Bilateral Space Maintainers: A 7-year Retrospective Study from Private Practice

Todd R. Moore BSc, MSc, DDS[1] David B. Kennedy BDS, MSD,[2]

Abstract

Purpose: The purpose of this study was to report survival times and problems encountered with bilateral space maintainers placed over a 7 year period.

Methods: Charts were reviewed for all patients who had bilateral space maintainers placed between January 1, 1996 and December 31, 2003. Appliance lifetime and problems encountered were recorded and assessed on July 30, 2005, if still in use. Failures were recorded as: (1) cement loss; (2) solder breakage; (3) split band; (4) eruption interference; (5) bent wire; (6) loss; or (7) not specified. Also recorded were: (1) failed appliances; (2) transferred patients; and (3) those lost to follow-up.

Results: A total of 482 space maintainers were evaluated, with 114 failures (24%) and 349 successes (72%). Of the 114 known failures: 68 (60%) were from cement loss; 12 (10%) were from solder breakage; 11 (10%) were from split bands; and 13 (11%) were from reasons not specified. No statistical differences were noted between types of failures or between genders. Mean pooled survival times were 20 months for lingual arches and 23 months for Nance appliances, with no statistical differences between arches, except in successful appliances where Nance was superior (P=.011). Of the 114 failed appliances: 44 (39%) were not recemented or remade, which was considered clinically successful; 51 (45%) were recemented; and 19 (17%) were remade. Eight appliances were lost to follow-up or transferred.

Conclusion: The majority of bilateral space maintainers (72%) lasted their anticipated lifetimes. (Pediatr Dent 2006;28:499-505)

KEYWORDS: BILATERAL SPACE MAINTAINERS, LINGUAL ARCH, NANCE, LEEWAY SPACE, SURVIVAL ANALYSIS, TOOTH MIGRATION

Received March 9, 2006 Revision Accepted May 16, 2006

Premature loss of primary teeth can lead to: (1) midline shifts; (2) space loss; and (3) crowding.[1-3] Hoffding and Kisling1 reported that Class III molar occlusion increased in patients with premature mandibular second primary molar loss. Premature maxillary second primary molar loss led to an increase in Class II molar occlusion.[1] There was a statistically significant increase in crowding with premature primary tooth loss.[2] Midline shifts occurred towards the extraction side, with greater discrepancies in the mandible vs the maxilla.[3] Space maintainers are recommended after early loss of primary teeth to prevent these side effects.[4]

Gianelly has suggested that late-mixed dentition crowding can be treated by preserving the leeway space.[5] Arnold predicted that up to 72% of patients could have an average crowding of 4.5 mm resolved by holding the mandibular arch leeway space.[6] After mandibular lingual arch therapy, mandibular incisor crowding was resolved in 60% in patients, with pretreatment crowding averaging 4.85 mm.[7] Mandibular leeway space maintenance resulted in good stability of incisor alignment 9 years after lingual arch treatment.[8]

Another use of a bilateral space maintainer in the late-mixed dentition is to preserve anchorage in a serial extraction case.[9] Also, when there is a midline discrepancy and serial extraction is used, the Nance holding arch and/or a mandibular lingual arch can preserve extraction space for future midline correction with orthodontic mechanics.[9]

Studies assessing space maintainers placed after early loss of primary teeth have shown limited appliance longevity.[10-14] Reported difficulties with all space maintainers have ranged from 13%[14] to 63%.[12] Median survival times of all space maintainers have been found to be: (a) 7 months[12,14]; (b) 14 months[10]; and (c) 18 months.[13] Problems with mandibular lingual arches were encountered in 45%[13] and 57%[11] of cases and median survival times were 4 months[12] and 14

[1]*Dr. Moore is a junior resident at Eastman Dental Centre, Rochester, New York, United States;* [2]*Dr. Kennedy practices orthodontics and pediatric dentistry in Vancouver, British Columbia, Canada. Correspond with Dr. Kennedy at drdavidkennedy@yahoo.ca*

Table 1. Sample of Children and Appliances Surveyed in the Present Study

Appliance	Mean age at insertion	Gender		Total patients	Appliances initially placed	Recemented appliances	Remade appliances	Total appliances
		M	F					
Lingual arch	11 ys, 0 mos	107	122	229	235	31	11	277
Nance	10 ys, 10 mos	80	83	163	177	20	8	205
Total	10 ys, 9 mos	187	205	392	412	51	19	482

Table 2. Outcomes of Bilateral Space Maintainers Expressed as Numbers and Percentages and According to Success, Failure, and Unknown Outcome

			Success		Fail		Unknown	
Lingual arch type		Placed	Successful	Still in use	Failed	Removed by general practitioner	Patient transferred to new care	Lost to follow-up
Mandibular lingual arch	n	277	166	30	71	1	5	4
	%		60	11	26	0	2	1
Nance appliance	n	205	126	27	43	0	5	4
	%		61	13	21	0	2	2
Total	n	482	292	57	114	1	10	8
	%		61	12	24	0	2	2

months.[13] Problems with Nance appliances were encountered in 8%[13] and 26%[10] of cases, and median survival times were 6 months[12] and 24 months.[13] Most previous studies found no significant difference in survival times between the arches in which the appliance was placed[12,14]; only Rajab[13] showed a statistically significant difference in median survival time between mandibular lingual arches (14 months) and Nance appliances (24 months). The median survival time for recemented space maintainers was 4.5 months, with remade space maintainers surviving for an average of 10 months.[12]

Unilateral appliances, such as the band and loop, were found to have survival times significantly greater than bilateral space maintainers such as the mandibular arch and Nance appliance.[10,12,13] There were no significance differences in outcomes when the following were assessed:

1. gender;
2. age;
3. primary vs mixed dentition; and
4. the operator who planned or placed the space maintainer.[12-14]

The most common difficulties encountered were: (1) broken arch or loop; (2) broken bands; (3) loose bands/cement loss; (4) distorted arch or loop; (5) solder failure; (6) soft tissue lesions; (7) loss of the appliance; and (8) interference with eruption sequence.[10-13] Given the poor survival times, it is disappointing that a large proportion of patients with space maintainers were lost to follow-up, ranging from 20%[13] to 53%.[14]

Since space maintainer longevity is poor, and has limited documentation regarding success, the Canadian Association of Public Health Dentistry has questioned whether space maintainers should be used at all.[15] Brothwell has documented an evidence-based decision-making approach towards the use of space maintainers in the child patient.[17] Rajab suggested that mandibular lingual arches should be avoided whenever possible because of their low median survival time.[13] In all of these studies,[10-14] the appliances were placed to hold space after primary tooth loss in a university setting either by faculty, graduate students, or undergraduate students. One exception was where undergraduate dental students placed appliances in an outreach clinic.[11]

To date, there have been no longevity studies of cemented space maintainers from private practice with the exception of cemented crown-retained distal shoe appliances.[17]

This study's purpose was to report on the survival time and problems encountered with all mixed dentition bilateral space maintainers placed in a private orthodontic practice over a 7-year time period.

Methods

This retrospective study included data obtained from a 2-person private orthodontic practice in Vancouver, British Columbia, Canada. The sample included a total of 482 appliances (277 mandibular lingual arches and 205 Nance appliances) inserted into 392 patients (187 males and 205 females) between January 1, 1996, and December 31, 2003. When an appliance was recemented or remade, it

was counted as a new appliance and the survival data was recorded for the new appliance (Table 1). Appliances were followed until removal or, if still in use, to the study's end point (July 31, 2005). Therefore, the 482 space maintainers included:

1. patients with a:
   a. lingual arch;
   b. Nance appliance; or
   c. both; and
2. appliances that were:
   a. initially placed
   b. recemented
   c. remade

Patients were accepted into the study if they had:

1. an appliance placed to hold the leeway space with or without primaty tooth extraction; or
2. a maxillary Nance appliance and/or lingual arch in conjunction with premolar serial extractions in the mixed dentition.

Nance appliances with a habit-breaking crib were excluded; maxillary Nance and mandibular lingual arches used in conjunction with tooth movement were also eliminated from the sample. Therefore, the sample represented all passive bilateral space maintainers placed in the mixed dentition over a 7-year period, which were followed from January 1, 1996 until July 31, 2005.

After diagnosis and treatment planning, the mandibular lingual arch and maxillary Nance appliances were made in the following manner. At the first visit, separators were: (1) placed interproximal to the first permanent molars; and (2) left for 1 week. At the second visit: (1) separators were removed; (2) bands were fitted; (3) an alginate impression was taken; and (4) separators were replaced. All band fitting and impression taking was done by an orthodontic module certified dental assistant. All appliances were made by the same internal orthodontic laboratory utilizing 0.040 round stainless steel wire soldered at the lingual midpoint of the molar bands. Immediately prior to cementation, the: (1) separators were removed; (2) teeth were polished; and (3) appliance was trial fitted. The insides of the bands were microetched, and the appliance was then cemented by 1 of 2 orthodontists with a glass ionomer cement (Fuji II, GC America, Alsip, Ill) mixed on a frozen slab to allow increased working time and maximum incorporation of powder to strengthen the mix.

Patients were followed up periodically at 6 to 9 month intervals to observe eruption and assess the appliance. In addition, it was recommended that patients receive regular care from their family or pediatric dentist; any problems noted by that dentist were reported to the orthodontist.

Information was retrieved from charts by one of the authors (TRM) to determine the longevity and outcome of the appliances. Noted were the dates of: (1) patient's birth; (2) appliance insert; (3) recementation; (4) repair; and (5) removal. It was recorded whether the appliances: (1) succeeded; (2) were still in use; (3) were removed by the general or pediatric dentist; (4) failed; (5) lost to follow-up; or (6) transferred to new care. The lifetime of the appliance was assessed on July 30, 2005, if they were still in use.

Appliances were considered successful if they were still in use on that date or if they had been removed by either orthodontist having been deemed clinically successful. The appliance's end date was the day of removal. This usually coincided with the completion of Phase 1 orthodontics and the start of Phase 2 care if needed. If an appliance failed, the mode of failure was recorded. Failure categories were: (1) cement loss (ie, loose band); (2) solder breakage; (3) bent arch wire; (4) split band; (5) soft tissue lesion; (6) eruption interference; (7) complete loss; and (8) failure for reasons not specified. Appliances were considered to be failures for any of the aforementioned reasons or if the appliance had been removed between appointments by the patient's general or pediatric dentist. The failure date was recorded as the date when the loose, broken or distorted appliance was

Table 3. Complete Demonstration of All Types of Failure Identified in the Overall Sample With Statistical Significance

Lingual arch type		Total	Cement loss	Solder breakage	Reason not specified	Band split	Eruption interference	Soft tissue lesion	Bent wire	Complete loss
Mandibular lingual arch	n	71	40	8	10	10	1	2	0	0
	%		56	11	14	14	1	3	0	0
Nance appliance	n	43	28	4	3	1	3	1	2	1
	%		65	9	7	2	7	2	5	2
Total	n	114	68	12	13	11	4	3	2	1
	%		60	11	12	10	4	4	1	1
P		NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 4. Fate of Known Failed Bilateral Space Maintainers Expressed as Numbers and Percentages of All Failures and of the Total Sample

Appliance type	No longer needed	Recemented	Remade	Total
Mandibular lingual arch	29	31	11	71
Nance appliance	15	20	8	43
Total	44	51	19	114
% of total failures	39	45	17	100
% of total appliances	9	11	4	24

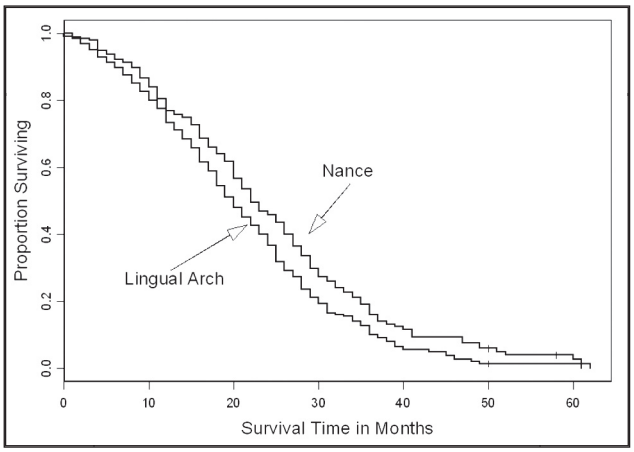

Figure1. Comparison of survival of lingual arch and Nance appliances.
- - - Nance
..... Lingual arch

removed. It was classified as a failure even if the decision was made not to recement or remake it. If an appliance failed, the fate of the appliance was documented as: (1) no longer needed; (2) recemented; or (3) remade.

Data were entered into an Excel spreadsheet (Excel 2003, Microsoft Corporation, Redmond, Washington). The DBMS/COPY data conversion package, (Conceptual Software Inc., Houston, Texas) was then used to convert the spreadsheet into a SAS data file (SAS Institute Inc., Cary, North Carolina). Subsequent data analyses were carried out in SAS. Descriptive statistics—including frequencies of successes and failures, types of failures, and means and standard deviations of survival times—were gathered using SAS procedures (FREQ and MEANS). Frequencies of failures under different conditions were compared using contingency table chi-square tests. When cell frequencies were small, the Fisher exact test was used to make comparisons between groups. Means of survival times were compared using 2 methods. The generalized linear model procedure (PROC GLM) was used to compare mean survival times, controlling for extraneous variables such as age at insertion and gender. The log-rank test (PROC LIFETEST) was used to produce and compare survival curves. The significance level was predetermined at the probability value of 5% or less (P<.05).

Results

The clinical records of 392 patients, in whom 482 space maintainers were fitted, were identified—with 10 patients transferring care and 8 lost to follow-up. The patients' ages at appliance insertion ranged from 7 years, 6 months to 13 years, 11 months—with a mean of 10.9 years (±1.1 SD). The sample is shown in Table 1.

Appliance outcomes are shown in Table 2. If those appliances that were still in use are rated as successful, then the success of the: (1) mandibular lingual arch was 71%; and (2) maxillary Nance appliance was 75%. Of all bilateral space maintainers, 72% were either still in use or had lasted their expected lifetime without incident. The types of appliance failure are shown in Table 3, with statistical comparisons between upper and lower appliances recorded. There were 114 appliances (24%) counted as failures. One additional appliance was removed by a general dentist and included in the failure category, since the reason for its removal was unknown.

Most of the 114 known failures were due to, in order of frequency: (1) cement loss (60%); (2) solder breakage (11%); (3) reason not specified (11%); and (4) split bands (10%). There were no statistically significant differences in mandibular lingual arch failures compared to Nance failures. Split bands occurred more often in mandibular lingual arches (P=.05). Failure outcomes are recorded in Table 4. Of the 114 failures: (a) 19 (17%) were remade; (b) 51 (45%) were recemented; and (c) 44 (39%) were classified as "no longer needed." Of the total sample of 482 space maintainers: (a) 11% needed recementation; (b) 4% were remade; and (c) 9% were left out, as they were considered to have served their purpose.

Survival times are shown in Figure 1 and Table 5. This study's mean survival time for all appliances (both successful and failed) was 20 months for mandibular lingual arches and 23 months for maxillary Nance appliances, with no statistically significant differences between them. The pooled mean lifetime of both mandibular lingual arches and maxillary Nance appliances was 21 months. The mean survival time of successful Nance appliances was 25.3 months, which was statistically superior to the successful lingual arch mean survival time of 21.9 months (P=.011). No statistically significant differences were noted in appliance success in males vs females. Lingual arches did not demonstrate a more statistically significant increase in failure rates than Nance appliances.

Ten appliances could not be followed, as the patient's care was transferred away from the authors' practice. An additional 8 appliances were lost to follow-up. Not surprisingly, the mean survival times of recemented or remade appliances were less than the original appliance since the original appliance, served some of the total treatment time.

Remade appliances were successful 38% of the time compared to 33% for recemented appliances. Analysis of failed appliances showed that when an appliance failed more than twice, the likelihood of future success was very low.

Discussion

It has previously been determined that problems with bilateral space maintainers range from 8% to 57%.[10-14] In this study, problems were encountered in 26% of mandibular lingual arch appliances and in 21% of maxillary Nance appliances—which is lower than most other reported studies.[10-14] This study's pooled mean survival time of 19.9 months for mandibular lingual arches and 22.7 months for maxillary Nance appliances compares favorably to previous longevity studies that range from a low of 4.5[12] months to a high of 24 months.[13] There was no statistically significant difference between the overall failure rates of mandibular lingual arches and maxillary Nance appliances, similar to previous studies.[10,12,14] Mirroring Rajab's results with the maxillary Nance appliance[13] and Baroni's 24 to 36 month survival times,[10] this study's successful appliances showed that the Nance exhibited superior longevity to the lingual arch.

Further evidence of this is shown in Table 4, where 71 mandibular lingual arches failed compared to only 43 Nance appliances. The clinical significance of these findings is that when an appliance's anticipated longevity exceeds 20 months, the clinician can expect superior results from the Nance compared to the mandibular lingual arch. Therefore, appliances placed in the early mixed dentition may require recementation and/or need to be remade if the anticipated longevity exceeds 20 months. When an appliance fails more than twice, consideration should be given to leaving the appliance out since the likelihood of future success is poor.

The patients' mean starting age of 10.9 years may explain this study's improved results. The authors used Gianelly's philosophy of late-mixed dentition intervention.[5] Therefore, this sample of children with late-mixed dentition may have been more cooperative than samples of younger pediatric patients who have a space maintainer placed after primary tooth extraction. Also, the first permanent molar clinical crowns of 10-year-old children may be more amenable to banding than for 6 or 7 year olds. The resulting better band fit may explain the improved results compared to other studies.

The experience of the orthodontic module-certified dental assistant may have also contributed to improved band fit. Most staff in the authors' practice have over 5 years of clinical experience involving banding molars on a daily basis; this may contribute to improved band fit and appliance longevity. Since all appliances were made by the same in-house laboratory, consistency in appliance fabrication—a reported problem in another study[12]—was assured. The presence of a chairside dental assistant in private practice may facilitate improved isolation during cementation; dental students may not have enjoyed these working conditions in previously reported studies.[10-14]

There were 29 lingual arches and 15 Nance appliances that failed but were not recemented or remade, as it was felt that the appliance had served its purpose. The failure likely occurred late into the appliance's lifetime, resulting in this clinical decision. While these were recorded as failures, the appliances actually did their job. Were they considered to be successful, then the overall success rate would improve to 81% for the lingual arch and 82% for the Nance. The late-mixed dentition patient also requires a reduced anticipated lifetime of the appliance, from approximately 10.9 to 12 years of age (when second molar eruption occurs and Phase 2 orthodontics begins). The appliances were expected to last between 15 and 30 months, and the majority did. These factors may help explain why these results are superior to the longevity of appliances reported for the pediatric patient.[10-14]

Failures mirrored previous studies, with cement loss being the highest failure. Since cement failure was the most common type of failure, failure rates should be compared to orthodontic band failure in the permanent dentition. Single glass ionomer-cemented orthodontic bands failed at rates ranging from less than 1% to almost 20%.[18-21] This study's failure rate from cement loss was 15%, which falls well within those values previously found, especially considering that an appliance failed if only 1 of the 2 bands lost its cement. While these failures are classified as cement loss, likely it is due to poor band fit. Failures might also be attributed to the:

1. leverage placed on the band by the archwire bridging the bands; and
2. younger age of patient placement during the late-mixed dentition compared to the conventional permanent dentition orthodontic patient.

The increased band splitting of mandibular appliances (P=.05) may be due to the longer lever arm and increased occlusal trauma to the band's buccal aspect.

In the present study, patients lost to follow-up comprised only 2%, compared to a low of 20% and a high of 53% in previous reports.[12-14] The recall system used required

Table 5. Mean Survival Times in Months of Bilateral Space Maintainers With Statistical Significance Between Appliances

Appliances	Failed±(SD)	Success±(SD)	Pooled±(SD)
Mandibular lingual arch	14±9.9	21.9±10.5	19.9±11.0
Nance	13.3±10.7	25.3±11.3	22.7±12.2
Pooled	13.7±10.2	23.9±10.8	21.0±11.5
Significance between lower lingual arch/Nance	NS*	*P*=.011	NS

*NS=Nonsignificant.

placing 2 phone calls and then sending a reminder card to elicit a patient's response. If there was still no response, a registered letter was sent recommending that their fixed appliance required monitoring and absolving the practice of the consequence of failure to attend. This probably accounts for the improved retention of patients and is, therefore, a recommended system for following patients with fixed appliances. It might also be that patients from private practice are more motivated to attend for visits than those seeking care at a university clinic, explaining the higher retention rates.

Retrospective studies have strengths and weaknesses that provide direction for interpretation and future research. The strengths of this study are: (1) large sample size; (2) long duration; (3) conducted in a private practice; and (4) all appliances were accounted for in the study. Poor record keeping, however, resulted in 13 appliance failures that could not be accurately classified according to the exact type of failure. There was no randomization in appliance selection, since the study was retrospective. Since the sample was drawn from an orthodontic practice that treats children exclusively, the results should not be transferred either to a pediatric or general dental practice. The pediatric dental literature is in need of long-term outcome studies of space maintainers from private practice.

Factors contributing to appliance success and failure that are worthy of future investigation include: (1) age at insertion; (2) decay rate; (3) regularity of recall; (4) appliance type; (5) cement used; and (6) operator. While evidence is available about the effectiveness of the distal shoe[17] and lingual arch,[7,8] research is lacking regarding other space maintainers' effectiveness.

Conclusions

Based on this study's results, the following conclusions can be made:

1. In a private orthodontic practice, the vast majority (72%) of bilateral space maintainers lasted their anticipated lifetimes without incident or were still in service.
2. Problems were encountered in 26% of mandibular lingual arches and in 21% of maxillary Nance appliances placed in the mixed dentition.
3. Although there were a number of unknown failures, the chief causes of known failure were, respectively:
   a. cement loss;
   b. solder breakage; and
   c. band splitting.
4. The mean survival times were 19.9 months for the mandibular lingual arch and 22.7 months for the maxillary Nance appliance.

Acknowledgements

The authors wish to thank Dr. D.C. Flanagan for access to his charts for data retrieval and Dr. Alan Donald for his statistical analysis.

References

1. Hoffding J, Kisling E. Premature loss of primary teeth: Part II, the specific effects on occlusion and space in the permanent dentition. J Dent Child 1978;45:284-7.
2. Hoffding J, Kisling E. Premature loss of primary teeth: Part I, its overall effect on occlusion and space in the permanent dentition. J Dent Child 1978;45:279-83.
3. Kisling E, Hoffding J. Premature loss of primary teeth: Part III, drifting patterns for different types of teeth after loss of adjoining teeth. J Dent Child 1979;46:34-8.
4. Kisling E, Hoffding J. Premature loss of primary teeth: Part V, treatment planning with due respect to the significance of drifting patterns. J Dent Child 1979;46:300-6.
5. Gianelly AA. Crowding: Timing of treatment. Angle Orthod 1994;64:415-8.
6. Arnold S. Analysis of Leeway Space in the Mixed Dentition [thesis]. Boston, Mass: Boston University; 1991.
7. Brennan MM, Gianelly AA. The use of the lingual arch in the mixed dentition to resolve incisor crowding. Am J Orthod Dentofacial Orthop 2000;117:81-5.
8. Dugoni SA, Lee JS, Varela J, Dugoni AA. Early mixed dentition treatment: Postretention evaluation of stability and relapse. Angle Orthod 1995;65:311-20.
9. Dale JG, Brandt S. Dr. Jack G. Dale on serial extraction. J Clin Orthod 1976;10:44-60.
10. Baroni C, Franchini A, Rimondini L. Survival of different types of space maintainers. Pediatr Dent 1994;16:360-1.
11. Hill CJ, Sorenson HW, Mink JR. Space maintenance in a child dental care program. J Am Dent Assoc 1975;90:811-5.
12. Qudeimat MA, Fayle SA. The longevity of space maintainers: A retrospective study. Pediatr Dent 1998;20:267-72.
13. Rajab LD. Clinical performance and survival of space maintainers: Evaluation over a period of 5 years. J Dent Child 2002;69:124, 156-60.
14. Tulunoglu O, Ulusu T, Genc Y. An evaluation of survival of space maintainers: A six-year follow-up study. J Contemp Dent Pract 2005;6:74-84.
15. Ho E, Leake J. Evidence-based recommendations for the management of premature loss of deciduous molars in the North York dental program. Canadian Association of Public Health Dentistry. Community dental health services research unit quality assurance report No. 19. Available at: "http://www.caphd-acsdp.org/spacer.pdf". Accessed November 10, 2005.
16. Brothwell DJ. Guidelines on the use of space maintainers following premature loss of primary teeth. J Can Dent Assoc 1997;63:753, 757-760, 764-856.
17. Brill WA. The distal shoe space maintainer chairside fabrication and clinical performance. Pediatr Dent 2002;24:561-5.

18. Fricker JP, McLachlan MD. Clinical studies of glass ionomer cements. Part I: A 12-month clinical study comparing zinc phosphate cement to glass ionomer. Aust Orthod J 1985;9:179-80.
19. Maijer R, Smith DC. A comparison between zinc phosphate and glass ionomer cement in orthodontics. Am J Orthod Dentofacial Orthop 1988;93:273-9.
20. Millett DT, Gordon PH. The performance of first molar orthodontic bands cemented with glass ionomer cement: A retrospective analysis. Br J Orthod 1992;19:215-20.
21. Gillgrass TJ, Benington PC, Millett DT, Newell J, Gilmour WH. Modified composite or conventional glass ionomer for band cementation? A comparative clinical trial. Am J Orthod Dentofacial Orthop 2001;120:49-53.

Abstract of the Scientific Literature

Health-related Quality of Life of Overweight and Obese Children

The purpose of this study was to determine the relationships between weight and health-related quality of life (QOL) reported by parent-proxy and child self-report in a population sample of Australian school children. Of 1,943 children surveyed in 1997 as part of a longitudinal cohort study, 1,569 (81%) were resurveyed 3 years later at a mean age of 10.4 years. Health-related QOL was determined using the PedsQL 4.0 survey completed by both parent-proxy and by child self-report. Summary scores for children's total, physical, and psychosocial health and subscale scores for emotional, social, and school functioning were compared by weight category based on the International Obesity Task Force cut points.

Of 1,456 children whose data were analyzed, 1,099 (76%) children were classified as not overweight, 294 (20%) were classified as overweight, and 63 (4%) were classified as obese. Parent-proxy and child self-reported PedsQL scores decreased with increasing child weight. The parent-proxy total PedsQL mean (±SD) scores for children were: (1) 83.1±12.5=not overweight; (2) 80.0±13.6=overweight; and 75.0±14.5=obese (P<.001). The respective child self-reported total PedsQL mean scores were: (1) 80.5±12.2; (2) 79.3±12.8; and (3) 74.0±14.2 (P<.001). At the subscale level, child and parent-proxy reported scores were similar, showing decreases in physical and social functioning for obese children, compared with children who were not overweight (all P<.001). Decreases in emotional and school functioning scores by weight category were not significant. Ultimately, the effects of child overweight and obesity on health-related QOL in this community-based sample were significant.

Comments: In a large, community-based sample of 9- to 12-year-old Australian children, researchers demonstrated that health-related QOL decreased across categories of "not overweight," "overweight," and "obese" children. The decrease in QOL was small for overweight children, but more marked for those who were obese. These overweight and obese children differed from children who were not overweight most strongly on physical and social functioning scores, while emotional and school functioning seemed relatively unaffected. A strength of the PedsQL survey instrument used in this research is that it provides parallel reports by both a parent-proxy and the child. In this study, child self-report and parent-proxy versions were nearly identical. The researchers noted that health-related QOL or functioning began to decline as soon as a child was above average weight, with a gradual steepening as BMI increased. Further research is needed to determine if these findings can be replicated in other age groups and countries. What is not known is whether the health-related QOL in overweight and obese children decreased in response to their weight or whether children with lower health-related QOL from the outset were more likely to become overweight. This study points out the alarming number of children in industrialized countries who are overweight. It also draws attention to the fact that, in addition to the cardiovascular and endocrine comorbidities faced by these children, their physical and social functioning are also imperiled. **RLH**

Address correspondence to Dr. Joanne Williams, Centre for Community Child Health, Royal Children's Hospital, Flemington Road, Parkville 3052, Australia.

Williams J, Wake M, Hesketh K, Maher E, Waters E. Health-related quality of life of overweight and obese children. JAMA 2005;293:70-76.

24 references