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SCHOOL OF AEROSPACE MEDICINE
BROOKS AIR FORCE BASE, TEXAS

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PREVENTIVE DENTISTRY
IN THE UNITED STATES AIR FORCE: 1952-1976
PEOPLE, PLACES, EVENTS

November 1976



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| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The USAF Preventive Dentistry Program, established in the early 1950's, was the first officially integrated program of preventive dental services in the Armed Forces. This article traces the history of prevention in the USAF with a special emphasis on people, places, and events. The following topics are discussed: the developments of topical and systemic fluorides, role of the USAF Dental Health Officer, courses for enlisted and officer personnel, training aids, preventive workshops, overseas preventive programs, and recent developments. | | |

**PREVENTIVE DENTISTRY
IN THE UNITED STATES AIR FORCE: 1952-1976
PEOPLE, PLACES, EVENTS**

An Air Force-wide preventive dentistry program was formally established in October 1952, patterned after a program existing within the Strategic Air Command (34). Kenneth R. Elwell, the first Air Force officer to receive specialty training in dental public health, developed and established the initial Air Force program while serving as Deputy for Preventive Dentistry and Research with Marvin E. Kennebeck, Assistant Surgeon General for Dental Services, Office of the Surgeon General (17, 18).

BACKGROUND

Early Days

The program was developed because of the inability of available methods of treatment to meet the enormous dental workloads which existed in the military population, especially among new inductees (17, 27, 42). The initial goal was to "provide a minimum of one annual oral prophylaxis for each military person and to educate and promote the personal interest of airmen in good daily, oral health practice"(17).

Before development of the program, hundreds of dental airmen were trained during 1950 to 1952 at the Great Lakes Naval Training Center to perform oral prophylaxes. Arrangements for this training had been made through George E. Kennebeck, Assistant Surgeon General for Dental Services at that time.

At the start of the program, 1200 skilled technicians were available to accomplish the dental prophylaxes. By the mid-1950's, a preventive program was in effect at 90% of all USAF bases, although the degree of effectiveness varied considerably (19). In some instances the dental prophylaxes phase was hampered by lack of adequate facilities, and a few clinics lacked qualified or sufficient technical personnel. A goal was established for 9% of assigned personnel to receive a prophylaxis each month, and in these early days the Base Preventive Dentistry Officer was usually the periodontist.

End of the First Decade

In an article published after the first 10 years of the program, Elwell (19) reported that the program was firmly entrenched and consisted of a clinical and community health phase. This program included annual dento-oral examinations and dental prophylaxis, preventive dentistry counseling, water fluoridation, mouthguard construction, and a school oral health program for Air Force dependents. In 1964, an annual recall plan was initiated and during recent years this system has been strengthened with the use of computers and machine records processing. Timothy J. O'Leary and coworkers (32) developed a standardized periodontal disease screening examination method which was in use throughout the Air Force from 1965-1970. This 4-to 6-minute examination, using the mesial method, was designed for use by the general dentist and was reported on AF Form 528. According to O'Leary, the method was effective in detecting 96% of the patients affected with periodontal disease, permitted early detection of the disease, and thus allowed treatment to be simpler, less time-consuming, and more effective. The method was field tested at eight scattered Air Force installations in 1963 and an instruction manual was written and revised from 1963-1964 (26). In retrospect, this development had a considerable impact upon dentistry in the Air Force, spurred a new interest in periodontics, and an appreciation by the general dentist for the importance of early detection of periodontal disease. The periodontal probe became highly visible in Air Force dental facilities.

In 1967, under authority of the Department of Defense, a preventive dentistry program was established for dependent children of active duty, retired, and deceased members of the uniformed services. The program consisted of an annual screening-type dental examination, a dental prophylaxis with topical application of an anticariogenic agent, home care instructions, and a preventive dentistry lecture.

Fluorides

On 28 September 1954, Ramey AFB, Puerto Rico (since deactivated), under the direction of Carlos F. Schuessler, Base Dental Surgeon, became the first military installation to fluoridate its water supply (1, 36). This action was initiated after a survey of 2,500 children on the base in September 1952 revealed a higher incidence of dental caries than the average for children in the United States. The initial installation of fluoridation equipment cost about \$3,000. By April 1956, 15 bases had fluoridation projects approved by Hq United States Air Force (Hq USAF) and by 30 June 1965, 80 bases had installed controlled fluoridation systems or had sufficient fluoride in their water supplies (29). At present, the communal water supplies on 146 bases have

fluoride at an optimal level. Air Force policies on fluoridation and defluoridation are spelled out in Air Force Regulation 161-9.

Applications of a 2% sodium fluoride solution were widely used in Air Force dental health programs during 1952-1957 (19). By 1958, an analysis of the current scientific literature made by Harris and Hester (21) indicated that a switch to stannous fluoride was advisable. The USAF Dental Research Service, first at Randolph AFB, Texas, and later at Brooks AFB, Texas, was one of the research groups to pioneer basic and applied studies of anticariogenic stannous fluoride chemistry. Much of this research was stimulated by the work of Joseph C. Muhler, known as the "father of stannous fluoride," and his group from the University of Indiana. In the 1950's and 1960's at Brooks AFB, Texas, Vincent A. Segreto (principal investigator), Robert J. Detamore, Norman O. Harris, and Warren R. Hester worked in developing stannous fluoride, a silex silicone dental prophylaxis paste (X-5) with anticariogenic potentialities (14, 23, 37). In the 1960's and 1970's, Ira L. Shannon published numerous important in vitro studies to show the protective effects of stannous fluoride on enamel (38).

By 1966, the following stannous fluoride agents--tested at the USAF School of Aerospace Medicine (USAFSAM), Brooks AFB, Texas--were in widespread use throughout the Air Force: (a) Code X-14, a 20% stannous fluoride solution from which a stannous fluoride prophylaxis paste and a 10% topical solution could be prepared. At that time, the USAF School of Aerospace Medicine prepared and mailed X-14 solution to all Air Force requesters at no charge to them. Because the School established an automatic monthly resupply system for requesting bases and controlled the program, a \$25,000 savings was estimated. (b) Code X-16 was a 0.5% stannous fluoride clinical mouthrinse to be used in the clinic by all caries-susceptible patients following every dental appointment. The Code X-16 rinse was recommended for use in lieu of the 10% topical application of stannous fluoride after the use of the SnF₂ prophylaxis paste (38). These and other investigators helped pave the way for improved stannous fluoride-containing prophylaxis pastes, mouthwashes, gels, and topical solutions for clinical use.

Terry and Shannon (43) developed a nonfluoride-containing ingestible dentifrice (Code JAG-5) which was used later by NASA astronauts during Apollo and Skylab missions (20, 39). The dentifrice contained no volatile oils, no foaming or sudsing agents, and low calcium content, which was important so as not to contaminate the air of the space vehicle's cabin. In chamber studies, the ingestible dentifrice compared favorably with commercially available toothpastes in patient acceptance and oral hygiene efficiency.

A significant element of the Air Force Preventive Dentistry Program has been the long-range objective of developing additional methods of prevention and adding them to the regular program. Research developments have been important additions to the program throughout the past 24 years.

USAF Dental Health Officer

In a 1960-1961 staff study Norman O. Harris, Chief of Experimental Dentistry at the USAF School of Aerospace Medicine, suggested that a Unit Manning Document (UMD) position of Preventive Dentistry Officer for the Air Force be established at Brooks AFB, Texas (22). Subsequently, Paul V. Sundberg, Jr., was assigned from 1963-1967 as the first Air Force Preventive Dentistry Officer (41). John E. Devlyn, trained in the specialty of Dental Public Health, served as the USAF Dental Health Officer from 1967-1969. Thomas Salimeno, Jr., a periodontist, was in the position from 1969-1975. Arden G. Christen, trained in Oral Diagnosis/Oral Medicine and Preventive Dentistry at Indiana University, assumed the post in 1975.

The USAF Dental Health Officer supervises the Air Force Preventive Dentistry Course, coordinates preventive dentistry efforts throughout the Air Force, and serves as Dental Health Advisor to the Assistant Surgeon General for Dental Services. In this capacity, he is authorized to have direct communications with the Assistant Surgeon General for Dental Services.

TRAINING

Course in Oral Preventive Care

USAF Preventive Dentistry Course--Paul V. Sundberg, Jr., organized the USAF Preventive Dentistry Course, OZY9800, and the first course was held at Brooks AFB, Texas, from 25-28 May 1964 with 15 dental officers in attendance (41). Class participation and practical exercises were incorporated into classroom instruction. From May 1964 through December 1976, 667 Air Force dental officers have attended this five-day course. The course has expanded over the years to include 21 civilian and military guest speakers and consultants covering every facet of a modern preventive program. At present (1976) two courses a year are taught (May and November) at the USAF School of Aerospace Medicine, Brooks Air Force Base, Texas. Each year 70 Air Force dental officers attend this course representing all major continental United States air commands. In addition, residents in General Dentistry, Periodontics, and Prosthodontics from Wilford Hall USAF Medical Center attend as part of their graduate education. In most instances,

the officers who complete this course serve as the Preventive Dentistry Officer at their home bases. All students are supplied with audiovisual and reference materials.

Preventive Dentistry Specialists Course--In 1967, the Preventive Dentistry Specialists Course (981X1) was established at Wilford Hall USAF Medical Center, Lackland AFB, Texas, by Eugene R. Muth (31). The course has subsequently been moved to the School of Health Care Sciences, Sheppard AFB, Texas (13). Since the course was initiated, 560 technicians have been trained, with many additional personnel receiving instruction at the base level through on-the-job training.

Many innovative teaching techniques have been introduced into the course by Edwin B. Shiller, present Course Supervisor (40). This training includes the use of videotapes, continuous-loop single-concept films, and programmed texts integrated with sound/slide programs. Self-paced computer-assisted instruction is continuously used throughout the course to teach diagnostic techniques and the semantics of plaque removal by patients. This course is designed to give advanced training to experienced chairside assistants to produce military dental hygienists in seven weeks and three days.

The goals of the course are to train personnel to: (1) organize, present, and supervise base preventive dentistry programs; (2) be competent in the use of hand instruments; (3) be able to recognize signs of dental disease; and (4) provide radiographic expertise in the base dental clinic (40). In addition, Devlyn (15) has developed a special training program at the base level to provide a one-month periodontic rotation for preventive dentistry specialists. According to Devlyn, this rotation as chairside assistant to the base periodontist helps upgrade and maintain current levels of both knowledge and skills. It is of special importance that the preventive dentistry specialist have a thorough understanding of the interrelationship of his work to that of the periodontic treatment team.

Training Aids

Throughout the years Air Force dentists--often working with civilian consultants--have developed many significant training films, videotapes, slide series, and patient educational pamphlets.

In the early 1950's, George S. Moore and Harry S. Sauerman, at Carswell AFB, Texas, produced a widely used handbook including skits concerning oral health education as part of their base preventive dentistry program (18).

In 1955, two Air Force official motion pictures on preventive dentistry were developed and produced by Kenneth R. Elwell and Sherwood F. Benhart (18). Both films were shot on location at Randolph AFB, Texas.

In 1955, a 12-month preventive dentistry poster campaign was initiated at Barksdale AFB, Louisiana, for Second Air Force by the Dental Surgeon, Carlos R. Schuessler (36). With the cooperation and aid of the staff of the Information Services, a series of posters was developed and delivered to each base in Second Air Force from October 1955 until September 1956. At Hq USAF, the poster idea was later reviewed and expanded to include all Air Force installations. In early April 1958, different posters were being sent directly to base dental surgeons each month at a ratio of approximately 12 posters per thousand personnel (6). In 1956, Hq USAF spent nearly \$30,000 to procure and distribute preventive-oriented dental health literature.

In 1962, another official Air Force film entitled, "Dental Service-Practical Management," was produced by Elwell and Sundberg, which included staff and patient instructions in oral health education.

By 1966, a film magazine program (FM) was developed by USAFSAM and a commercial company and was subsequently used in many clinics after being evaluated at 10 Air Force installations and approved by the Assistant Surgeon General for Dental Services for Air Force-wide distribution (35). The film magazine was a continuous action containing 8-mm color films with captions projected by Technicolor Model 200 and 600 projectors. Single-concept films were available dealing with dental caries, periodontal disease, and dental home care.

In 1967, Timothy J. O'Leary and Claude L. Nabers (a civilian consultant in periodontics) wrote a pamphlet entitled, "Effective Oral Hygiene," which is still widely used at Air Force dental installations (33). Local reproduction of this pamphlet is authorized throughout the Air Force. From 1964-1969, Sundberg and Devlyn perfected a comprehensive "Preventive Dentistry File Notebook" for use in the Preventive Dentistry Course, and Salimeno produced many outstanding preventive dentistry 16-mm films, slide shows, and pamphlets to be used for plaque control classes at the base level.¹

¹By the mid-1970's, Salimeno had produced the following films at USAFSAM: AFSC-04-10023, "Dental Health Program for Children-Lecture;" AVR-10, "Plaque Control Program;" AVR-11, "Plaque Control Center Lecture;" and AVR-12, "Reinforcement Lecture for Plaque Control Lecture."

In the early to mid-1970's, Salimeno was also instrumental in developing the Plaque Control Center concept. The objective of the center is to educate and motivate small groups of patients (approximately six at a time). He developed a detailed physical description of the center, equipment, and supplies needed and described self-examination and self-treatment techniques. Phase contrast microscopy plays an important part in the center. His 81-page booklet entitled, "Preventive Dentistry," contains much valuable information and is still being used as a handout in the Air Force Preventive Dentistry Course.

Preventive Workshops

Sam W. Hoskins, Jr., and Roland M. Meffert, both formerly of the periodontic staff at Wilford Hall USAF Medical Center, Texas, established several important weekend preventive workshops at Lackland AFB in the late 1960's which greatly stimulated growth in military preventive dentistry (25, 28). A number of distinguished teachers of prevention participated including: Arthur L. Alban (periodontist, modified Snyder test), Sumter S. Arnim (Bass methods, phase contrast microscopy, microcosm), Robert F. Barkley ("Mr. Preventive Dentistry"), Gerald M. Latimer ("If you got 'em, floss 'em"), Donald H. Masters (periodontist, nutritionist), James T. ("Toothbrush") Thompson, and Merrill G. Wheatcroft (oral microbiology). In addition, Miles R. Markley, Air Force Consultant in Operative Dentistry, and Richard I. Evans, psychologist and consultant to the USAF School of Aerospace Medicine, have made unique contributions in the area of office management of preventive programs and patient motivation and education, respectively.

Of the above outstanding individuals, special recognition is given to Sumter S. Arnim, who made some of the greatest contributions of all toward stimulating the early interest and growth in prevention in the Air Force dental services. In a long and fruitful career, Arnim rediscovered, expanded, and publicized the ideas and ideals originally set forth early in the 20th century by Charles C. Bass, a physician at Louisiana State University, New Orleans (2, 5). Arnim's work in developing phase-contrast microscopy, understanding the microbiology of dental plaque (which he called "microcosm"), and developing plaque disclosants and home-care methodology has been highly important to the progressive development of the field of preventive dentistry (3, 4). Arnim served as Civilian Consultant in Preventive Dentistry, Lackland AFB, Texas, from 1963-1973 and National Consultant in Preventive Dentistry to the Surgeon General, USAF, from 1968-1972. Interestingly, Arnim became National Consultant as a result of a recommendation by Miles R. Markley, Denver, Colorado (2).

OVERSEAS PREVENTIVE PROGRAM

European Command Program

In 1970, interest in preventive dentistry was high at Air Force dental clinics throughout Europe. At the USAFE Medical Service Training Conference, 8-10 September 1970, at the Berchtesgadener Hof Hotel, Berchtesgaden, Germany, a major prevention "event" occurred. Sumter S. Arnim, from the University of Texas, presented an important seminar entitled, "A Practical Program for the Prevention of Dental Diseases." This program set the tone for things to come and was to have a long-lasting effect throughout the Command. On 3-5 May 1971, the European Association for Military Periodontists devoted a major portion of their program to discussing military preventive dentistry programs in Europe. The meeting, held in Madrid, Spain, was under the leadership of Roland M. Meffert, a staff periodontist stationed at Wiesbaden AB, Germany.

In the fall of 1971, Roger Hombs, Assistant Surgeon General for Dental Services, visited the Medical Service Training Conference, Berchtesgaden, and delivered a significant policy statement strongly endorsing preventive principles (24). Plaque control programs sprang up at many installations. Some Base Dental Surgeons advocated the use of dental health educators (9), specially trained auxiliaries, to teach home care procedures to patients.

In August 1973, Charles B. Malloy, Command Dental Surgeon for Europe, appointed Arden G. Christen, RAF Bentwaters, as the first Military Consultant to the USAF Surgeon (Europe) in Preventive Dentistry (8). This position is now (1976) held by Eugene R. Muth, recently assigned to RAF Lakenheath, England. This active, high-level command support led the Air Force into active involvement with the European Society for Preventive Dentistry (ESPD). This rapidly growing organization, originated by the U.S. Army and composed of dental officers and auxiliaries from the U.S. Army, Air Force, and Navy, is committed to sharing their experiences, motivation, methodology, and conclusions. At the ESPD meeting held 11-12 January 1974, at the Von Steuben Hotel in Wiesbaden, Germany, three Air Force dentists were on the program for the first time. The three speakers were from Hahn AB, Germany; Ramstein AB, Germany; and RAF Bentwaters, England. Stephen A. Reid of Hahn AB, Germany, was elected vice president. One of the most interesting and important papers presented was that of Bruce H. Weiner of Ramstein AB, Germany. He developed a comprehensive, oral health program for preschoolers, school-age children, and adults. At the meeting, he distributed an Oral Health School Syllabus which was designed to be used by teachers.

RECENT DEVELOPMENTS

In early 1976, the overall Air Force Preventive Dentistry Program was expanded and redesigned to meet more accurately the changing needs of the community. Besides plaque control, prevention has advanced to include efforts in the following areas: nutritional counseling; environmental protection for the dental operator (lighting, noise and air pollution, aerosols, mercury hygiene (12), accidents and injuries, eye protection, radiation biology); occupational disease prevention (drug addiction, alcoholism, suicide); motivation, emotion, and persuasion; reduction of psychological trauma; health screening programs, such as rheumatic fever (10), high blood pressure determination, cancer detection, and tobacco education programs (7).

In order to more realistically address the expanded field of prevention, the Dental Health Committee approach was revived. In the Air Force, this committee concept, originally proposed by J. Frank Collins (11) and the late William J. Takacs (44), was modified and simplified by Robert L. Dix (16) at Scott AFB, Illinois in the mid-1970's. The concept is based on the idea that no single individual can possibly conduct a comprehensive Preventive Dentistry Program at the base level. The committee system offers a method to spread out responsibilities equitably and also can operate efficiently in any size dental facility. The committee typically consists of the Base Preventive Dentistry Officer who serves as Chairman and an Assistant Preventive Dentistry Officer for each of the clinical, community health, and dependent children's phases.

On 12 March 1976, the first Preventive Dentistry Workshop was held at the USAF School of Aerospace Medicine, Brooks AFB, Texas to establish an informal Preventive Dentistry Management Committee. In this important meeting, members discussed in depth current preventive dentistry problems. Also they suggested solutions and arranged for coordinated efforts between USAFSAM, Wilford Hall USAF Medical Center, the University of Texas Dental School at San Antonio, and the School of Health Care Sciences (30). Workshop participants included Arden G. Christen and Arthur J. Stumpf, Jr. (Brooks AFB, Texas); John E. Devlyn, Eugene R. Muth, and Edwin B. Shiller (Sheppard AFB, Texas); Paul R. Park (Lackland AFB, Texas); Robert L. Dix (Scott AFB, Illinois); and Norman O. Harris, Department of Community Dentistry, University of Texas at San Antonio.

This committee will meet twice a year to consider current problems in preventive dentistry with the continuing purpose of developing recommendations. These recommendations will include approaches to resolve problems encountered and suggestions for the adoption of

research results and other promising methods to promote the progress of the USAF Preventive Dentistry program in the years ahead.

Many people have contributed and others will continue to carry out and add further advances. This review mentions a few and salutes all who continue to serve the interests of our Air Force people through the USAF Preventive Dentistry Program.

SUMMARY

The USAF Preventive Dentistry Program, formally established in the early 1950's, was the first officially integrated program of preventive dental services in the Armed Forces. This article traces the history of prevention in the U. S. Air Force with a special emphasis on people, places, and events. During the past 24 years since the program was adopted Air Force wide, many advancements have been added which have improved its professional, educational, and administrative elements. Progressive development of the program is a continuing objective of the USAF Dental Service.

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