Masticatory function in patients with Juvenile Rheumatoid Arthritis

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Abstract

Purpose: Children with Juvenile Rheumatoid Arthritis (JRA) rarely report temporomandibular joint (TMJ) pain, which may be due to pain avoidance mechanisms resulting in compromised masticatory function. This study examined the relationship between self-report measures of pain and dysfunction and measures of chewing performance in 44 JRA children and 34 normal controls.

Methods: The children were divided into three groups: Group 1, JRA children with temporomandibular joint disorder (TMD); Group 2, JRA children without TMD; Group 3, normal control children without TMD. Both visual and analog scales of jaw pain, ability to chew, and quality of life were administered before and after chewing tasks. Children chewed standardized portions of an artificial food for 20 cycles and expectorated the particles into a cup. This process was repeated five times. Median particle size and a broadness of particle distribution index were measured. Also, the number of chewing cycles prior to the child's first swallow for a cube of carrot was recorded.

Results: The broadness of particle distribution index was greater for Group 1 ($P<0.001$) and Group 2 ($P<0.03$) than for Group 3 with no difference in number of chews for carrot mastication among groups. Group 1 reported more pain and dysfunction before the chewing tasks than Groups 2 or 3 ($P<0.05$). Interestingly, only Group 3 reported increased pain and decreased ability to chew after chewing tasks ($P<0.02$).

Conclusion: Children with JRA compromise their masticatory function as a pain avoidance mechanism. Such findings may have profound implications with regard to the nutritional status for these children. (Pediatr Dent 22:200-206, 2000)

Juvenile Rheumatoid Arthritis (JRA) is the most common rheumatic disease of childhood, affecting more than a quarter of a million children in the United States.[1,41] Studies of JRA children indicate temporomandibular joint (TMJ) involvement in 5-65% of children.[2,15,18,20,22,31] This wide range of TMJ involvement may be at least partially attributable to inconsistency in TMJ diagnostic criteria. A diagnosis of JRA is assigned to persistent inflammation of a joint for six or more weeks in an individual who is 16 years of age or younger at the time of the onset of the disease and in the absence of another disease.[21] Children with JRA report joints that are often swollen and painful with limited range of motion.[21]

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Children with TMJ involvement rarely report TMJ pain,[36,37] which may be due to pain avoidance mechanisms. Because of the high percentage of reported TMJ involvement in JRA, it is important to establish the effect that the presence of pain might have on masticatory function in these patients. Research Diagnostic Criteria (RDC) designed to assess TMJ dysfunction in adult populations does not account for pain avoidance mechanisms. The latter could not only alter masticatory function, but may also affect a patient's self-report of pain. Alterations in masticatory function to avoid pain may mask TMJ involvement and compromise the potential for early diagnosis and treatment. It is possible that these children could reach advanced stages of TMD in the relative absence of pain due to pain avoidance mechanisms which result in altered chewing performance. Additionally, compromised masticatory function may help to explain why JRA children present with a higher incidence of malnutrition than the general pediatric population.[13,27] Alteration in chewing performance to avoid pain likely influences individuals to select a more restricted diet with a potential negative impact on overall health and the child's ability to cope with their illness. These children may select foods that they can easily eat but may not be nutritionally adequate. In fact, poor nutrition could impact on the child's ability to cope with his/her illness from a physiological and psychological standpoint.

Evaluation of chronic pain disorders, such as chronic musculoskeletal disorders, includes a functional component to assess the impact of the disease on the patient.[8,10,11] Chewing performance serves as an objective measure of an individual's masticatory function.[3] These findings can then be combined with the clinical examination and self-report of pain and dysfunction to detect early involvement of the TMJ. Although several researchers[3,12,17,34,44] have investigated the area of chewing performance, to date no one has included an assessment of masticatory performance in the comprehensive evaluation for TMD in children. The purpose of this study was to determine the relationship between self-report measures of pain and dysfunction and measures of chewing performance in JRA children with temporomandibular joint involvement.

Table 1. Demographic Characteristics of Study Population

Age (years)	12.1±3.5
Total Population:	78
Female	54
Male	24
Control	34
JRA:	44
JRA Positive for TMD:	24
Female	18
Male	6
JRA Negative for TMD:	20
Female	14
Male	6

Materials and methods

The present study evaluated children with a prior diagnosis of JRA, being treated in the Arthritis Clinic at the Texas Scottish Rite Hospital for Children in Dallas, Texas. The study was approved by the Institutional Review Boards of Baylor College of Dentistry and the Texas Scottish Rite Hospital for Children. Children with a history of craniofacial surgery were excluded from the study, as well as children with pauciarticular JRA, due to the lesser number of joints involved in their disease process. Control children with temporomandibular disorders were excluded from this study due to the small sample size detected within the initial test population.

Group assignment

Table 1 outlines the demographic characteristics of the study population. Children and adolescents aged 6-18 years were included in the study with an average age of 12.1 years. There was a total of 54 females and 24 males. Three groups of children were included in the study with an equal distribution of age and gender among all the groups. Group 1 (N=24) included JRA children with a diagnosis of TMD based on the RDC Axis I assessment as described by Dworkin and LeResche.[7] Group 2 (N=20) included JRA children without clinical evidence for TMD. Group 3 (N=34) included normal control children with no history of JRA and no clinical evidence for TMD.

RDC axis I examination

A trained examiner with 25 years of clinical experience in the assessment of TMD assessed all children using the RDC Axis I described by Dworkin and LeResche.[7] Included in this examination is an evaluation of mandibular opening patterns, range of mandibular motion, TMJ sounds, and craniofacial muscle pain. The subjects' mandibular opening patterns were visualized and measured. Ranges of mandibular motion were measured at the incisor edges using a millimeter ruler: opening without pain, maximum opening, right and left excursions and protrusion. TMJ sounds were evaluated using both palpation and auscultation. Palpation for tenderness was performed on the masticatory and neck muscles, TMJ lateral capsule, and TMJ retrodiscal tissues.

TMD can be divided into diagnostic categories of muscle disorders, disc displacement and arthralgia, arthritis, and arthrosis by the RDC as described by Dworkin and LeResche.[7] A positive reading in any one of these three categories was sufficient for a diagnosis of TMD in the JRA children, and these children were included in Group 1.

Visual and analog scales

Children were given uniform instructions and then were asked to rate their level of comfort using both a visual and an analog scale assessing three areas both before and after chewing tasks: jaw pain, impairment of ability to chew, and quality of life as impacted by their jaw pain. On the visual scale, each of these three areas was rated on a 100 mm vertical line, labeled with a '0' at one end and a '10' at the other. For each visual scale, the distance from zero to the mark placed by the child was measured with a millimeter ruler and recorded. For the analog scale, a small box was located beneath each vertical line of the visual scale, in which the child could numerically rate their assessment. Each child was given the same instructions with regard to the visual and analog tasks.

Chewing performance

Subjects were asked to chew standardized cubes of an impression material (CutterSil®; Miles Dental Products) that sets to a consistent density. After 20 chewing cycles at the normal rate for each child, the chewed particles were expectorated into a cup. The 20 chewing cycles were performed all at one time and this process was repeated five times. The particles were then washed, allowed to dry, and passed through a series of seven metal sieves with decreasing aperture sizes. The weight of the residual particles on each sieve was then plotted relative to sieve aperture size. The cumulative weight percentage undersize for a certain sieve aperture was defined as the percentage of the particles by weight that can pass that sieve. Median particle size and the broadness of particle distribution index were calculated for each subject using the Rosin-Rammler equation, as described by Julien et al[17] and Olthoff et al.[28]

$Q_w=100[1-2^{-(x/x50)b}]$, where Q_w is the weight percentage of particles with a diameter smaller than x (the maximum sieve aperture). The median particle size (x_{50}) is the aperture of a

Table 2. Self-Report of Pain and Dysfunction: Correlation between Visual and Analog Scales

	Before Chewing Task			After Chewing Task		
Group	Jaw pain	Ability to chew	Quality of life	Jaw pain	Ability to chew	Quality of life
1	0.92*	0.76*	0.97*	0.97*	0.93*	0.96*
2	—	—	0.72**	0.78*	0.59**	0.82*
3	0.55*	0.82*	—	0.97*	0.97*	1.00*

Kendall rank correlation coefficient, **P*=0.001, ***P*<0.01
Group 1 – JRA with TMD (N=24); Group 2 – JRA without TMD (N=20); Group 3 – Control without TMD (N=34).

Table 3. Changes in Analog Scale after Chewing Performance Tasks

Group	Jaw pain Rank (*P* value)	Ability to chew Rank (*P* value)	Quality of life Rank (*P* value)
1	0.71 (0.48)	0.92 (0.36)	1.00 (0.32)
2	1.34 (0.18)	1.00 (0.32)	1.00 (0.32)
3	2.39 (< 0.05)*	2.38 (< 0.05)*	1.00 (0.32)

Wilcoxon Signed Ranks Test *$P<0.05$
Group 1–JRA with TMD (N=24); Group 2–JRA without TMD (N=20);
Group 3–Control without TMD (N=34).

theoretical sieve through which 50% of the weight can pass, and b is a unitless measure which describes the broadness of the distribution of the particles. Distributions of particle sizes that are less broad correspond the curves with steeper slopes and higher 'b' values.

Subjects were also asked to chew and swallow a half-inch cube of fresh carrot, selected to help determine chewing performance for a natural food substance of standard consistency. This task was only done once and always followed the Cuttersil® task. A natural food substance was used, since chewing patterns may vary among different non-food substances (e.g., gum, Cuttersil,® etc.).[3] The number of chewing cycles required prior to the child's first swallow was counted by the investigator and recorded.

Occlusal contact

The number of occlusal contacts for each child may be a contributing factor to the child's ability to efficiently chew his food and, therefore, must be taken into account when calculating chewing efficiency.[43] To account for differences in the occlusal surface area available for chewing, a bite registration at maximum intercuspation was obtained from each child using a dental impression material (Blu-Mousse® Super-Fast; Parkell). The number of teeth in occlusal contact was determined by counting the number of teeth that perforated the impression material.

Statistical methods and analysis of data

Skewness and kurtosis were analyzed for visual and analog data, as well as chewing performance data, and were found to be unevenly distributed. Therefore, nonparametric statistical analyses were used. The Kruskal-Wallis test for the analysis of variance by ranks among groups was used, followed by a Mann-Whitney rank sum test to determine which groups differed. The Wilcoxon paired-sample test was used to compare within group differences before and after the chewing tasks. Kendall rank correlation coefficients were used to evaluate the relationship between visual and analog measures. Statistical significance was established at a *P* value equal to or less than 0.05. All statistics were computed using the SPSS® Software System (SPSS® Inc., Chicago, IL).

Results

Demographic descriptors of the study population are outlined in Table 1. Children in this study ranged from 6 to 18 years old, with an average age of 12.1±3.5 years. Of the 78 children in the study, the ratio of females to males was roughly 2:1 (54 females, 24 males). Twenty-four JRA children (30.8%) were diagnosed as having TMD based on RDC Axis I criteria, as described by Dworkin and LeResche.[7] Of the JRA children, 18 of the females (56%) and 6 of the males (50%) were diagnosed with TMD. There were no demographic differences among the three groups with respect to age ($F=0.55$, $P=0.58$) or gender ($X^2=0.71$, $P=0.70$). In order to determine if there were differences in self-report or chewing performance measures that might be age dependent, the children were divided into two age populations: ages 6-12, and ages 13-18. There were no differences for any of the variables between these two age populations. Therefore, subsequent results are reported for all age groups combined.

Self-report measures

In general, visual self-report measures were significantly correlated with analog measures of jaw pain, ability to chew, and quality of life (Table 2). Therefore, analog measures are used for subsequent analysis. As seen in Table 3, there were no changes within Group 1 or Group 2 for self-report measures after chewing tasks relative to the pre-chewing task reports. However, the control children (Group 3) reported increased jaw pain ($P<0.05$) and impaired ability to chew ($P<0.05$) following the chewing tasks.

Table 4a. Differences among Groups for Analog Self-Report Measures

	Before Chewing Task		
Group	Jaw pain	Ability to chew	Quality of life
1	48.39*,**	52.76*,**	46.04*,**
2	33.50	31.00	36.53
3	34.60	33.04	34.50

Mann-Whitney Rank-Sum Statistic, *Group 1>Group 2 ($P<0.05$),
**Group 1>Group 3 ($P<0.001$)
Group 1–JRA with TMD (N=24); Group 2–JRA without TMD (N=20);
Group 3–Control without TMD (N=34).

Table 4b. Differences among Groups for Analog Self-Report Measures

	After Chewing Task		
Group	Jaw pain (Rank)	Ability to chew (Rank)	Quality of life (Rank)
1	45.76*	49.78**,†	37.81†
2	32.42	29.11	30.25
3	36.99	36.12	27.66

Mann-Whitney Rank-Sum Statistic, *Group 1>Group 2 ($P<0.05$),
**Group 1>Group 2 ($P<0.001$), †Group 1>Group 3 ($P<0.05$)
Group 1–JRA with TMD (N=24); Group 2–JRA without TMD (N=20);
Group 3–Control without TMD (N=34).

Table 5. Group Differences for Chewing Performance Measures

Group	Broadness of particle Distribution (Rank)	Median particle Size (mm) (Rank)	Number of chews for Carrot Mastification (Rank)
1	48.50*	44.59**	42.14**
2	40.50†	40.58	35.34
3	27.02	29.66	30.95

Mann-Whitney Rank-Sum Statistic, *Group 1>Group 3 ($P<0.001$), **Group 1>Group 3 ($P<0.05$), †Group 2>Group 3 ($P<0.05$)
Group 1–JRA with TMD (N=22); Group 2–JRA without TMD (N=19);
Group 3–Control without TMD (N=32).

There were significant differences among the three groups with respect to all of the self-report measures prior to the chewing tasks (Table 4a). JRA Children with TMD (Group 1) reported significantly greater jaw pain, impaired ability to chew, and impaired quality of life before chewing than did either JRA or control children (Group 2, Group 3), ($P<0.05$, $P<0.001$). Also, with respect to self-report of pain, there were differences among the groups after the chewing tasks (Table 4b). After chewing, JRA children with TMD (Group 1) reported significantly greater jaw pain and impaired ability to chew than did JRA children without a diagnosis of TMD (Group 2), ($P<0.05$), but did not show a significant difference in Jaw Pain from the control children.

Chewing performance

The results for chewing performance are shown in Table 5. There were differences among the groups with respect to median particle size. In Group 1, median particle size was larger compared to the control children (Group 3), ($P<0.05$). Broadness of particle distribution was significantly smaller (higher index number) for JRA children with TMD (Group 1) ($P<0.001$) and JRA children without TMD (Group 2) ($P<0.05$) than for control children (Group 3). Group 1 also required a greater number of chews for carrot mastication than did Group 3 ($P<0.05$). Occlusal contact is defined as the number of teeth with at least one occlusal contact point. The number of occlusal contacts did not differ among the groups. As shown by a one-way analysis of variance (ANOVA) the number of occlusal contacts (Table 6) did not differ among the groups, $F(3,63) = 0.77$, $P=0.5144$.

Discussion

Each group was balanced with regard to age and gender. It is also important to note that the number of occlusal contacts was evenly distributed among all three groups. This means that there were equal numbers of children in each stage of occlusal development represented in each of the groups. Over half (55 %) of the JRA population was found to have TMD as diagnosed with the RDC Axis I clinical examination. This is consistent with reported rates of TMD involvement for JRA populations.[2,6,15,18,19,20,22,30,31] The number of control children with TMD in our study was too small for comparisons to be generalized to the overall population; therefore, data from this group were not included in this study. Further studies are required that will incorporate more control children with TMD in order to make these comparisons. For the JRA population, the incidence of TMD involvement by gender was greater in females than males at a ratio of 2:1, which is also consistent with other published data.[2,4,9,15]

Visual and analog formats have been validated for assessing pain in children above 5 years of age[24] and are the most simple and versatile methods for assessing pain intensity across a wide variety of age groups.[25] The visual and analog formats[29] have been found to significantly correlate with disease activity in the JRA population.[41] Alternative scales, such as facial affective scales,[45] and measures of behavioral response (CHEOPS)[26] were not used, as they are designed to measure the child's affective response or behavioral reactions to pain, rather than the level of pain experienced.[23] These formats may be included in future studies. Physiological measures in response to pain, such as heart rate, were not used, as they are unreliable indicators of pain.[5,16,24,38]

Visual and analog self-report measures were highly correlated in our study with few exceptions, demonstrating the reliability of each format. Children were able to consistently quantify their jaw pain experiences using either visual or analog formats, which were generally highly correlated for all groups. This consistency may be due to the fact that the two types of self-report measures were presented at the same time, allowing children to self-correct and, therefore, increase the consistency between formats. However, it is unknown if the reliability that was found between the visual and analog measures in this study would have been maintained had the visual and analog measures been presented separately. Therefore, it is suggested that when assessing analog self-report measures, children may benefit from having a visual reference in order to allow for this self-correction.

Self-estimates of jaw pain, impairment of ability to chew, and impaired quality of life were greater in JRA children with TMD than in JRA children without TMD or control children before the chewing tasks. This suggests that the children in Group 1 have a history of experiencing TMJ pain, and even at this age are aware of a compromise in their chewing performance. Walco et al.[42] and Hogweg et al.[14] found that children with JRA had lower pain thresholds than control children. Although the JRA children with TMD in our study reported more TMJ pain both before and after the chewing tasks than the JRA children with no RDC Axis I diagnosis of TMD, it is important to note that neither of these groups increased their pain levels after the chewing tasks. A self-report of chewing performance may be a useful indicator of TMJ involvement for children with JRA. Also, compromised chewing may be an avoidance mechanism used by the JRA children with TMD in order to obviate TMJ pain while chewing. The JRA children with TMD were not significantly different from the control children in their report of pain after the chewing tasks. The fact that there was no difference between these groups would suggest that the control children maximized their chewing efforts even to the level of jaw joint discomfort.

The results of the chewing performance tasks in this study would seem to support the use of a pain avoidance mechanism. Since the number of occlusal contacts among groups did not differ, the occlusal table available for mastication was consis-

Table 6. Number of Occlusal Contacts

Group	Mean (SD)
1	6.43 (1.38)
2	6.63 (1.71)
3	6.30 (1.43)

Kruskal-Wallis test for the analysis of variance by ranks among groups demonstrates no statistical significance among the groups for number of occlusal contacts.

tent among groups and was not a factor in the chewing performance findings. To explain these findings, it is important to understand the differences between measures of chewing performance.[28] Median particle size is the average size particle measured in millimeters, produced during the chewing task. The broadness of particle distribution index[28] (a unitless value) defines the relative range of particle sizes produced, from very small to very large particles. The higher the slope of the distributions, the narrower the range of particle sizes.

Our results with regard to median particle size and broadness of particle distribution for the control population compare favorably with data presented by Julien et al.[17] The broadness of particle distribution index for our control group of children (Group 3) was fairly large at 8.3, consistent with a broadness of particle distribution index of 7.7 reported by Julien et al.[17] However, JRA children with TMD produced a significantly narrower particle distribution than did control children. This narrow distribution of particle size in JRA children with TMD may have been due to a progressive alteration in chewing pattern, as a conscious pain avoidance mechanism, in response to the stress of repeated chewing trials. This avoidance mechanism would, therefore, result in consistently larger particles and explain the narrow range of particle sizes. Reflex neuromuscular mechanisms are another factor that may play a role in pain avoidance, effectively reducing the masticatory forces when pain is experienced during chewing.[33,35] Also, Stohler et al.[34] have reported that individuals experiencing painful mastication will "guard" against this pain through frequent reshaping and repositioning of the bolus being chewed. Therefore, both conscious and reflex mechanisms play a role in pain avoidance during mastication.

Pain avoidance mechanisms would be expected to increase with the stress of subsequent chewing trials, such that chewing efficiency would drop across trials. An example of this process is as follows: Beginning with trial 1, JRA children with TMD and control children may have dissimilar chewing patterns, with JRA children producing larger sized particles. By trial 3, both groups of children begin to experience the stress of the chewing task. At this point, children with JRA and TMD begin to alter their chewing effort to avoid pain which they know from experience will occur with further chewing, with a resulting increase in the particle size. Control children continue to chew with maximum effort, producing smaller particle size but with an increase in masticatory discomfort. Upon reaching chewing trial 5, children with TMD have slightly altered their chewing pattern to further avoid pain and continue to produce large particles, but effectively guard against an increase in pain. Control children also chew slightly less efficiently than in trial 1, but still produce smaller particles than children with JRA and TMD. However, control children report significantly increased discomfort over successive chewing trials because they do not employ pain avoidance mechanisms.

Given the sequence of chewing trials in our study, it was not surprising to find that the control children (Group 3) increased their self-report of pain, such that there was no significant difference between this group and children with JRA and TMD (Group 1). The JRA children with no evidence for TMD (Group 2) based on RDC Axis I assessment, did not report an increase in pain after the chewing tasks, as compared to the control children without TMD. The lack of increase in self-report of pain in Group 2, comparable to the increase in Group 3, could also be due to initiation of pain avoidance mechanisms.[42] The TMJ, like any other joint in the body, can be a site for chronic synovial inflammation in JRA.[9,31,32] TMJ involvement has been reported to occur in 29% to 41% of all children with JRA, but is commonly asymptomatic.[38] In this regard, pain avoidance for Group 2 may indicate subclinical levels of TMD involvement in these children not detectable with the clinical examination. JRA children without clinical or radiographic evidence for TMJ involvement may, therefore, also incorporate pain avoidance mechanisms while chewing, and this avoidance may be an indicator of subclinical levels of TMJ involvement.

Median particle size in the children with JRA and TMD (Group 1) was greater when compared to the control children (Group 3) (P<0.02). It appears that examining the combined median particle size of all chewing trials is sufficient to describe the differences in chewing performance among these groups. However, it is likely that median particle size increases across each subsequent chewing trial, as individuals decrease bite force in response to stress on the TMJ. In future studies, the median particle size of each subsequent bolus should be examined independently to determine if changes in chewing efficiency occur with the increased stress of chewing. If chewing efficiency is compromised by the stress of chewing across a series of trials, and further compounded by avoidance mechanisms secondary to TMJ involvement, then the rate of loss of efficiency across trials may be an important index of joint dysfunction.

Although JRA children with TMD produced larger median particle size than control children, there were no differences among groups in number of chews required to masticate a bolus of carrot. Wilding[41] has suggested that individuals with reduced chewing efficiency will chew longer than individuals with better chewing efficiency, but still swallow large particles of food. Wilding's findings would help to account for the lack of discrepancy among groups in the present study, as children with JRA swallowed larger particles of carrot. These findings of inefficient mastication of food in TMD patients with JRA may have profound nutritional implications and may contribute to developmental skeletal deformities. In fact, poor nutrition could impact on the child's ability to cope with his illness from a physiological and psychological standpoint.

Conclusions

Children with JRA compromise their masticatory function as a pain avoidance mechanism and, in this regard, decreased chewing efficiency is consistent with their reported low pain levels. Chewing performance studies are valid measures of pain avoidance in these children and could be used as non-invasive tests to monitor the progress of the disease state as it affects masticatory function.

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Abstracts of the Scientific Literature

Accumulation of Fermentable Sugars and Metabolic Acids

This study was undertaken to measure sugars, starches, and metabolic acids in retained food particles. Study subjects consumed portions of different foods, then particles were removed from all bicuspids and first molars at defined times after swallowing. Dry weights and levels of sugars and short-chain carboxylic acids were determined. The study demonstrated the persistence of sugars, the progressive accumulation of starch breakdown products, and the fermentation of the accumulated sugars in retained foods particles. The findings support the view that high-starch foods contribute to the development of caries lesions. The critical difference between high-starch foods and high-sucrose confections was that the latter delivered high levels of sugars to local bacteria immediately after ingestion, but for short periods of time, while the former delivered progressively increasing concentrations of sugars over a considerably longer time

Comments: To date, this is the definitive study on the role of high-starch foods in caries development. It clearly demonstrates that potato chips, salted crackers, and other high-starch low-sucrose foods can exhibit relatively high cariogenic potential. In addition, it further underscores the difficulty in making food comparisons in the context of caries-causing potential. Advising the reduction or elimination of sugar from a child's diet in the prevention of caries may be ineffectual at best, nutritionally confounding at worst. SJM

Accumulation of Fermentable Sugars and Metabolic Acids in Food Particles that Become Trapped on the Dentition; The Journal of Dental Research , 75(11), 1996)

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Pharmacists' Knowledge, Concerning Sugar-Free Medicines

Aims: To examine the attitudes of pharmacists to sugar in medicine and sugar-free preparations and their levels of knowledge concerning sugar-free preparations and the implications for dental health.

Design: A questionnaire was designed with a mixture of closed and open-ended questions.

Method: Seventy pharmacists were randomly chosen from the list of pharmacists practising in a defined area and were asked to participate in the study.

Results: Seventy-five percent of the pharmacists stated that they had not received formal education concerning sugar in medication and its effect on dental health. Their main source of information on the subject was dental health literature. Forty-six percent stated that sugar in medication was definitely an important cause of dental caries in children and 44% felt that it was a possible factor. The major factors influencing the provision of sugar-free medicines were parental request, health promotion literature, reports, and media advertising. Thirty-nine percent of the pharmacists always offered a sugar-free preparation for over-the-counter medication (provided that a sugar-free alternative was available), and 56% sometimes did so. Fifty percent always offered a sugar-free form for prescribed items wherever possible, the remainder depended on it being specified by the prescriber.

Conclusion: There is a high level of interest in this issue among pharmacists, but there is a need for an increased educational input on a continuous basis.

Comments: As pediatric dentists, all of us are aware of the need to educate parents and pediatricians regarding ECC prevention. Pharmacists should not be overlooked. AK

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