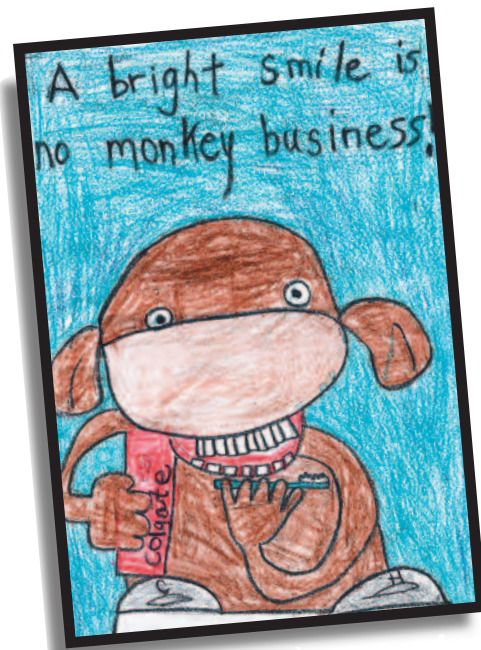




# Advances and Progress in Oral Health Through Oral Care Education



*Scientific Proof of the  
Effectiveness of a  
Global Oral Health  
Education Initiative*



### *This is dedicated to the children*

For over 100 years, Colgate-Palmolive has been the world leader in oral health through innovative oral care technologies, and education and awareness programs. Colgate's initiatives have had a significant impact on oral health status across all social and age strata, though most profoundly on children of developed and developing nations. The cornerstone of that effort has been Colgate's *Bright Smiles, Bright Futures* program. This monograph is dedicated to *Bright Smiles, Bright Futures* — the scientific basis for the initiative and the clear demonstration of its clinical effect. It tells of how a well-orchestrated effort, designed to integrate within a grade school curriculum, can improve preventive self-care, and ensure optimal oral health for a lifetime. This is dedicated to the children.



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**Foreword**

Back in the 1950s when the first fluoridated dentifrices became commercially available, the notion of a global decline in the prevalence of dental disease in children was more of a dream than an attainable goal. Today, with the advent of more effective dental education and dental therapeutics, and a shift in the emphasis in dental care from curative to preventive, such a goal is nearing reality.

In researching the material for this monograph, I was impressed by the fact that support for such an imperative was indeed universal, and that so many respected global institutions could come together, pooling talent and resources, toward a single important end — the oral health of the world’s children. Clearly, the achievement of measurable improvements in dental health worldwide is a victory to be shared by many.

Yet I would be remiss were I not to single out the efforts of some organizations who have been at the forefront in the advancement of vital preventive oral health initiatives: the World Health Organization for its perpetual commitment to ensuring optimal health for people of all ages, through its creation and implementation of programs to raise awareness and motivation for healthier lifestyles; the United Nations Children’s Fund for the generous and sustaining support it provides to nations of the world for child development; the National Institute of Dental Research, the International Association for Dental Research, the World Federation of Dental Associations (Fédération Dentaire Internationale), the International Association of Pediatric Dentistry, as well as the many national dental associations, public health and education ministries, and schools of dentistry and dental hygiene for the significant roles they play in establishing critical support and direction toward those at the highest risk for dental disease; and the Colgate-Palmolive Company for fulfilling their commitment to the oral health of children around the world through their *Bright Smiles, Bright Futures* program, and for their support for this monograph, which I hope will prove to be a useful, comprehensive resource for all those interested in safeguarding the oral health of children — now and for generations to come.

Stephen M. Siegel  
Editor

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## Acknowledgments

The design, development and global implementation of the *Bright Smiles, Bright Futures* initiative was a remarkable achievement, supported through the efforts of private and public institutions, and the commitment, expertise and countless hours of work of a team of tireless, dedicated individuals. We acknowledge their efforts toward the creation of this monograph, the *Bright Smiles, Bright Futures* program, and the oral health of children around the world.

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# Advances and Progress in Oral Health Through Oral Care Education

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The objective of this monograph is to emphasize the benefits of global oral health awareness initiatives, to demonstrate the efficacy of such initiatives where they do exist, and to prove scientifically the clear clinical benefits to be accrued by children who have participated in the Colgate-Palmolive *Bright Smiles, Bright Futures* school-based program.

The monograph is divided into four sections. The first section explores a decade of scientific research on the subject of oral health programs, establishing the need for such initiatives and the benefits to various population groups when such efforts have been undertaken. The second section describes in detail the Colgate *Bright Smiles, Bright Futures* program, its innovative elements, its proven efficacy in the United States, and its successful application to and implementation in other developed and developing nations.

Section three presents the protocol and results of a unique scientific study which, through accepted research methodology, confirms a clinical oral health improvement among school children of a developing nation who participated in the *Bright Smiles, Bright Futures* program. And section four provides a summary of the key learnings of the monograph, all leading to the conclusion that Colgate's *Bright Smiles, Bright Futures*, implemented through school-based educational curricula and supported by community outreach efforts, offers significant oral health benefits to children in both developed

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### Introduction

Preventive dental decisions are often dictated by the perceived value of outcomes gained or lost through action or the lack thereof (Kay and Blinkhorn, 1993). Effective oral health education, properly implemented, underscores the significance of preventive measures and the positive results of such actions. Preventive oral health strategies involving patient motivation results in positive long-term oral health practices (Seibert *et al.*, 1990), and a preventive strategy which includes oral health education is reliable for the control of dental disease (Parodi and Garcia, 1991). In contrast, oral health programs which focus on the curative versus preventive aspects of disease tend to have only a marginal impact on oral health status (Volschenk *et al.*, 1997). Indeed, if a school dental program was designed to lower the incidence of oral disease, primary preventive measures must be included (Horowitz, 1979). It may be concluded, therefore, that an effective, preventive-oriented oral health education program can positively affect those actions necessary to achieve an oral health benefit.

In 1982, in assessing the interim report of the International Collaborative Study of Dental Manpower Systems (1979), the reports from the United Kingdom of the Royal Commission on the National Health Service (1979), the Nuffield Inquiry into Dental Education (1980), and the United States Public Health Service report on children's oral health, among others, G.H. Leatherman, Executive Director Emeritus of the Fédération Dentaire Internationale concluded, "What we must have in relation to oral hygiene for children are manpower, materials and health education." For many years since, oral care investigators have sought to demonstrate the efficacy of education on the oral health status of various population groups, and to underscore the need for such programming

where none exists.

Nearly a decade and a half ago, Alice Horowitz, Director of the National Caries Program of the National Institute of Dental Research, stated, "Sound health education and health promotion activities, validated by research, form the foundation upon which prevention is organized, implemented and perpetuated." A review of the dental research literature over the past 28 years, more than half of which were oral and poster presentations from the International Association for Dental Research Annual Scientific Sessions, illustrates this point (Table I).

### Efficacy of Oral Health Educational Interventions

Oral health education initiatives can have a positive and sustaining impact on oral hygiene. In Israel, for example, it was found that toothbrushing instruction, combined with related educational programs, had a positive effect on both improving and maintaining tooth cleaning skills (Anaise and Zilkah, 1976). Further, the method by which oral health education is implemented can have a bearing on its rate of success. In 1970, for example, Podshadley *et al.* published two studies which suggested the importance of utilizing a comprehensive and systematic approach to oral health education among school children, demonstrating the clear lack of effectiveness of the single-lecture toothbrushing instruction technique.

Ultimately, what is presented within the context of an oral health education program is key to the success of such an initiative. The content of any effective oral health education initiative must be current, accurate, and must provide reinforcement of the preventive regimens provided by the schools (Russell *et al.*, 1989; Woolfolk *et al.*, 1989; Frazier and



Horowitz, 1990). A 1991 study in Sweden took this notion a step further by showing that a program participant's awareness of the importance of the information presented enhances the educational experience (Kinnby *et al.*, 1991).

Published reports of studies conducted throughout the world support the value and efficacy of oral health education initiatives. Investigations on the impact of oral health education and training across different age strata have shown such interventions to be significantly effective in reducing cigarette, smokeless tobacco and alcohol use (Wisniewski *et al.*, 1993; Walsh *et al.*, 1994; Lee *et al.*, 1994; Mathias *et al.*, 1996; Canto *et al.*, 1997) and dental fears (Kroeger and Smith, 1987). Further studies have shown that educational interventions among diabetic

patients result in improved knowledge of the relationship between diabetes and oral health (Scruggs *et al.*, 1987), and that such programming results in a significant improvement in oral health status (Warren *et al.*, 1987). Among children who are either physically or mentally challenged, studies have found that oral health education interventions can be very effective in improving oral hygiene techniques and results (Lunn and Williams, 1990; Cohen *et al.*, 1991).

Among the elderly, education and empowerment programs can assist in improved awareness of oral disease and prevention (Kiyak *et al.*, 1994). Studies have shown that oral health training and education can positively influence a sense of personal responsibility for oral health (Saxe *et al.*, 1992) and can further affect treatment expectations

Published reports of studies conducted throughout the world support the value and efficacy of oral health education initiatives

Even when directed toward parents, education can improve children's oral hygiene practices and oral health



learning and reinforcement of behavior change positively impact on oral health self-care, inquisitiveness and oral status within this age category (Kiyak and Grayston, 1991). One recent study demonstrated a high correlation between oral health-related knowledge, positive attitudes toward oral health and increased utilization of dental services (Dolan *et al.*, 1993).

A meta-analytic evaluation of oral health interventions among various population groups in the United Kingdom showed that oral health education and promotion are effective in improving plaque levels and gingivitis (Lee *et al.*, 1997). Studies among adults in Japan proved that oral health education, as an element of a community-based or work-based preventive program, is effective in preventing periodontal disease (Morita *et al.*, 1991, 1994).

Oral health promotion programs around the world have been shown to be effective in improving children's oral health knowledge (Woolley, 1980; Flanders, 1987; Rubinson and Tappe, 1987; Otchere *et al.*, 1988), behaviors (Stapf, 1975; Buischi *et al.*, 1994) and status (Kawaguchi *et al.*, 1994; Schwartz *et al.*, 1996). Even when directed toward parents, education can improve children's oral hygiene practices and oral health (Rayner, 1989).

A study among adolescents in Brazil showed that oral health motivation can affect

a reduction in bacterial plaque levels (Saba-Chujfi *et al.*, 1997). A report from the United Kingdom on a study among five-year-old children demonstrated significant reductions in plaque scores and significant improvements in gingival health following a dental health education campaign (Schou and Wight, 1994).

Numerous investigations on the impact of oral health education on caries rates among children have been conducted worldwide and, indeed, preventive interventions, particularly among high caries-risk children, have been shown to be of benefit (Jankovi *et al.*, 1989; Laloo and Solanki, 1993; Veilleux *et al.*, 1993). A recent study in the United States determined that children exposed to a school-based oral hygiene and nutrition education program experience significant declines in caries rates (Lovett *et al.*, 1997).

In Denmark, a study found that a school-based nutrition education program is effective in influencing and maintaining positive attitudes toward healthy foods as a means of caries prevention (Hølund, 1989). A report from the United Kingdom showed that eight-year-old children, enrolled in a dental health education initiative, showed a significant increase in knowledge about diet and oral health, frequently opted for non-cariogenic foods and drinks, and increased toothbrushing frequency as a result of the campaign (Shou *et al.*, 1991).



## The Need for Oral Health Educational Interventions

Given the level of efficacy of these educational programs at all population levels, investigators have consistently emphasized the need for such interventions to meet the objective of optimal oral health (Nowjack-Raymer and Gift, 1993), particularly when access to dental care is limited (Kiyak *et al.*, 1994).

In no group, however, is the need for such intervention greater than among those at high risk for dental disease. Three studies among high caries-risk first grade minority children in a selected urban area of the United States clearly underscore the need for early preventive intervention during developmental years (Sintes *et al.*, 1993; Lovett *et al.*, 1994; Lovett *et al.*, 1995).

A study among migrant workers in the United States concluded that effective oral health education and prevention programs are necessary to meet the needs of an at-risk population (Sintes *et al.*, 1993). Additionally, the levels of dental disease among various age groups in Puerto Rico suggested a strong need for primary preventive interventions, such as education (Elias *et al.*, 1997). Investigators in the United Kingdom determined that the perceptions of adults regarding oral cancer dictates the need for improved oral health education and promotional activities among those individuals at high risk for the disease (Shetty *et al.*, 1997). And a clear indication of the need for oral health education was one conclusion of a study of children residing in a fluoridated-water community. The authors found a high caries prevalence rate due, largely, to limited water intake and toothbrushing activities (Lemeh *et al.*, 1994).



Lastly, investigators have long felt that for an oral health education program to be completely effective for children, the need exists to educate parents (Storhaug and Holst, 1987; Petersen *et al.*, 1995), teachers (Lang *et al.*, 1989) and auxiliary health personnel within a community (Hunter *et al.*, 1995), though this, unfortunately, is not always the practice. The final results of the Fédération Dentaire Internationale report of health education aspects of preventive dental programs for school-age children showed that among the 34 countries surveyed, presentations to community leaders and community participation were among the least frequently used strategies, and only half the counties surveyed reported targeting education to parents and health workers (Frazier *et al.*, 1983).

The overwhelming scientific evidence supporting the value of preventive oral health education interventions, and the further need for such programming worldwide among those at high risk for dental disease has galvanized the development of well-designed school- and community-based educational efforts. The section which follows describes in detail one such endeavor.

Given the level of efficacy of these educational programs at all population levels, investigators have consistently emphasized the need for such interventions to meet the objective of optimal oral health

**Table I**  
**Historical Research Perspective Demonstrating the Need for and Efficacy of Oral Health Education Interventions Among Various Global Populations**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Implementation of a Community Oral Health Programme in Cimareme, Bandung	Hartono <i>et al.</i>	1997	Indonesia	NA	Health personnel can be motivated to promote community-wide oral health during daily routines
Statistical Results on Oral Hygiene Motivation on Brazilian Adolescents	Saba-Chujfi <i>et al.</i>	1997	Brazil	Adolescence	Oral health motivation affects a reduction in bacterial plaque levels
A Meta-analysis of the Effectiveness of Dental Health Education	Lee <i>et al.</i>	1997	U.K.	Various	Oral health education and promotion interventions are effective in improving plaque levels and gingivitis
Hispanic Youths' Knowledge of Oral Cancer Risk Factors	Canto <i>et al.</i>	1997	U.S.A.	Adolescence	Education on the risk factors for oral cancer is associated with non-tobacco and non-alcohol use
Changes in Untreated Caries in Oakland, California, 1992-1994	Lovett <i>et al.</i>	1997	U.S.A.	Early Childhood	Children exposed to a school-based oral hygiene and nutrition education program experience significant declines in caries rates
Impact of Oral Health Services in the Kruger National Park - A Periodontal Perspective	Volschenk <i>et al.</i>	1997	South Africa	Adult	Oral health programs which focus on curative vs. preventive aspects of disease have a marginal impact on oral health status
Assessment of a Community's Oral Health Status	Elias <i>et al.</i>	1997	Puerto Rico	Various	Levels of dental disease dictate a need for primary prevention programs, such as education

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Perceptions of South Asian Adults in London on Oral Cancer	Shetty <i>et al.</i>	1997	U.K.	Various	Improved oral health education and promotion activities are needed for individuals at high risk for oral cancer
Prevention of Early Childhood Caries - A Fluoride Toothpaste Demonstration Trial on Chinese Children	Schwartz <i>et al.</i>	1996	Hong Kong	Early Childhood	An organized daily school-based toothbrushing intervention combined with health education slows caries development among children in kindergarten
Smokeless Tobacco Education Efficacy Among Sixth, Seventh and Eighth Graders	Mathias <i>et al.</i>	1996	U.S.A.	Adolescence	Educational intervention is effective in increasing awareness of the health hazards of smokeless tobacco, though earlier intervention is suggested for prevention
The Current Status of Dental Health Education in the Training of Midwives and Health Visitors	Hunter <i>et al.</i>	1996	U.K.	Various	Dental health education must be given a higher profile among midwives and health visitors to ensure that accurate information is imparted
Oral Health Behavior, Knowledge, and Attitudes of Children, Mothers, and Schoolteachers in Romania in 1993	Petersen <i>et al.</i>	1995	Romania	Various	In high caries-risk areas, oral health education of children and caregivers is necessary
Comparative Epidemiology of Dental Caries for Black First-graders in Oakland, CA	Lovett <i>et al.</i>	1995	U.S.A.	Childhood	Limited access to preventive and restorative dental services results in higher rates of untreated dental decay



**Table I - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Community Oral Health Promotion Activities in Hiraizumi, Japan	Kawaguchi <i>et al.</i>	1994	Japan	Early	Oral health promotion activities are effective in improving the oral health of children
Ethnic Differences in Health Self-efficacy and Awareness	Kiyak <i>et al.</i>	1994	U.S.A.		When access to dental care is limited, education and empowerment programs can assist the elderly in improved awareness of oral disease and prevention
Evaluation of Repeated Periodontal Health Care Activities for Industrial Workers	Morita <i>et al.</i>	1994	Japan		Serial oral health education and prevention intervention improve periodontal health
Dental Caries Treatment Patterns of Hispanic First Grade Students in Oakland, California	Lovett <i>et al.</i>	1994	U.S.A.		A significantly lower caries-free rate among minority children suggests a strong need for early interventions
An Evaluation of a School-based Comprehensive Public Oral Health Care Programme	Lallo and Solanki	1994	South Africa		A school-based oral health program is effective in reducing the prevalence of caries
Caries Relation to Fluoridated Water Consumption and Toothbrushing	Lemeh <i>et al.</i>	1994	U.S.A.		High caries prevalence rate among children in a fluoridated-water community, suggests a need for education on the importance of drinking water and toothbrushing

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Does Dental Health Education Affect Inequalities in Dental Health	Schou and Wight	1994	U.K.	Childhood	A comprehensive school-based oral health education program is effective in reducing plaque and improving gingival health
Psychosocial Factors Influencing Smokeless Tobacco Use by Teenage Military Dependents	Lee <i>et al.</i>	1994	U.S.A.		Training and education can be effective in reducing smokeless tobacco use
Spit Tobacco Cessation Among College Athletes: Results After 1 Year	Walsh <i>et al.</i>	1994	U.S.A.		Education and training interventions are effective in promoting smokeless tobacco cessation
Effect of Two Preventive Programs on Oral Health Knowledge and Habits Among Brazilian Schoolchildren	Buischi <i>et al.</i>	1994	Brazil		Comprehensive oral health education resulted in improved dental knowledge and dental behaviors
Oral Health of Migrant Workers	Sintes <i>et al.</i>	1993	U.S.A.		Effective oral health education and prevention programs are needed to meet the needs of an at-risk population
Validity of a Caries Risk Screening Method Used in Quebec	Veilleux <i>et al.</i>	1993	Canada		High caries-risk children will benefit from preventive intervention
Dental Caries Among First grade Students in Oakland	Sintes <i>et al.</i>	1993	U.S.A.		High caries rates among minority vs. non-minority children demonstrate the need for early intervention and prevention

**Table I - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Geriatric Oral Health Promotion	Dolan <i>et al.</i>	1993	U.S.A.	Elderly	A high correlation exists between oral health-related knowledge, positive attitudes toward oral health and increased use of dental services
Knowledge of Common Signs of Gum Disease	Nowjack-Raymer and Gift	1993	U.S.A.	Adult	Targeted health education and promotion are needed to meet the objective of gingival health
A Targeted Approach Toward Smokeless Tobacco Cessation	Wisniewski <i>et al.</i>	1993	U.S.A.	Adult	Targeted education is meaningful and encourages cessation of smokeless tobacco use
A Dental Health Education Programme, Including Home Visits, for Nursery School Children	Rayner	1992	Scotland	Childhood	Oral health education is enhanced for children when parents are involved in the experience
Dental Locus of Control in Elderly: Oral Health Promotion Effects	Saxe <i>et al.</i>	1992	U.S.A.	Elderly	Oral health training can positively influence a person's sense of responsibility for oral health
Four Years' Follow-up Results After a Dental Preventive Program in Children Aged 4-8 Years	Parodi and Garcia	1991	Argentina	Childhood	A preventive strategy which includes oral health education is reliable for controlling dental disease
The Role of Instruction and a Brushing Device on the Oral Hygiene of Blind Children	Cohen <i>et al.</i>	1991	Israel	Adolescence	An integrated approach to teaching dental hygiene skills is beneficial
Methods of Health Promotion for Independent Elderly	Kiyak and Grayston	1991	U.S.A.	Elderly	Active learning and reinforcement of behavior change impact positively on oral health self-care, inquisitiveness and oral status

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
A Community Program for the Prevention of Periodontal Disease	Morita <i>et al.</i>	1991	Japan	Adult	Oral health education, as an element of a community-based preventive program, is effective in the prevention of periodontal disease
Evaluation of Information on Dental Health Care at Child Health Centers	Kinnby <i>et al.</i>	1991	Sweden	Childhood	In oral health education programs, it is essential for participants to realize the importance of the information presented
Deprivation and Dental Health. The Benefits of a Child Dental Health Campaign in Relation to Deprivation as Estimated by the Uptake of Free Meals at School	Schou <i>et al.</i>	1991	Scotland	Childhood	Dental health education produces a significant increase in knowledge of diet and dental health, resulting in a decrease in the intake of cariogenic foods and an increase in toothbrushing frequency
Assessing the Effectiveness of a Preventive Dental Program	Seibert <i>et al.</i>	1990	U.S.A.	Childhood through Elderly	Preventive oral health strategies involving patient motivation results in long-term positive health practices
The Development of a Toothbrushing Programme at a School for Children with Moderate to Severe Learning Difficulties	Lunn and Williams	1990	U.K.	Early Childhood through Adolescence	An oral hygiene education and skills program improves and maintains oral health
Oral Health Education and Promotion in Maternal and Child Health: A Position Paper	Frazier and Horowitz	1990	U.S.A.	Childhood	Education designed to empower as well as inform, and which shares decision making among community members and health professions is most appropriate

**Table I - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
A Dental Health Education Program for Nursery School Children	Rayner	1989	U.K.	Early Childhood	Oral health education directed toward parents of young children improves children's oral hygiene practices and oral health
School-based Preventive Regimens and Oral Health Knowledge and Practices of Sixth Graders	Russell <i>et al.</i>	1989	U.S.A.	Adolescence	For education to be effective, it must be accurate and provide reinforcement for positive oral health behaviors
The Effect of a Nutrition Education Program on Adolescents' Knowledge, Beliefs and Attitudes	Hølund	1989	Denmark	Adolescence	Learning through teaching via a school-based nutrition education program is effective in influencing and maintaining positive attitudes toward healthy foods as a means of caries prevention
Oral Health Knowledge and Sources of Information Among Elementary Schoolchildren	Woolfolk <i>et al.</i>	1989	U.S.A.		A need exists to correct misinformation about dental health and inform children about effective preventive agents
Effects of Knowledge and Behaviour of Pre-School Children of Oral Health	Janković <i>et al.</i>	1989	Yugoslavia		Dental health education and prevention positively affect dental health
Oral Health Knowledge and Attitudes of Elementary Schoolteachers in Michigan	Lang <i>et al.</i>	1989	U.S.A.		Increasing oral health knowledge among teachers provides the chance to educate those who can positively impact on children
Evaluation of the Effectiveness of the Toronto Dental Education Programme	Otchere <i>et al.</i>	1988	Canada		A school-based oral health education program significantly improves oral health knowledge

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Effectiveness of Dental Health Educational Programs in Schools	Flanders	1987	U.S.A.	Childhood through Adolescence	An effort should be made to make children more aware of preventive programs which can be of benefit to them
Caries Experience of Disabled School-age Children	Storhaug and Holst	1987	Norway	Childhood through Adolescence	Family education on feeding, toothbrushing techniques, diet and fluorides is necessary for the oral health of disabled children
Evaluating a Private Dental Practice Behavioral Fear Control Program	Kroeger and Smith	1987	U.S.A.	Unknown	An auxiliary-based, technology-assisted training program is effective in reducing dental fears
Evaluation of a Dental Health Program for Insulin-Dependent Diabetics	Warren <i>et al.</i>	1987	U.S.A.	Unknown	An oral health education program for diabetic patients results in a significant improvement in oral health status
An Educational Approach to Improving Acceptance of Dentures by Geriatric Patients	Loupe <i>et al.</i>	1987	U.S.A.	Elderly	Educational intervention significantly changes the expectations of denture wearers in an elderly population
Juvenile Diabetics' Dental Health Knowledge	Scruggs <i>et al.</i>	1987	U.S.A.	Childhood	Juvenile diabetic patients receiving extensive oral health education demonstrate improved knowledge about diabetes and oral health
An Evaluation of a Preschool Dental Health Program	Rubinson and Tappe	1987	U.S.A.	Childhood	An oral health education program is effective in improving knowledge, attitudes and behavior about oral health

**Table I - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Effective Oral Health Education and Promotion Programs to Prevent Dental Caries	Horowitz	1983	U.S.A.	Childhood through Adolescence	Health education and promotion, validated by research, form the foundation upon which prevention is organized, implemented and perpetuated
Health Educational Aspects of Preventive Dental Programs for School-age Children in 34 Countries – Final Results of an FDI International Survey	Frazier <i>et al.</i>	1983	Various	Childhood through Adolescence	A global initiative is needed for more efficient application of primary preventive measures, means to evaluate programs and program achievement, and firming the role of community education in oral health, prevention and treatment
Oral Hygiene for Children: A Look at What We Must Have and What We Should Do	Leatherman	1982	U.K.	Childhood through Adolescence	Organized dentistry must examine its policies on education, clinical practice research and administration to offer primary dental health services throughout the world
Changing Oral Hygiene Attitudes and Habits	Woolley	1980	Australia	Childhood through Adolescence	After 6 months, children are able to recall 70% of the dental health message given during oral health education initiatives
A Comparison of Available Strategies to Affect Children's Dental Health: Primary Preventive Procedures for Use in School-based Dental Programs	Horowitz	1979	U.S.A.	Childhood through Adolescence	Primary preventive practices are necessary for school-based oral health programs to lower the incidence of oral disease
Effectiveness of a Dental Education Program on Oral Cleanliness of School-children in Israel	Anaise and Zilkah	1976	Israel	Adolescence	Oral hygiene skill building combined with education improves and maintains toothbrushing skills

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Report on the Learning Effect in School Children Following Toothbrushing Instruction by Students	Stapf	1975	Germany	Unknown	Following education on caries and periodontal disease prevention, oral hygiene practices are positively affected
Oral Hygiene Performance of Elementary School Children Following Dental Health Education	Podshadley and Shannon	1970	U.S.A.		Comprehensive programs are necessary to teach the importance of and means to achieve good oral hygiene
The Effectiveness of Two Educational Programs in Changing the Performance of Oral Hygiene by Elementary School Children	Podshadley and Schweikle	1970	U.S.A.		Single lecture-designed oral health education programs are ineffective in children

Introduction

For over 100 years, Colgate-Palmolive has been committed to providing oral health education to populations worldwide, and reaching children in the schools has always been the cornerstone of that effort.

*Bright Smiles, Bright Futures*, developed by Colgate-Palmolive in cooperation with an Oral Health Improvement Advisory Board comprised of early childhood and health educators, dental professionals and multi-cultural experts, is a comprehensive, self-esteem-based, cross-curricular educational program, designed to implement preventive oral health concepts at both the elementary and pre-school levels within the context of a school's existing curriculum.

The first grade curriculum and materials, for children ages 6-8 years, were developed in partnership with the Laboratory for Health Promotion, Research and Development, and the Department of Health Education at the University of Maryland, College Park, Maryland (U.S.A.); the pre-school syllabus and materials were developed in conjunction with the United States Head Start Bureau and the Department of Health and Human Services. In 1993, in support of the World Health Organization's objective to affect an overall decline in the prevalence of dental disease in children globally by the year 2000, a third grade program was added to the scope and sequence of *Bright Smiles, Bright Futures*. The development team for this program level included a worldwide advisory board of educators, health and educational policy makers and dental professionals.

The primary goal of the *Bright Smiles, Bright Futures* program is to develop the knowledge and behavior of children, to empower them to take control of their own oral health, and provide skills which they

can then carry through adolescence and adulthood. The fundamental oral health concepts include the importance of brushing at least twice a day with a fluoride toothpaste (flossing is addressed in the curriculum for older children), regular visits to the dental professional, and limiting the frequency of sweet and sticky snacks. Secondary oral health concepts include an understanding of the plaque acid reaction, the importance of dental sealants, fluoride, safety and protection of the mouth, and timely replacement of toothbrushes.

*Bright Smiles, Bright Futures* is currently being used in more than 50 countries worldwide. By the year 2000 the Colgate-Palmolive Company plans to execute the program in the seventy countries in which it operates, reaching over 50 million children and their families each year.

In the United States and throughout the world, Colgate partners with dental schools, dental health and educational opinion leaders on regional, state and local levels, government agencies, Ministries of Education and Health, and outreach programs to achieve support and recognition of the *Bright Smiles, Bright Futures* curriculum. Community-based programs in various countries include mobile clinics staffed by volunteer professionals offering free screenings and treatment in key target areas and at cultural events. *Bright Smiles, Bright Futures*, therefore, effectively reaches out to children and their families on three levels — through schools, through the dental professional, and throughout the community.

For relevancy and ease of implementation, the program materials are translated and adapted for the cultures in which they are used. Currently, there are two versions of the Teacher's Guide, including one for developed nations using an integrated

curriculum and one for developing nations using a more unit-based approach, with a custom-designed version for countries with specific challenges in educational structure and classroom size. In all cases, the program's activities are created in harmony with a country's available audio and video resources.

Program Evaluation

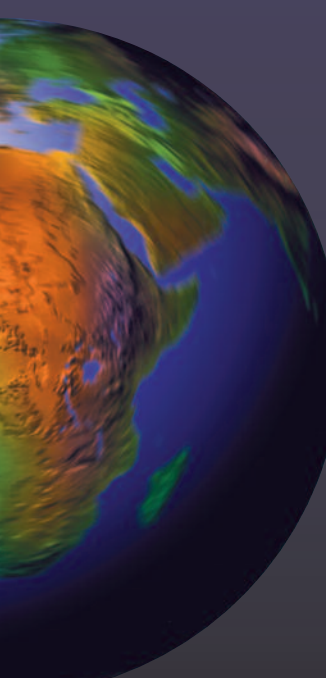
The effectiveness of the *Bright Smiles, Bright Futures* curriculum was evaluated in 1992 at the University of Maryland Laboratory for Health Promotion, Research and Development, and the efficacy study was conducted in Washington, D.C. to determine what student outcome changes, if any, were associated with the curriculum when implemented under controlled conditions. Among the key findings of the efficacy study:

1. Students who were exposed to the *Bright Smiles, Bright Futures* curriculum had significantly more knowledge about the importance of healthy oral structures and preventive measures than students in the control group.
2. Students exposed to the *Bright Smiles, Bright Futures* curriculum had significantly more knowledge about food and drinks which are good for their teeth, and more knowledge about safe oral behaviors than students in the control group.
3. Students exposed to the *Bright Smiles, Bright Futures* curriculum reported more frequent visits to the dentist, more frequent daily toothbrushing habits, and exhibited greater proficiency in toothbrushing skills compared to students in the control group.

Implementation studies were conducted in Oakland, California (U.S.A.) and Philadelphia, Pennsylvania (U.S.A.) to assess the use of the *Bright Smiles, Bright Futures* curriculum under normal teaching conditions. Levels of teacher and principal (administrator) satisfaction, as well as student receptivity and family involvement were assessed. Among the key findings of the implementation studies:

1. All teachers reported that the *Bright Smiles, Bright Futures* curriculum provided high-quality, multi-cultural materials, previously unavailable in their school districts.
2. The *Bright Smiles, Bright Futures* curriculum was considered by teachers to be more comprehensive than other health materials with which they were familiar.
3. The *Bright Smiles, Bright Futures* curriculum complemented existing oral health programs provided by the school district, allowing teachers to elaborate on and reinforce major oral health issues.
4. Because the *Bright Smiles, Bright Futures* curriculum was easily integrated into the curricula of other subjects, teachers were able to devote one to two hours per week to oral health instruction -- traditionally a "low priority" subject.
5. Family members believed the *Bright Smiles, Bright Futures* program to be an important adjunct to their children's school curriculum, and liked the fact that the program taught students to accept responsibility for their own oral health.

Students who were exposed to the *Bright Smiles, Bright Futures* curriculum had significantly more knowledge about the importance of healthy oral structures and preventive measures than students in the control group.



Additionally, students could accurately describe the specific actions they could take to protect their teeth and gums.

Principals of schools in which *Bright Smiles, Bright Futures* was implemented reported that teachers and students were satisfied that the program fully met their needs for a comprehensive school-based oral health education program, adding that family involvement was an important factor in the curriculum. Further, student outcomes, receptivity and reactions to the program were evaluated. Among the key findings of the evaluation:

1. The most profound change in students' oral health knowledge, attitudes and behaviors after experiencing the *Bright Smiles, Bright Futures* curriculum was a shift in focus from dental disease and the outcomes of poor oral health, to a greater emphasis on the importance of prevention. Additionally, students could accurately describe the specific actions they could take to protect their teeth and gums.
2. Following implementation of the *Bright Smiles, Bright Futures* program, students had an expanded vocabulary with which to describe oral health issues, and could accurately describe the natural processes of tooth development and loss.
3. Students participating in the *Bright Smiles, Bright Futures* program enjoyed learning about their teeth and mouth, were able to identify with the program's characters, and associate the program's oral health activities with their own behaviors and those of their families.
4. Students who partook in the *Bright Smiles, Bright Futures* program retained all elements of the program components.

## Program Implementation

*Bright Smiles, Bright Futures* is divided into three grade levels with developmentally appropriate materials and concepts for each level (program availability varies for each country):

- A pre-school program for children who are learning and refining their basic oral health behaviors, such as brushing;
- A first grade program with a focus on the loss of baby teeth; and
- A third grade program for children including more refined motor skills, such as flossing.

Each level consists of a kit which becomes a permanent addition to the classroom. The basic components of each kit includes:

- A comprehensive teacher's guide with program goals and objectives;
- An oral health background section;
- Curriculum-based lessons;
- Developmentally appropriate classroom activities;
- Reproducible masters for in-class and take-home use; and
- Family involvement activities.

Classroom materials contained in the kit vary with each grade level and include:

- Engaging four-color resources such as literacy-based storybooks and wall posters;
- Educational videos;



- Audio cassettes with oral health songs in a variety of cultural music styles;
- Take-home toothbrushing charts;
- Parent education literature;
- Wall calendars; and
- Glow-in-the-dark light switch stickers that remind children to "Brush Before Bedtime" (Pre-schooler resource).

## Bright Smiles, Bright Futures Worldwide

*Bright Smiles, Bright Futures* is a worldwide collaborative effort with government, dental organizations, institutions and communities to reduce the prevalence of oral disease among children. The program has evolved in different directions in different countries, determined, to a large degree, by cultural and social dictates, governmental regulations, and staff available to initiate and execute the project. The global effort, viewed

in the aggregate, has proven to be of unquestionable value. A series of examples follows.

### Poland

Colgate-Palmolive began a major professional initiative, including ads in



professional publications, sponsorship of various civic activities and mailings of consumer and professional leaflets to increase the awareness of *Bright Smiles, Bright Futures* among the 10,000 members of the Polish

*Bright Smiles, Bright Futures* is a worldwide collaborative effort with government, dental organizations, institutions and communities to reduce the prevalence of oral disease among children.

Children bring the *Bright Smiles, Bright Futures* materials into their homes to educate and motivate the entire family.

Dental Association and the 10,000 non-member dentists in that country. Additionally, a seminar on *Bright Smiles, Bright Futures* was developed and presented to the Polish Dental Association, and an exhibition was held at the Central European Dental Exhibition.

Finally, a comprehensive educational program called the "Colgate Club," targeted to over a million children, was initiated to teach oral hygiene skills, develop good oral hygiene habits and familiarize children and their parents with effective oral hygiene products.



One of the main strategies includes the development of a family program to help increase oral health awareness and improve oral hygiene activities throughout the country. Colgate educates dentists to motivate teachers, who in turn promote family participation through the children. Activities developed at school are created specifically to involve parents.

The take-home materials support these important objectives. In addition to materials such as the brushing chart and activity book, each child receives a kit containing toothbrushes for the family and a family-size tube of toothpaste, along with a letter for their parents. Children bring the *Bright Smiles, Bright Futures* materials into their homes to educate and motivate the entire family.

Oral Health & Prevention in Childhood. The endorsements have been printed on the back of the teacher's manual and storybook, adding credibility among the teachers and dental professionals who use the *Bright Smiles, Bright Futures* program.

### South Africa

C-P-South Africa has a long history of educating children in oral hygiene. They are currently reaching over 1.5 million children annually with *Bright Smiles, Bright Futures*,

still others with the *Bright Smiles, Bright Futures* educational materials.

However, C-P-South Africa's professionals realized that geographical constraints would make it impossible to reach all of the targeted areas by van, so they use a "health train" designed to bring health care outreach across the country. Dental treatment is performed by students from various universities throughout South Africa. In 1995, the train covered over 5,000 kilometers, reaching over 7,000 children in 7 rural provinces.



and the video, "The Incredible Ride," has been recently translated into five local African languages beyond English. In many territories of South Africa, a mobile van will visit an individual school and conduct several oral health activities simultaneously. Traveling dental professionals and dental students will treat some children in the van, screen other children in classrooms, and teach

### China

China is a market which has tremendous oral health education potential, with some 10-20% of the urban population and 50-60% of the rural population not practicing adequate oral hygiene. C-P-China has established an agreement with the Ministry of Education to incorporate *Bright Smiles,*

In many territories of South Africa, a mobile van will visit an individual school and conduct several oral health activities simultaneously.



### Argentina

*Bright Smiles, Bright Futures* is the only school-based oral health education program currently in Argentina. *Bright Smiles, Bright Futures* was launched in Argentina in September, 1995 and is currently reaching over one-million children per year. With this impressive reach, Colgate-Palmolive (C-P)-Argentina expects to educate over four-million children with *Bright Smiles, Bright Futures* by the year 2000.

### Portugal

C-P-Portugal's *Bright Smiles, Bright Futures* program, which was launched in 1995 and reaches 200,000 children each year, has received professional endorsements from six prestigious organizations, including the Professional Association of Dental Medicine, the Portuguese Academy of Oral Medicine, the Portuguese Association of Dental Hygienists, and the Portuguese Society of

The National Education Committee of China (NEC) has endorsed the *Bright Smiles, Bright Futures* school materials, which reached more than 4.5 million children.



China's health education program. To make the program more relevant to the people of China, the *Bright Smiles, Bright Futures* materials were adapted to fit China's very traditional educational system. A flip chart was developed that can be used in classrooms with limited resources. The National Education Committee of China (NEC) has endorsed the *Bright Smiles, Bright Futures*

school materials, which reached more than 4.5 million children.

C-P-China revised the take-home materials to expand the program's reach and be more culturally relevant. For example, they modified the brushing chart to include members of a typical Chinese family: a mother, a father, and one child. The family brushing chart helps to motivate total family-oriented oral care.

### India

C-P-India has offered dental education to children for over 20 years in a strong alliance with the Indian Dental Association. Until recently, these initiatives have been concentrated in urban areas. However, with some 73% of Indians living in rural areas, there is a very high potential in these regions for effective oral care education.

The challenge for C-P-India was that there was no usable infrastructure — few electrical



resources and mailing addresses were available to reach the schools and let them know that the *Bright Smiles, Bright Futures* program was accessible. C-P-India resolved this problem by building upon the success of its existing van program initiative and resources to reach children in rural schools.



India has adapted the original *Bright Smiles, Bright Futures* syllabus to the needs of rural schools to extend the program's reach. Specifically, C-P-India modified the brushing chart to add family member icons to encourage all members of the family to brush. Through this rural oral health initiative that focuses on young children, and by using improved communications materials including a parent leaflet, C-P-India was able to increase its penetration into the country.

### A Continuing Global Commitment to Oral Health

The *Bright Smiles, Bright Futures* program is a noteworthy example of the Colgate-Palmolive commitment to optimal oral health. To date, millions of children and their families worldwide have benefitted from the program's unique teaching curriculum, and, with the endorsement of national health ministries, educators, dental institutions and non-government agencies, millions more will benefit by the end of the millennium.

The fact that *Bright Smiles, Bright Futures* has increased knowledge and awareness of oral health is unquestionable. Colgate-Palmolive then chose to take the evaluation of the program to the next plane — to determine if such knowledge can effectively translate to improved oral health status. In the next section, a study is described which first confirms the adaptability of the *Bright Smiles, Bright Futures* syllabus to children of a developing nation, then demonstrates clinically the measurable impact the program has had on the oral health of these children.

The *Bright Smiles, Bright Futures* program is a noteworthy example of the Colgate-Palmolive commitment to optimal oral health.



## CHAPTER 3

# Clinical Efficacy of a Sequential School-based Oral Health Curriculum Among Third Grade School Children in India

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### Introduction

Studies have shown that oral health education is far more effective when the theme is prevention-oriented rather than disease-oriented. Healthy teeth and gums contribute in many ways to overall physical health, self-esteem, language development, social development and self-confidence. The aim of the *Bright Smiles, Bright Futures* program is to educate children and their families about the importance of oral health and to prevent problems before they occur. It highlights the four prime messages about oral health — brush thoroughly twice a day, use a fluoride toothpaste, limit frequent snacking, and see a dental professional regularly — which reinforces the KAP theory — Knowledge and Attitude affect Practice, a theory that is particularly relevant for children. The *Bright Smiles, Bright Futures* program incorporates a variety of materials designed to teach oral health while encouraging age-appropriate learning such as reading, math and science.

### Objective

*Bright Smiles, Bright Futures*, developed jointly by Colgate-Palmolive in cooperation with an Oral Health Improvement Advisory Board comprised of early childhood and health educators, dental professionals and multi-cultural experts, is a comprehensive, self-esteem based, cross-curricular educational program, designed to implement preventive oral health concepts at both the elementary and pre-school levels within the context of a school's existing curriculum. The overall goal of the program is to provide a sequential school-based oral health curriculum that is sensitive to the needs, interests and cultural values of students at high risk for oral health problems. More specifically, the program seeks to:

- Improve oral health knowledge and oral health status of these high risk students;
- Affect high risk students' attitudes toward self-esteem and normal health preventive care by encouraging them to accept personal responsibility for such activities, by maintaining a healthy body, and appreciating and accepting the roles of others in helping them to achieve these ends; and
- Positively influence high risk students' health habits by teaching effective risk evaluation and decision-making skills, providing opportunities to promote and maintain personal health and encouraging adaptation to various social situations.

The objective of this study was to determine if the *Bright Smiles, Bright Futures* program, modified for a developing nation and implemented to school-age children, could increase oral health knowledge and improve oral hygiene, and if such improvements could achieve a measurable clinical impact when compared to children of the same grade who did not benefit from a similar curriculum.

### Methodology

#### Site Selection

Following an in-depth analysis of developing nations, India was chosen as the country in which the study was to be performed. National epidemiological surveys and oral care needs assessments suggested that the high rate of caries and periodontal disease, increased rates of pre-cancerous and cancerous lesions, and apparent lack of familiarity with dental needs

among the country's population made India an ideal site for preventive dental initiatives.

School selection was made on the basis of student population, allowing investigators to examine large, well-balanced groups within a single location. Proximity to the city for ease of commute by the examiners, and cooperation from school administrators and staff who were cognizant of the need for preventive oral health education were additional criteria for school selection.

### Preliminary Undertakings

Once a decision was reached to evaluate the effectiveness of the *Bright Smiles, Bright Futures* program in India, and once the two principal investigators were retained and dental team set in place, the principals met with administrators, teachers and other school personnel to gain complete support for the program. Having achieved such support, the existing *Bright Smiles, Bright Futures* curriculum was evaluated to determine its appropriateness for use in a school program in this country. Changes were subsequently made throughout the program to reflect the nation's unique socio-economic, health and dietary profile. Additionally, scoring and evaluation forms were modified in conformity to the school's oral health curriculum. Prior to the initiation of *Bright Smiles, Bright Futures*, all participating teachers were given thorough training on the objectives of the program, and the sequential utilization of all resources.

### Study Group Demographics

Eight third grade classes at the Padmakan Dhamdhare English Medium Primary School, situated on the campus of

the King George School, were selected to participate in this eight-week study. Students at the school represent a diverse socio-economic group.

Four classes were selected as the experimental group and four classes were chosen as the control group. Classes were comprised of both boys and girls, ranging in age from 7 to 9 years. A total of 566 students participated in the study. Students in the experimental group participated in the *Bright Smiles, Bright Futures* program during the eight-week test period, while students in the control group did not.

### Plaque Assessments

A team, consisting of two dental examiners, two dental assistants and a dental hygienist were responsible for the scoring, recording and instrument sterilization and



The objective of the study was to determine if the *Bright Smiles, Bright Futures* program, modified for a developing nation ... could achieve a measurable clinical impact

National epidemiological surveys and oral care needs assessments suggested that...India would be an ideal site for preventive dental initiatives

related tasks, respectively. The children participating in the study arrived at the dental clinic according to their class roll number. The examiners were blinded as to the student names or classes from which they came. All examinations took place during regular school hours.

After being seated, the children's DMF (diseased, missing, filled teeth) scores were documented for the purpose of assessing long-term effects of improved brushing habits in a future study. A disclosing solution was then applied with a cotton pellet in a locking plier, and the children were asked to rinse with water prior to plaque scoring. The Navy Plaque Index, as modified by Rustogi (Rustogi *et al.*, 1992), using a range from 0 (no plaque) to 5 (severe plaque), was used for scoring purposes. At the conclusion of the eight-week study period, plaque was re-assessed by the same dental examiners using the same scoring methodology. The DMF was not scored at this time.



### Knowledge Testing and Student Interviews

In addition to the clinical scoring procedures, pre- and post-tests were given to eight representative students (one student from each of the four classes in the experimental group, and one student from each of the four classes in the control group) to measure knowledge of dental health at the beginning and end of the eight-week test period. Additionally, student interviews were conducted among representatives from both the experimental and control groups, and verbatim responses were recorded and analyzed.

### Parent and Teacher Evaluations

At the conclusion of the 8-week study period, teachers participating in the administration of the *Bright Smiles, Bright Futures* program were asked to evaluate the effectiveness of the syllabus in their classrooms via a detailed questionnaire. Thirty-three parents, chosen at random, were similarly asked to complete a questionnaire to elicit their opinions and knowledge of the study and whether any change in their children's oral hygiene or dietary habits was

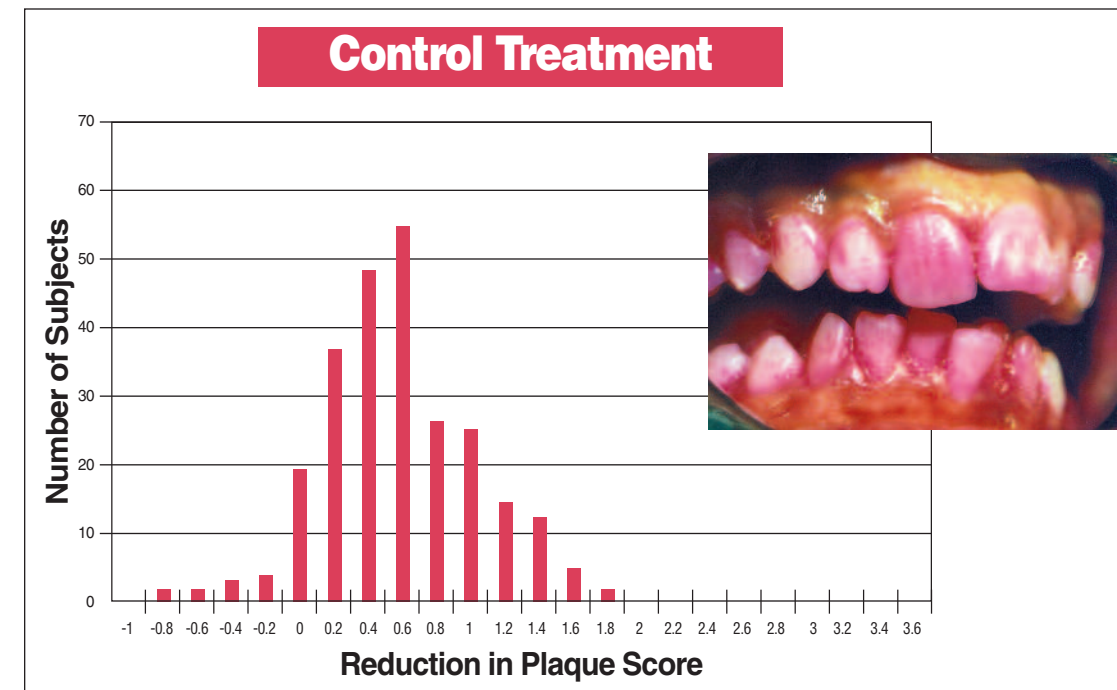
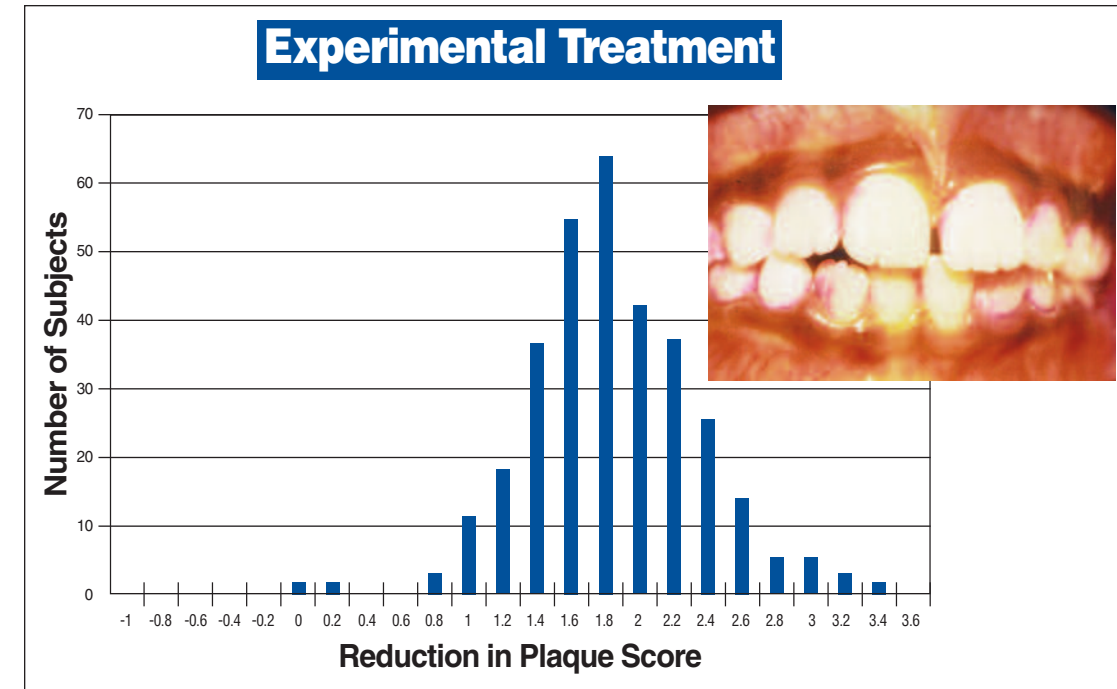
noted. An open discussion with the two principal investigators ensued following completion of the questionnaire.

### Results

#### Plaque Assessments

An analysis of plaque data was conducted to determine any changes in scores between the experimental and control groups, and a t-test was used to determine the significance, if any, of those changes.

As depicted in the bar charts on the following page, the average change in plaque scores for the experimental group was 1.74 as compared to an average change in plaque



scores of 0.49 for the control group. The difference in average plaque scores between the experimental and control groups was found to be highly significant ( $p < 0.0001$ ), demonstrating that the incorporation of the

*Bright Smiles, Bright Futures* syllabus into the existing curriculum had a significant impact on the students' oral health. Plaque reductions are further depicted graphically and in clinical photographs.

The incorporation of *Bright Smiles, Bright Futures*...had a significant impact on the students' oral health

## Knowledge Testing and Student Interviews

Students in the experimental group answered all interviewers' questions more



effectively during the post-test session vs. the pre-test session, suggesting an improved knowledge and greater familiarity with oral health matters. An analysis of the interview tapes revealed that students answered nearly all questions correctly, requiring very little prompting. Further, many of the answers were found to be quite insightful.

In contrast, among students in the control group, no appreciable change was found between responses to the pre- and post-test interview questions. In lieu of heavy prompting, few questions were answered correctly and the students seemed tentative in their responses. Though the students exhibited some degree of knowledge about the basic elements of oral health, such as brushing twice daily and the importance of regular visits to the dentist, they were unable to define plaque, flossing or other key oral health terms, and could not effectively articulate the importance nor were knowledgeable about proper brushing technique or dental safety issues.

Seventy-eight percent of parents noticed a dramatic change in their children's dental health habits

## Parent and Teacher Evaluations

Overall impressions culled from both the questionnaires and interviews suggest that the parents were concerned about the oral health of their children, and most were enthusiastic about their children's participation in the *Bright Smiles, Bright Futures* program, asking when the syllabus would be made available to all students. Seventy-eight percent of parents noticed a dramatic change in their children's dental health habits. The following is a partial list of some of the parents' observations during the term of the program:

- Children now brush when they return from school.
- Parents no longer have to ask their children to brush.
- Children who participated in the *Bright Smiles, Bright Futures* program got their siblings to brush as well.
- Children enjoyed tracking their brushing habits by using the brushing chart and requested more charts. Some of the children suggested that parents track their own brushing habits on the chart.

Written and verbal responses from teachers revealed that students participating in the *Bright Smiles, Bright Futures* curriculum had become more alert to the importance of keeping their teeth clean through regular brushing. They also felt that proper guidance is an essential element in maintaining oral health knowledge and behavior.

In general, teachers found that the students were enthusiastic in class during the *Bright Smiles, Bright Futures* sessions, displaying enthusiasm about their knowledge when questions were asked of them.

The inclusion of color in the program's artwork and the addition of the educational film demonstrating proper toothbrushing technique enhanced the curriculum. They reported that the puzzle book and brushing

calendar were very popular among the students. Those elements, plus the videotape and storybook, were routinely utilized by all teachers; three of the four teachers used the poster.

## Summary and Conclusions

This study was designed to determine if a sequential, school-based oral health education program could be modified for developing nations, and whether a clinical effect could be obtained through the incorporation of such a program into a school's existing curriculum. Based on the results of the study, the following conclusions could be drawn:

- The *Bright Smiles, Bright Futures* curriculum, originally implemented in a developed nation, could be successfully modified to meet the needs of a developing nation.
- The dissemination of important oral health knowledge to students, and subsequently filtered down to parents and siblings, provides a cost-effective mechanism for improving oral care behaviors which could lead to a reduced incidence of dental disease; an important finding for developing nations where prevention is the best solution to the problems of large remote populations, often in a poor economic climate and with minimal professional care.
- *Bright Smiles, Bright Futures* significantly increased the awareness of oral health, and was instrumental in improving children's personal oral hygiene and self-esteem.
- Participation in the *Bright Smiles, Bright Futures* program resulted in improved oral hygiene practices, and a statistically significant improvement in dental plaque scores when compared to children who did not participate in the syllabus.
- Children participating in the *Bright Smiles, Bright Futures* program tested higher in oral health knowledge and practiced better preventive measures than those children who did not benefit from the *Bright Smiles, Bright Futures* curriculum, attesting to the value of the program's resources.

The *Bright Smiles, Bright Futures* curriculum ... could be successfully modified to meet the needs of a developing nation

Nearly three decades of scientific evidence clearly support the effectiveness of and need for community- and school-based oral health education initiatives (Tables I and II). Such efforts are of the greatest benefit to children around the world who, through limited access to professional services, poor diet and lack of knowledge about dental care are most susceptible to oral disease.

The *Bright Smiles, Bright Futures* program is a noteworthy example of Colgate-Palmolive's commitment to optimal oral health. To date, millions of children and their families worldwide have benefitted from the program's unique teaching curriculum and, with the endorsement of national health ministries, educators, dental institutions and non-government agencies, millions more will benefit by the end of the millennium. Independent research and program evaluations of *Bright Smiles, Bright Futures* have demonstrated that:

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Students who were exposed to the <i>Bright Smiles, Bright Futures</i> curriculum had significantly more knowledge about the importance of healthy oral structures and preventive measures than students in the control group.</li> <li>• Students exposed to the <i>Bright Smiles, Bright Futures</i> curriculum had significantly more knowledge about food and drinks which are good for their teeth, and more knowledge about safe oral behaviors than students in the control group.</li> <li>• Students exposed to the <i>Bright Smiles, Bright Futures</i> curriculum reported more frequent visits to the dentist, more frequent daily toothbrushing habits, and exhibited greater proficiency in toothbrushing skills compared to students in the control group.</li> <li>• All teachers reported that the <i>Bright Smiles, Bright Futures</i> curriculum provided high-quality, multi-cultural materials, previously unavailable in their school districts.</li> <li>• The <i>Bright Smiles, Bright Futures</i> curriculum was considered by teachers to be more comprehensive than other</li> </ul> | <p>health materials with which they were familiar.</p> <ul style="list-style-type: none"> <li>• The <i>Bright Smiles, Bright Futures</i> curriculum complemented existing oral health programs provided by the school district, allowing teachers to elaborate on and reinforce major oral health issues.</li> <li>• Because the <i>Bright Smiles, Bright Futures</i> curriculum was easily integrated into the curricula of other subjects, teachers were able to devote one to two hours per week to oral health instruction — traditionally a “low priority” subject.</li> <li>• Family members believed the <i>Bright Smiles, Bright Futures</i> program to be an important adjunct to their children's school curriculum, and liked the fact that the program taught students to accept responsibility for their own oral health.</li> <li>• The most profound change in students' oral health knowledge, attitudes and behaviors after experiencing the <i>Bright Smiles, Bright Futures</i> curriculum was a shift in focus from dental disease and the outcomes of poor oral health to a greater emphasis on the importance of prevention.</li> </ul> |
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- Additionally, students could accurately describe the specific actions they could take to protect their teeth and gums.
- Following implementation of the *Bright Smiles, Bright Futures* program, students had an expanded vocabulary with which to describe oral health issues and could accurately describe the natural processes of tooth development and loss.

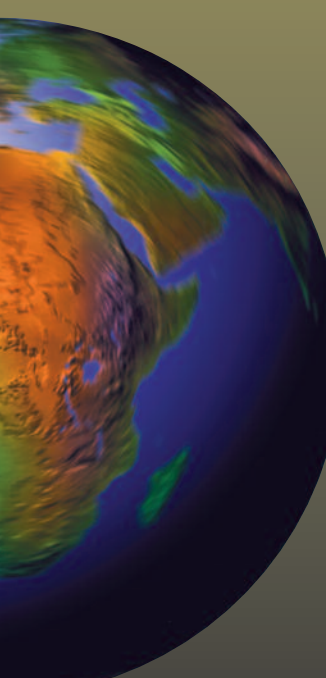
- Students participating in the *Bright Smiles, Bright Futures* program enjoyed learning about their teeth and mouth, were able to identify with the program's characters and associate the program's oral health activities with their own behaviors and those of their families.
- Students who partook in the *Bright Smiles, Bright Futures* program retained all elements of the program components.

A clinical study among school-age children in India was undertaken to determine if the *Bright Smiles, Bright Futures* curriculum could be effectively implemented in a developing nation, and if successful, whether this oral health education initiative could achieve a clinical benefit among program participants. The results of the study are as follows:

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• The <i>Bright Smiles, Bright Futures</i> curriculum, originally implemented in a developed nation, could be successfully modified to meet the needs of a developing nation.</li> <li>• The dissemination of important oral health knowledge to students, and subsequently filtered down to parents and siblings, provides a cost-effective mechanism for improving oral care behaviors which could lead to a reduced incidence of dental disease; an important finding for developing nations where prevention is the best solution to the problems of large remote populations, often in a poor economic climate and with minimal professional care.</li> <li>• <i>Bright Smiles, Bright Futures</i> significantly increased the awareness of oral</li> </ul> | <p>health, and was instrumental in improving children's personal oral hygiene and self-esteem.</p> <ul style="list-style-type: none"> <li>• Participation in the <i>Bright Smiles, Bright Futures</i> program resulted in improved oral hygiene practices, and a statistically significant improvement in dental plaque scores when compared to children who did not participate in the syllabus.</li> <li>• Children participating in the <i>Bright Smiles, Bright Futures</i> program tested higher in oral health knowledge and practiced better preventive measures than those children who did not benefit from the <i>Bright Smiles, Bright Futures</i> curriculum, attesting to the value of the program's resources.</li> </ul> |
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*Bright Smiles, Bright Futures* is currently being used in more than 50 countries worldwide. By the year 2000, the Colgate-Palmolive Company plans to execute the program in the seventy countries in which it operates, reaching over 50 million children and their families each year. For many of the world's children, *Bright Smiles, Bright Futures* will be their first opportunity to learn about the importance of oral care, and experience has shown that such an opportunity will help to ensure a lifetime of optimal oral health.

For many of the world's children, *Bright Smiles, Bright Futures* will be their first opportunity to learn about the importance of oral care



**Table I**  
**Historical Research Perspective Demonstrating the Efficacy of Oral Health Education Interventions Among Various Global Populations**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Implementation of a Community Oral Health Programme in Cimareme, Bandung	Hartono <i>et al.</i>	1997	Indonesia	NA	Health personnel can be motivated to promote community-wide oral health during daily routines
Statistical Results on Oral Hygiene Motivation on Brazilian Adolescents	Saba-Chujfi <i>et al.</i>	1997	Brazil	Adolescence	Oral health motivation affects a reduction in bacterial plaque levels
A Meta-analysis of the Effectiveness of Dental Health Education	Lee <i>et al.</i>	1997	U.K.	Various	Oral health education and promotion interventions are effective in improving plaque levels and gingivitis
Hispanic Youths' Knowledge of Oral Cancer Risk Factors	Canto <i>et al.</i>	1997	U.S.A.	Adolescence	Education on the risk factors for oral cancer is associated with non-tobacco and non-alcohol use
Changes in Untreated Caries in Oakland, California, 1992-1994	Lovett <i>et al.</i>	1997	U.S.A.	Early Childhood	Children exposed to a school-based oral hygiene and nutrition education program experience significant declines in caries rates
Impact of Oral Health Services in the Kruger National Park - A Periodontal Perspective	Volschenk <i>et al.</i>	1997	South Africa	Adult	Oral health programs which focus on curative vs. preventive aspects of disease have a marginal impact on oral health status
Assessment of a Community's Oral Health Status	Elias <i>et al.</i>	1997	Puerto Rico	Various	Levels of dental disease dictate a need for primary prevention programs, such as education

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Perceptions of South Asian Adults in London on Oral Cancer	Shetty <i>et al.</i>	1997	U.K.	Various	Improved oral health education and promotion activities are needed for individuals at high risk for oral cancer
Prevention of Early Childhood Caries - A Fluoride Toothpaste Demonstration Trial on Chinese Children	Schwartz <i>et al.</i>	1996	Hong Kong	Early Childhood	An organized daily school-based toothbrushing intervention combined with health education slows caries development among children in kindergarten
Smokeless Tobacco Education Efficacy Among Sixth, Seventh and Eighth Graders	Mathias <i>et al.</i>	1996	U.S.A.	Adolescence	Educational intervention is effective in increasing awareness of the health hazards of smokeless tobacco, though earlier intervention is suggested for prevention
Community Oral Health Promotion Activities in Hiraizumi, Japan	Kawaguchi <i>et al.</i>	1994	Japan	Early	Oral health promotion activities are effective in improving the oral health of children
Ethnic Differences in Health Self-efficacy and Awareness	Kiyak <i>et al.</i>	1994	U.S.A.		When access to dental care is limited, education and empowerment programs can assist the elderly in improved awareness of oral disease and prevention
Evaluation of Repeated Periodontal Health Care Activities for Industrial Workers	Morita <i>et al.</i>	1994	Japan		Serial oral health education and prevention intervention improve periodontal health

**Table I - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Dental Caries Treatment Patterns of Hispanic First Grade Students in Oakland, California	Lovett <i>et al.</i>	1994	U.S.A.	Childhood	A significantly lower caries-free rate among minority children suggests a strong need for early interventions
An Evaluation of a School-based Comprehensive Public Oral Health Care Programme	Lallo and Solanki	1994	South Africa	Childhood	A school-based oral health program is effective in reducing the prevalence of caries
Does Dental Health Education Affect Inequalities in Dental Health	Schou and Wight	1994	U.K.	Childhood	A comprehensive school-based oral health education program is significantly effective in reducing plaque and improving gingival health
Psychosocial Factors Influencing Smokeless Tobacco Use by Teenage Military Dependents	Lee <i>et al.</i>	1994	U.S.A.		Training and education can be effective in reducing smokeless tobacco use
Spit Tobacco Cessation Among College Athletes: Results After 1 Year	Walsh <i>et al.</i>	1994	U.S.A.		Education and training interventions are effective in promoting smokeless tobacco cessation
Effect of Two Preventive Programs on Oral Health Knowledge and Habits Among Brazilian Schoolchildren	Buischi <i>et al.</i>	1994	Brazil		Comprehensive oral health education results in improved dental knowledge and dental behaviors
Validity of a Caries Risk Screening Method Used in Quebec	Veilleux <i>et al.</i>	1993	Canada		High caries-risk children will benefit from preventive intervention
Geriatric Oral Health Promotion	Dolan <i>et al.</i>	1993	U.S.A.		A high correlation exists between oral health-related knowledge, positive attitudes toward oral health and increased use of dental services

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
A Targeted Approach Toward Smokeless Tobacco Cessation	Wisniewski <i>et al.</i>	1993	U.S.A.	Adult	Targeted education is meaningful and encourages cessation of smokeless tobacco use
A Dental Health Education Programme, Including Home Visits, for Nursery School Children	Rayner	1992	Scotland	Childhood	Oral health education is enhanced for children when parents are involved in the experience
Dental Locus of Control in Elderly: Oral Health Promotion Effects	Saxe <i>et al.</i>	1992	U.S.A.	Elderly	Oral health training can positively influence a person's sense of responsibility for oral health
Four Years' Follow-up Results After a Dental Preventive Program in Children Aged 4-8 Years	Parodi and Garcia	1991	Argentina	Childhood	A preventive strategy which includes oral health education is reliable for controlling dental disease
The Role of Instruction and a Brushing Device on the Oral Hygiene of Blind Children	Cohen <i>et al.</i>	1991	Israel	Adolescence	An integrated approach to teaching dental hygiene skills is beneficial
Methods of Health Promotion for Independent Elderly	Kiyak and Grayston	1991	U.S.A.	Elderly	Active learning and reinforcement of behavior change impact positively on oral health self-care, inquisitiveness and oral status
A Community Program for the Prevention of Periodontal Disease	Morita <i>et al.</i>	1991	Japan	Adult	Oral health education, as an element of a community-based preventive program, is effective in the prevention of periodontal disease
Evaluation of Information on Dental Health Care at Child Health Centers	Kinnby <i>et al.</i>	1991	Sweden	Childhood	In oral health education programs, it is essential for participants to realize the importance of the information presented

**Table I - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Deprivation and Dental Health. The Benefits of a Child Dental Health Campaign in Relation to Deprivation as Estimated by the Uptake of Free Meals at School	Schou <i>et al.</i>	1991	Scotland	Childhood	Dental health education produces a significant increase in knowledge of diet and dental health, resulting in a decrease in the intake of cariogenic foods and an increase in toothbrushing frequency
Assessing the Effectiveness of a Preventive Dental Program	Seibert <i>et al.</i>	1990	U.S.A.	Childhood through Elderly	Preventive oral health strategies involving patient motivation results in long-term positive health practices
The Development of a Toothbrushing Programme at a School for Children with Moderate to Severe Learning Difficulties	Lunn and Williams	1990	U.K.	Early Childhood through Adolescence	An oral hygiene education and skills program improves and maintains oral health
Oral Health Education and Promotion in Maternal and Child Health: A Position Paper	Frazier and Horowitz	1990	U.S.A.	Childhood	Education designed to empower as well as inform, and which shares decision making among community members and health professions is most appropriate
A Dental Health Education Program for Nursery School Children	Rayner	1989	U.K.	Early Childhood	Oral health education directed toward parents of young children improves children's oral hygiene practices and oral health
School-based Preventive Regimens and Oral Health Knowledge and Practices of Sixth Graders	Russell <i>et al.</i>	1989	U.S.A.	Adolescence	For education to be effective, it must be accurate and provide reinforcement for positive oral health behaviors

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
The Effect of a Nutrition Education Program on Adolescents' Knowledge, Beliefs and Attitudes	Hølund	1989	Denmark	Adolescence	Learning through teaching via a school-based nutrition education program is effective in influencing and maintaining positive attitudes toward healthy foods as a means of caries prevention
Effects of Knowledge and Behaviour of Pre-school Children of Oral Health	Janković <i>et al.</i>	1989	Yugoslavia	Childhood	Dental health education and prevention positively affect dental health
Oral Health Knowledge and Attitudes of Elementary Schoolteachers in Michigan	Lang <i>et al.</i>	1989	U.S.A.	Various	Increasing oral health knowledge among teachers provides the chance to educate those who can positively impact on children
Evaluation of the Effectiveness of the Toronto Dental Education Programme	Otchere <i>et al.</i>	1988	Canada	Childhood	A school-based oral health education program significantly improves oral health knowledge
Effectiveness of Dental Health Educational Programs in Schools	Flanders	1987	U.S.A.	Childhood through Adolescence	An effort should be made to make children more aware of preventive programs which can be of benefit to them
Evaluating a Private Dental Practice Behavioral Fear Control Program	Kroeger and Smith	1987	U.S.A.	Unknown	An auxiliary-based, technology-assisted training program is effective in reducing dental fears
Evaluation of a Dental Health Program for Insulin-Dependent Diabetics	Warren <i>et al.</i>	1987	U.S.A.	Unknown	An oral health education program for diabetic patients results in a significant improvement in oral health status

**Table I - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
An Educational Approach to Improving Acceptance of Dentures by Geriatric Patients	Loupe <i>et al.</i>	1987	U.S.A.	Elderly	Educational intervention significantly changes the expectations of denture wearers in an elderly population
Juvenile Diabetics' Dental Health Knowledge	Scruggs <i>et al.</i>	1987	U.S.A.	Childhood	Juvenile diabetic patients receiving extensive oral health education demonstrate improved knowledge about diabetes and oral health
An Evaluation of a Preschool Dental Health Program	Rubinson and Tappe	1987	U.S.A.	Childhood	An oral health education program is effective in improving knowledge, attitudes and behavior about oral health
Effective Oral Health Education and Promotion Programs to Prevent Dental Caries	Horowitz	1983	U.S.A.	Childhood through Adolescence	Health education and promotion, validated by research, form the foundation upon which prevention is organized, implemented and perpetuated
Changing Oral Hygiene Attitudes and Habits	Woolley	1980	Australia	Childhood through Adolescence	After 6 months, children are able to recall 70% of the dental health message given during oral health education initiatives
Effectiveness of a Dental Education Program on Oral Cleanliness of Schoolchildren in Israel	Anaise and Zilkah	1976	Israel	Adolescence	Oral hygiene skill building combined with education improves and maintains toothbrushing skills
Report on the Learning Effect in Schoolchildren Following Toothbrushing Instruction by Students	Stapf	1975	Germany	Unknown	Following education on caries and periodontal disease prevention, oral hygiene practices are positively affected

**Table II  
Historical Research Perspective Demonstrating the Need for Oral Health Education Interventions Among Various Global Populations**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Assessment of a Community's Oral Health Status	Elias <i>et al.</i>	1997	Puerto Rico	Various	Levels of dental disease dictate a need for primary prevention programs, such as education
Perceptions of South Asian Adults in London on Oral Cancer	Shetty <i>et al.</i>	1997	U.K.	Various	Improved oral health education and promotion activities are needed for individuals at high risk for oral cancer
The Current Status of Dental Health Education in the Training of Midwives and Health Visitors	Hunter <i>et al.</i>	1995	U.K.	Various	Dental health education must be given a higher profile among midwives and health visitors to ensure that accurate information is imparted
Oral Health Behavior, Knowledge, and Attitudes of Children, Mothers, and Schoolteachers in Romania in 1993	Petersen <i>et al.</i>	1995	Romania	Various	In high caries-risk areas, oral health education of children and care-givers is necessary
Comparative Epidemiology of Dental Caries for Black First-Graders in Oakland, CA	Lovett <i>et al.</i>	1995	U.S.A.	Childhood	Limited access to preventive and restorative dental services results in higher rates of untreated dental decay
Caries Relation to Fluoridated Water Consumption and Toothbrushing	Lemeh <i>et al.</i>	1994	U.S.A.	Childhood	High caries prevalence rate among children in a fluoridated-water community suggests a need for education on the importance of drinking water and toothbrushing



**Table II - Continued**

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Oral Health of Migrant Workers	Sintes <i>et al.</i>	1993	U.S.A.	Various	Effective oral health education and prevention programs are needed to meet the needs of an at-risk population
Knowledge of Common Signs of Gum Disease	Nowjack-Raymer and Gift	1993	U.S.A.	Adult	Targeted health education and promotion are needed to meet the objective of gingival health
Dental Caries Among First-grade Students in Oakland	Sintes <i>et al.</i>	1993	U.S.A.	Childhood	High caries rates among minority vs. non-minority children demonstrate the need for early intervention and prevention
Oral Health Knowledge and Sources of Information Among Elementary Schoolchildren	Woolfolk <i>et al.</i>	1989	U.S.A.		A need exists to correct misinformation about dental health and inform children about effective preventive agents
Caries Experience of Disabled School-age Children	Storhaug and Holst	1987	Norway		Family education on feeding, toothbrushing techniques, diet and fluorides is necessary for the oral health of disabled children
Health Educational Aspects of Preventive Dental Programs for School-age Children in 34 Countries – Final Results of an FDI International Survey	Frazier <i>et al.</i>	1983	Various		A global initiative is needed for more efficient application of primary preventive measures, means to evaluate programs and program achievement, and firming the role of community education in oral health, prevention and treatment

TITLE	AUTHOR(S)	YEAR	COUNTRY	AGE	OPINION
Oral Hygiene for Children: A Look at What We Must Have and What We Should Do	Leatherman	1982	U.K.	Childhood through Adolescence	Organized dentistry must examine its policies on education, clinical practice research and administration to offer primary dental health services throughout the world
A Comparison of Available Strategies to Affect Children's Dental Health: Primary Preventive Procedures for Use in School-based Dental Programs	Horowitz	1979	U.S.A.	Childhood through Adolescence	Primary preventive practices are necessary for school-based oral health programs to lower the incidence of oral disease
Oral Hygiene Performance of Elementary School Children Following Dental Health Education	Podshadley and Shannon	1970	U.S.A.		Comprehensive programs are necessary to teach the importance of and means to achieve good oral hygiene
The Effectiveness of Two Educational Programs in Changing the Performance of Oral Hygiene by Elementary School Children	Podshadley and Schweikle	1970	U.S.A.		Single lecture-designed oral health education programs are ineffective in children