

# Usefulness of a psychometric questionnaire in exploring parental attitudes in children's dental care

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In this methodological study we investigated the usefulness and reliability of a questionnaire designed to capture 4 aspects of parental dental attitudes: dental knowledge, child oral health behavior, perceived importance of dental related aims, and parental responsibility. The study was undertaken in a group of 140 parents of schoolchildren aged 8–12 years from four comprehensive schools in Sweden. Test–retest reliability, quantified by the intraclass correlation coefficient (ICC) or by Cohen's kappa, varied from acceptable to excellent for different aspects of the questionnaire. The knowledge and responsibility-taking sections were also answered by a group of dental experts who showed a high level of internal agreement. Expert profiles, to which the parental assessments could be compared, were created. Exploration of the 4 aspects showed that this group of parents commonly had a multifocal view on the etiology and prevention of caries. Correlations between their knowledge assessments and the assessments made by the expert group varied from moderately negative to strongly positive. The parents revealed a high degree of dental-related motivation and responsibility, particularly according to oral health behaviors. In conclusion, the results indicate that this 4-part psychometric questionnaire might be a suitable instrument in investigations of priority and responsibility-taking as new aspects of parental dental attitudes, along with dental knowledge and child oral health behaviors. □ *Dental knowledge; priorities; responsibilities*

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Providing dental health care to children is a complex interaction between the child, the parent, the dentist, and the dental assistant. All parties influence the situation with their norms, values, and behavior. For young children, the impact from parent's beliefs and behavior is known to be strong (1–3). A parent's dental fear or anxiety, especially the mother, has been shown to have a significant influence on children's dental fear and behavior (4–8). In addition, in previous studies factors related to parental norms, knowledge, attitudes, and behavior have been associated with parents' abilities to conduct or promote adequate dental health behavior in their children (9–14). Grytten et al. (10), in a review of the role of primary socialization in the formation of the child's health behavior, put special emphasis on the impact of beliefs and health behaviors held by the mother, which reflected a broader perspective of norms and cultural and social circumstances (10). In addition, the influence of interdental cleaning behavior of both parents and older siblings on the corresponding behavior of a younger child was investigated in a Norwegian study of 295 families. In this study the mother still came out as the more important and thereby was identified as the family gatekeeper of dental health behavior (13). In a questionnaire study of 212 Danish children (6-year-olds), parents (most of them mothers) demonstrated a high parental awareness of sugar and bacteria in the role of caries disease. In addition to improper oral hygiene and excessive sweet consumption,

heredity, medicine, general illness, and saliva factors were identified by the parents as explanatory factors for dental caries (15). Aspects such as the impact of parental priorities or beliefs related to the importance of dental health and care in a framework of other motivations have not yet been thoroughly investigated. In addition, possible influences of the views of parents of their own responsibilities in regard to children's dental homecare, as well as in relation to their dental treatment and cooperativeness, have been poorly explored. However, in 1989 Petersen reported on Guttman scaling of parental dental attitudes, where some were related to responsibility-taking (16).

The aim of the present study was to evaluate the usefulness, primarily test–retest reliability, of a new questionnaire designed to capture 4 aspects of parental dental attitudes: parents' dental knowledge, their assessment of the child's oral health behavior, their perceived importance of dental-related aims, and their responsibility-taking related to child dental health behavior or dental treatment.

## Materials and methods

### *Subjects*

Subjects were recruited among parents of schoolchildren 8–12 years of age from 4 comprehensive schools

Table 1. Sample characteristics

Area	Responding parent			Child gender and age							
	<i>n</i> (tot)	Mother	Father	Boys			Girls			Total	
		<i>n</i>	<i>n</i>	<i>n</i>	<i>n</i>	Mean age	<i>s</i>	<i>n</i>	Mean age	<i>s</i>	Mean age
At test											
Urban	64	58	6	29	11.1	1.0	35	11.2	0.8	11.1	0.9
Mixed	73	59	14	33	10.2	0.8	40	10.0	0.8	10.0	0.8
Total	137	117	20	62	10.6	1.0	75	10.5	1.0	10.6	1.0
At retest											
Urban	19	18	1	8	11.4	1.0	11	10.3	0.8	10.7	1.0
Mixed	44	40	4	21	10.0	0.8	23	9.8	0.8	9.9	0.8
Total	63	58	5	29	10.3	1.1	34	9.9	0.8	10.1	1.0

*s* = standard deviation.

in 1 mixed urban–rural area (2 schools representative of the environs of Örebro, a middle-sized town) and 2 urban areas (schools representative of different socio-economic areas in the cities of Göteborg, a large town, and Karlstad, middle-sized) in Sweden. The parents were contacted by means of a letter distributed to the schoolchildren by their teachers which included information about the aims and procedures of the study and stated that participation was voluntary and anonymous. The Örebro County Council Research Ethics Committee approved the study.

One-hundred-and-ninety-seven subjects received the information along with the test questionnaire and return envelopes; 140 parents (71%) responded, 64 (69%) from urban and 76 (73%) from the mixed urban–rural areas, respectively. Retest questionnaires were distributed after 2 to 3 weeks to 111 subjects (1 schoolteacher abstained from participating in the retest procedure). Seventy parents (63%) responded on retest. Three test questionnaires were excluded owing to unknown respondents, and 7 retest questionnaires owing to differing respondents. The final sample therefore comprised 137 parents at test and 63 parents at retest.

### Sample characteristics

The majority of the responding parents were mothers (at test 85%; at retest 92%). The area, gender, and child age distributions are given in Table 1. All children were between 8.2 and 12.2 years (mean age at test 10.6 years; standard deviation (*s*), 1.0). Parents who responded to the retest questionnaire had significantly younger children compared to non-responders (mean age 10.1; *s*, 1.0 versus 11.0; *s*, 0.8; *t* = 5.44; *P* < 0.001). There were no age differences between boys and girls.

### Instruments

The questionnaire investigated 4 areas of parental beliefs and attitudes and the instruments were first tested for readability and absence of ambiguity in a separate pilot study with 20 parents of randomly selected child dental patients not included in the present study.

### Parental dental knowledge

To capture parents' attitudes of dental home care for their children, a separate part of the questionnaire assessed the responders' *dental knowledge*. Eight items partly extracted and modified from a previous Swedish study (17) included ratings of the importance of 3 possible enamel protection agents and of 5 caries etiologic factors on a 5-point Likert scale from 1 (of little consequence) to 5 (very important).

A transformation of items to an individual dental knowledge score was made by correlation to importance ratings given by a group of experts requested to take part in validation of the questionnaire. Twenty-two (of 27 contacted) experts in pediatric dentistry or cariology rated the same items as the parents. After exclusion of 2 outliers, the agreement in the expert group was very good (Cronbach's alpha 0.98; mean inter-expert correlation 0.66; expert-total correlation from 0.44 to 0.97) and from those 20 experts a knowledge profile of mean importance ratings was created, to which the ratings from single parents were correlated, giving a knowledge score expressed as a correlation coefficient (Pearson's *r*), which could therefore vary between -1 and +1. See Table 2 for item definition.

### Children's oral health behavior as perceived by their parents

In seven items, the parents reported their child's *toothbrushing and eating habits* on a 6-step frequency interval scale from never to more than once per day. The 4 items dealing with eating habits were selected from the clinically frequently used dietary formula for children (18) and chosen in the light of empirically perceived discriminating capacity. In addition there was a 3-part open-ended question about the child's consumption of sugary drinks (see Table 3 for item definition).

### Priorities of dental-health-care-related aims

Parents' *priorities of dental-health-care-related aims* compared to priorities in general, such as school or sport, were labeled 'everyday priorities'. A list of 10 aims for the child was presented (see Table 4 for item definition) and the 5

Table 2. Parental dental knowledge

	At test ( $n = 137$ )		Experts ( $n = 20$ )		Test-retest reliability ( $n = 63$ ) ICC
	Mean	$s$	Mean	$s$	
Importance of enamel protection agents					
Fluoride	4.7	0.7	4.7	0.5	0.66
Vitamins	3.5	1.2***	2.1	1.0	0.81
Calcium	4.2	1.0***	2.5	1.2	0.52
Importance of caries risk factors					
Heredity	3.6	1.2***	2.8	0.6	0.84
Between meal eating	4.4	1.0	4.5	0.7	0.44
Inadequate toothbrushing	4.8	0.5***	3.8	0.9	0.30
Saliva composition	4.4	0.9***	3.2	1.0	0.57
Infections and diseases	3.8	1.0***	2.8	0.8	0.77
Knowledge score ( $r$ ):	0.42	0.35			

$s$  = standard deviation.

most important were to be selected and ranked. Among the 5, the parents were allowed to include and rank 1 open-ended alternative of their own choice.

#### Parental responsibility

The 4th aspect dealt with parents' *responsibility-taking* and their beliefs about how *responsibility* for their children's dental health should be shared between themselves and the dental profession. Seven common situations in children's dentistry were described (see Table 5 for item definition) and the parents answered on a 5-point scale from 'mainly a responsibility for the dentist' (a score of 1) to 'entirely the family's responsibility' (score 5).

Parallel with the knowledge score, transformation to a responsibility score was done. Nineteen of the 22 expert responders completed this questionnaire section. Cronbach's alpha of 0.98 (mean inter-expert correlation 0.80; expert-total correlation 0.66–0.97) indicated excellent agreement between experts. Assessments from each parent were correlated to the expert profile of means, giving individual responsibility scores expressed as correlation coefficients (Pearson's  $r$ ) varying between  $-1$  and  $+1$ .

#### Statistical analysis

Descriptive statistics were used to report data at test. Differences between parent and the expert data were analyzed using Student's  $t$  test and the Mann-Whitney U-test. ICC (19) or Cohen's kappa was used to estimate stability over time. We used mean ICC scores, which represent stability averaged across all raters. Mean intraclass coefficients  $>0.40$  were judged as acceptable and ICCs  $>0.60$  as satisfactory; ICCs  $>0.80$  indicated excellent stability (20).

All statistics were computed using the SPSS version 9.0, and  $P$  values lower than 0.05 indicated statistical significance.

## Results

#### Parental dental knowledge

The parents rated 'inadequate toothbrushing', 'eating between meals', and 'saliva composition' as the most important caries risk factors, while 'fluoride' was rated as the most important enamel protection agent. With the exceptions of 'fluoride' and 'eating between meals', parental ratings were significantly higher than ratings of the expert group ( $t = 4.33$  to  $7.02$ ;  $U = 406$  to  $711$ ;  $Z = -3.59$  to  $-6.31$ ;  $P < 0.001$ ) (Table 2). The mean knowledge score was 0.42 and ranged from  $-0.56$ , indicating a significant disagreement with the experts, to 0.96, which indicated a very strong agreement with the experts about caries risks and protection.

Stability over time for the *knowledge* items was found to be mainly acceptable, with ICCs varying between  $r_1 = 0.30$  and  $r_1 = 0.84$ . Mean values and standard deviations for the test sample and the expert group, along with ICCs for each item and the parental mean knowledge score, are given in Table 2.

#### Children's oral health behavior

There was a high number of missing answers on the question regarding toothbrushing assistance. Those who answered on any of the two connected items concerning toothbrushing are reported, assuming that no mark for assistance frequency means 'without assistance'. Thus 16% of the children received daily help or assistance from an adult when brushing their teeth. The frequency of toothbrushing in the whole test sample is given in Table 3, which also includes a summary of dietary habits.

ICCs for the 7 items concerning *toothbrushing and eating habits* varied from  $r_1 = 0.79$  to  $r_1 = 0.96$  (Table 3), indicating excellent test-retest reliability. Stability for the 3-part question about *sugary drink consumption* was estimated with Cohen's kappa after dichotomization (where lemonade, juice, or soft drinks were merged as sugary drinks

Table 3. Children's oral health behavior as perceived by their parents

	Frequencies in percentage at test ( $n = 137$ )						Test-retest reliability ( $n = 63$ ) ICC
	Never	<1/week	1/week	>1/week	1/day	>1/day	
Assistance in toothbrushing	73	3	1	6	9	7	0.96
Toothbrushing frequency				1	10	89	0.79
Toothpaste use	1				10	89	0.95
Sweet consumption	3	7	45	45		1	0.92
Biscuits or cookies	2	22	30	39	8		0.92
Fruit	2	4	3	30	43	19	0.85
Sweet soup or compote	34	37	19	8	2		0.93
Juice, lemonade, or soft drinks:	No	Yes					Kappa
With lunch or dinner	89	11					0.52
Between meals	61	39					0.65
When thirsty	71	29					0.57

and given value 1 versus 0 for all others in each of the 3 question parts); kappa values were fair to good (0.52–0.65).

#### Everyday priorities

The highest priority rankings were given to 'eating healthy food', followed by 'having many friends', the two school-related aims, and 'having sound and clean teeth'. It was concluded that three listed aims were less relevant in a methodological perspective (Table 4, in parentheses), and that the inter-item dependence created by the requested ranking procedure led to analytical problems. Mean figures for all priority aims (free formulation added) are reported and listed in Table 4 to give a better overview of the ratings. The opportunity to add a free formulation was utilized by 34 parents, of which 28 put it on the first or second place. One-third of these formulations dealt with social competence and the rest mainly with health and well-being. ICCs for the listed and free *everyday priorities* varied between  $r_i = 0.67$  and  $r_i = 0.93$ , showing that stability over time was at least satisfactory.

#### Parental responsibility

The total mean scores of the 7 items varied between 2.2 and 4.9 (Table 5). Clearly higher ratings, indicating comparably higher responsibility-taking by the parents/family, were made for children's sweet consumption and toothbrushing compared to ratings of child behavior in dentistry and dental treatment. No significant differences compared to the experts were shown. The transformed responsibility scores varied from  $-0.23$  to  $0.99$ , with a mean of  $0.69$ , indicating a relatively high agreement between the assessments made by parents and the experts.

Reliability test of the *responsibility* section showed ICCs from  $r_i = -0.08$  to  $r_i = 0.82$ . For two items (toothbrushing and sweet consumption) the distributions were extremely skewed (means near max. scores), which explains the lowest ICCs ( $r_i = -0.08$ ,  $r_i = 0.21$ ). Percentage agreements for these two items were 82 and 90, respectively. ICCs for the remaining 5 items were all above  $r_i = 0.58$ . In total, the responsibility-taking instrument showed good *test-retest reliability* with  $r_i = 0.86$  for the sum scores of the instrument.

Table 4. Everyday priorities

Listed aims	At test ( $n = 137$ )			Test-retest reliability ( $n = 63$ ) ICC
	Mean	$s$	Rank	
Be successful in school	2.3	1.9	3	0.78
Have many friends	2.4	1.9	2	0.87
(Be good at some sport)	0.3	0.8		0.90
Cope with dental treatment without great difficulty	0.3	0.7		0.74
(Learn to play an instrument)	0.2	0.7		0.93
(Wear fashionable clothes)	0.1	0.3		0.93
Do the homework thoroughly	2.2	1.7	4	0.82
Have sound and clean teeth	2.0	1.6	5	0.79
Eat healthy food	2.8	1.8	1	0.75
Learn to be punctual	1.3	1.5		0.67
Added free formulation	1.1	2.0		0.87

$s$  = standard deviation.

Table 5. Parental responsibility taking in relation to dentistry for their children

How do you think the responsibility should be shared between your family and the dentist if the child . . . ?	At test ( <i>n</i> = 137)		Experts ( <i>n</i> = 19)		Test-retest reliability ( <i>n</i> = 63) ICC
	Mean	<i>s</i>	Mean	<i>s</i>	
Doesn't brush the teeth	4.8	0.6	4.7	0.5	0.21
Hasn't been dentally examined for 2 years	2.9	1.3	2.4	0.8	0.82
Has early signs of dental decay	3.6	1.3	4.1	0.7	0.76
Eats sweets almost every day	4.9	0.3	4.9	0.3	-0.08
Has toothache in restored tooth	2.2	1.4	2.0	0.9	0.58
Doesn't want to visit the dentist	3.4	1.0	3.6	0.7	0.67
Refuses dental treatment	2.9	0.9	3.0	0.9	0.69
Responsibility score ( <i>r</i> ):	0.69	0.23			

*s* = standard deviation.

## Discussion

Our attempt to evaluate the impact of different aspects of parental dental attitudes on dentistry for fearful or uncooperative children revealed a shortage of suitable instruments. In the present study, new constructs of parental dental attitudes built on perceived importance and responsibility-taking were focused on, in addition to knowledge and health behavior aspects. A questionnaire designed to capture these aspects was constructed and tested in a school-based reference group of parents of 8 to 12 years old average child dental patients. Reliability measures showed varying, but on the whole at least satisfactory, stability over time for the 4 questionnaire sections. It was also shown that reported dental knowledge produced a multi-focal picture and that the individual parental knowledge scores varied widely. Children's oral health behavior was in agreement with previously reported levels. Dental health was found to have a high rank-order level compared to certain other everyday priorities, and parent/family responsibility-taking was also revealed to be high.

The sample in this study was selected without randomization to represent different geographical and socio-economic areas in Sweden. However, selection bias was not possible to control for, and no general conclusions about the attitudes held by parents can be drawn from this sample. Instead, the focus lies in the methodology.

The response rates at test and retest were in the expected range, considering the circumstances. The fact that parents of younger children responded more frequently at retest can be explained by their assumed greater involvement in their children's dental care, and was judged not to be any problem in the reliability analyses. Accordingly, it is reasonable to assume a difference in engagement between respondents and non-respondents at both test and re-test, and underreporting of unfavorable dental attitudes and health behaviors can be presumed. Parents who did respond at retest rated fluoride and calcium and the between-meal factor as significantly more important than parents who failed to respond (data not shown). The responding parents significantly higher-ranked the everyday priority dealing with healthy food.

No differences were seen in the responsibility assessments.

Test-retest reliability for all questionnaire sections except the 3-part dichotomized item about sugary drink consumption was quantified by the ICC, which is preferable to the more common Pearson's *r* (19). The ICC assesses the strength of association and is also sensitive to one measurement being systematically higher or lower than the other, which reduces the ICC. The intraclass correlation tests were performed assuming ordinal scales and item independence. This was not fully correct for the priority measures, where the parents were asked to rank the 5 most important aims and the criteria of item independence were consequently not met. Thus, the good or even excellent levels of test-retest reliability for the everyday priority measurement should be interpreted with caution.

ICCs for the dental knowledge items varied from not acceptable to excellent, indicating a need for further adjustment and testing. Transformation to a knowledge score by correlation to expert answers gave wide-ranging scores, showing that the parental ratings of importance varied a lot compared with the profile constructed from the ratings of experts. The differences in means between parents and experts indicated that, despite the fact parents were aware of the most important factors, they did not clearly differentiate the less important factors, which revealed a multifocal knowledge profile.

The ICCs were highly convincing concerning stability of the measurement of the children's oral health behavior. However, the kappa values for the stability of the parents' assessments of the children's sugary drink consumption revealed an uncertainty in the assessments. We believe that this may have been due to flexibility within individuals, each child consuming a variety of different drinks, which makes it difficult for the parent to be sure of the most common products.

The parental responsibility assessments showed widely varying ICCs. The ICC is the proportion of total variability accounted for by the variability among individuals (19); a high ICC indicates a low variability due to assessments on different occasions. This means that if the variability among individuals is low, the ICC

decreases, which happened for the 2 responsibility items (toothbrushing and sweet consumption), where the mean scores touched maximum scores. High percentage agreements for these items along with the remaining ICCs can be interpreted conclusively as satisfactory test–retest reliability for the responsibility items. Also for the responsibility section of the questionnaire, a score was created by correlation to an expert profile. Here the parental mean score was higher compared to the knowledge score, and the agreement between experts very good, assuming that the construct of a responsibility-taking level was appropriate.

Although the prime focus of this investigation was methodological, some observations can be mentioned. Firstly, for the dental knowledge aspect, a multi-focal picture appears of parental views on caries protection and risk factors, with all mean ratings above the scale mean. The high ratings of the toothbrushing and between meal components were in agreement with earlier studies in Denmark and United Kingdom (14, 15), while the equally high rating of the saliva component was a new finding.

Secondly, it was shown that toothbrushing frequencies were slightly increased compared to the reported level for Swedish schoolchildren 10–15 years ago (21–23). Compared to the study of Honkala (21), the proportion of children who had sweets daily had decreased from 8% for 11-year-old schoolchildren to 1% in our study of 8–12-year-olds.

Thirdly, the questionnaire section assessing everyday priorities emanated from the clinical impression that dental care often seems to have a clearly lower priority than for instance school or sport activities. The results indicate that general health, represented by 'healthy food' and to some extent by 'sound and clean teeth', followed by the social dimension of 'having many friends' followed by performance in school, were the most important priorities. This was confirmed also by the focus of the added free formulations. Thus, the initial hypothesis of low priority for dental care was not confirmed in this group, although some bias due to social desirability cannot be excluded.

Finally, in all but one responsibility item (toothache in a restored tooth) the average assessment exceeded 2.9, while an assessment of 3 indicated an approximately equal responsibility between the dentist and the family. Considering the scale format this means that the parents at least felt a shared responsibility for all items, while 'toothbrushing' and 'sweet consumption' were clearly responsibilities for the family.

## Conclusions

The results indicate that this 4-part psychometric questionnaire may be a suitable instrument for investigating priority and responsibility-taking as new aspects of parental dental attitudes along with dental knowledge and oral health behavior. Reliability measures showed at least satisfactory stability over time.

In this group of parents of 8–12-year-old average child dental patients, the reported dental knowledge produced a multi-focal picture, and individual knowledge scores varied widely. Children's dental health was found to have a high rank-order level compared to certain other everyday priorities and parent/family responsibility-taking was revealed to be high.

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## References

1. Sallis JF, Nader PH. Family determinants of health behaviors. In: Gochman DS, editor. *Health behavior. Emerging research perspectives*. New York: Plenum Press; 1988. p. 107–24.
2. Bush JP, Melamed BG, Cockrell CS. Parenting children in a stressful medical situation. In: Miller TW, editor. *Stressful life events*. Madison: International Universities Press; 1989. p. 643–57.
3. Murphey DA. Constructing the child: relations between parents' beliefs and child outcomes. *Develop Rev* 1992;12:199–232.
4. Johnson R, Baldwin DC. Maternal anxiety and child behavior. *ASDC J Dent Child* 1969;36:87–92.
5. Bailey PM, Talbot A, Taylor PP. A comparison of maternal anxiety levels with anxiety levels manifested in the child dental patient. *ASDC J Dent Child* 1973;40:277–84.
6. Holst A. Behaviour management problems in child dentistry. Frequency, therapy and prediction [thesis]. Lund University, Sweden 1988. *Swed Dent J* 1988; Suppl 54.
7. Klingberg G, Berggren U. Dental problem behaviors in children of parents with severe dental fear. *Swed Dent J* 1992;16:27–32.
8. Klingberg G. Dental fear and behavior management problems in children. A study of measurement, prevalence, concomitant factors, and clinical effects [thesis]. Göteborg University, Sweden 1995. *Swed Dent J* 1995; Suppl 103.
9. Blinkhorn A. Influence of social norms on toothbrushing behavior of preschool children. *Community Dent Oral Epidemiol* 1978;6:222–6.
10. Grytten J, Rossow I, Steele L, Holst D. Aspects of the formation of dental health behaviours in early childhood. *Dental Health* 1989;28:6–10.
11. Ekman A, Persson B. Effect of early dental health education for Finnish immigrant families. *Swed Dent J* 1990;14:143–51.
12. Kinnby CG, Palm L, Widenheim J. Evaluation of information on dental health care at child health centers. Differences in educational level, attitudes, and knowledge among parents of preschool children with different caries experience. *Acta Odontol Scand* 1991;49:289–95.
13. Rossow I. Intrafamily influences on health behavior. A study of interdental cleaning behavior. *J Clin Periodontol* 1992;19:774–8.
14. Hood CA, Hunter ML, Hunter B, Kingdon A. Demographic characteristics, oral health knowledge and practices of mothers of children aged 5 years and under referred for extraction of teeth under general anaesthesia. *Int J Paediatr Dent* 1998;8:131–6.
15. Petersen PE. Oral health behavior of 6-year-old Danish children. *Acta Odontol Scand* 1992;50:57–64.
16. Petersen PE. Guttman scale analysis of dental health attitudes and knowledge. *Community Dent Oral Epidemiol* 1989;17:170–2.
17. Kinnby CG. On the value of dental health care information at child health centers. Influence of social factors with particular reference to dietary behaviour and dental caries [dissertation]. Lund University, Sweden; 1994.
18. Holm A-K, Johansson E, Månsson B, Johansson T, Osland,

- Samuelsson G. Kostanarnnes för barn. *Tandlakartidningen* 1980;72:736–40.
19. Deyo RA, Dicht P, Patrick DL. Reproducibility and responsiveness of health status measures. Statistics and strategies for evaluation. *Control Clin Trials* 1991;12:142S–58S.
  20. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977;33:159–74.
  21. Honkala E, Kannas L, Rise J. Oral health habits of schoolchildren in 11 European countries. *Int Dent J* 1990;40:211–7.
  22. Rise J, Haugejorden O, Wold B, Aarö LE. Distribution of dental health behaviors in Nordic schoolchildren. *Community Dent Oral Epidemiol* 1991;19:9–13.
  23. Kuusela S, Honkala E, Kannas L, Tynjälä J, Wold B. Oral hygiene habits of 11-year-old schoolchildren in 22 European countries and Canada in 1993/1994. *J Dent Res* 1997;76:1602–9.

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