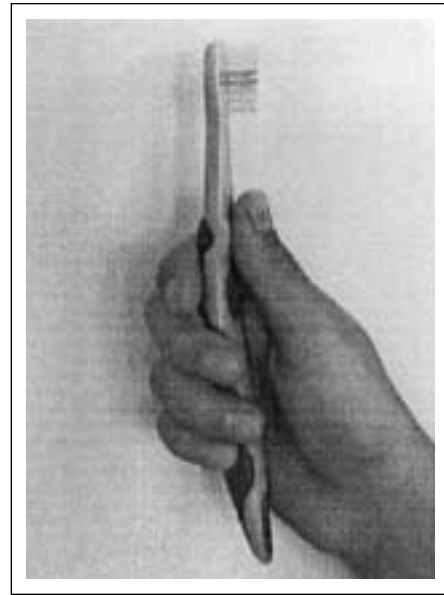


Figure 5. Distal Oblique grip.

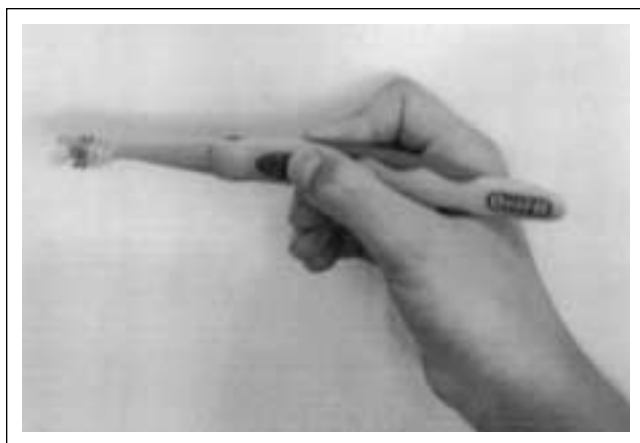


Figure 6. Spoon grip.

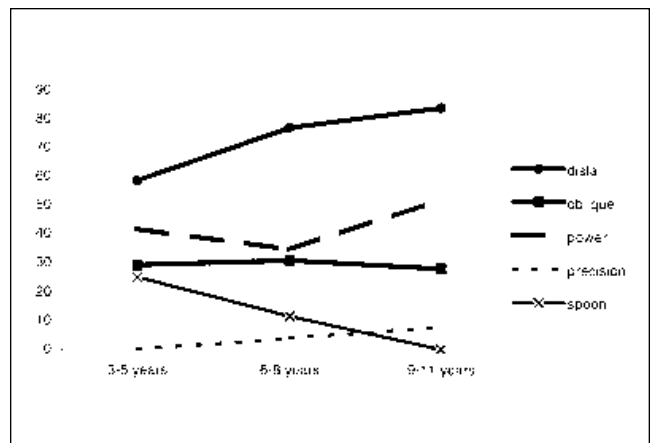


Figure 7. Preference of manipulation of the brushed over time.

Table 1. Percentage of children using different grip types.

n	3-5 years 24	6-8 years 26	9-11 years 25	total 75
distal	58	77	84	73
oblique	29	31	28	29
power	42	35	52	43
precision	0	4	8	4
spoon	25	12	0	12
other	4	12	0	5

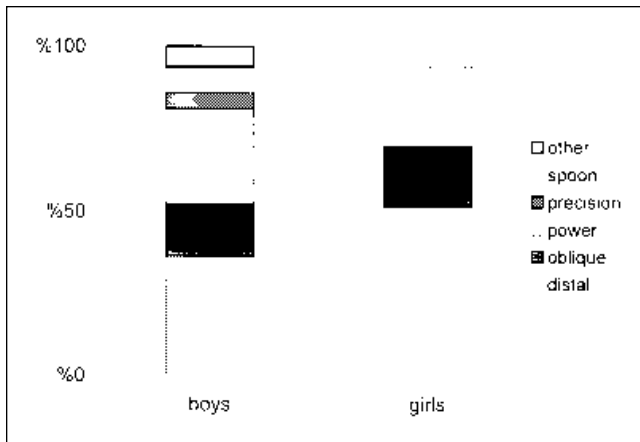


Figure 8. Grip preference according to gender.

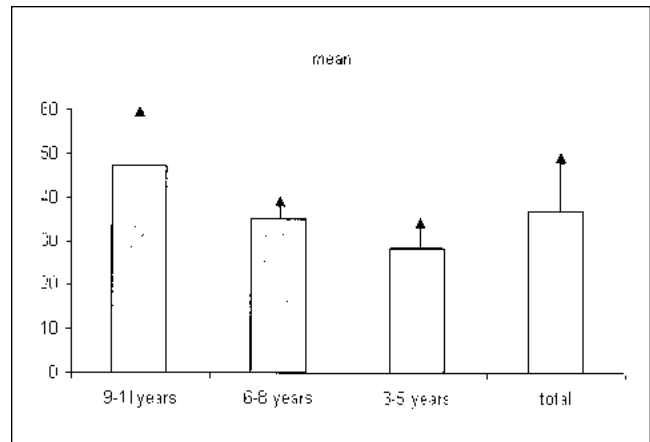


Figure 9. The mean duration of tooth brushing.

ing was recorded on videotape. The manual dexterity of the children was evaluated according to Beals *et al.*¹¹ (Figures 2-6: Precision, Oblique, Power, Distal Oblique and Spoon grips). The efficacy to brush different quadrants of the mouth and the duration of tooth brushing were also noted. The data was analysed in relation to age and gender using chi-square test.

RESULTS

Sixty-nine percent of children brushed their teeth with more than one type of grip (Table 1). The most preferred grip types were distal (73%), followed by power (43%) and oblique grips (29%). Four boys had uncharacteristic grips. There were statistically significant difference between age groups and the grip types ($p < 0.001$) (Figure 7), but no significant difference was seen between boys and girls in grip preferences ($p > 0.05$) (Figure 8).

The mean duration of tooth brushing (Figure 9) was shorter in the 3-5 years of age group (28 seconds) than the 6-8 and 9-11 age groups (35 and 47 seconds respectively).

DISCUSSION

In this study manual dexterity and the grip type used during brushing was evaluated. The function of the brush is remove debris and accumulations of microor-

ganisms. Some investigators emphasized the advisability of the parental brushing of the teeth for the young child. McClure⁴ stated that 3-5 year old children were unable to wield the toothbrush and he observed that parents brushed the children’s teeth more efficiently after instruction. Suzuki¹² stated that the ratio of persons who actually brush the 1-6 year old children’s teeth were as follows, “mother brushes (51.6%)”, “mother after child (37.1%)” and “child brushes (6.8%)”.¹⁰ In our study we found that the duration of brushing was very short in all age groups.

In 3-5 year age group the mean duration of toothbrushing was 28 seconds. Macgregor and Rugg-Gunn⁶ found that the mean duration brushing was 60.3 seconds in 85 uninstructed schoolchildren. The same investigators⁷ stated that the mean duration of brushing was 33 seconds in 60 uninstructed adults. Beals *et al.*¹¹ found that the mean duration of brushing was shorter than 60 seconds in adults.

Various observations have been made on toothbrushing time and motion, but little has been published about grip type. Understanding this aspect is important in the development of toothbrushes. Beals *et al.*¹¹ investigated the grip type in 71 adults. He stated that the distal oblique grip was used more than twice as frequently as any other grip. The spoon grip was relatively uncommon in brushing. In our study the most preferred grip

types were distal (73%), power (43%) and oblique grips (29%). The spoon grip was observed more in especially small children than adults. We found that there was no significant difference between boys and girls in grip preferences. Beals *et al.*¹¹ stated that brushing grips did not vary significantly across males and females.

In conclusion, the manual dexterity required for toothbrushing was in younger age groups. There is a need for toothbrushing instruction according to their manual skills.

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