

Work Environment and Occupational Health of Dental Hygienists: A Qualitative Assessment

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Objective: We sought to characterize the work environment and identify factors that influence the occupational health of dental hygienists. **Methods:** We conducted a qualitative analysis of dental hygiene work based on five national focus groups. **Results:** We found that musculoskeletal symptoms are common, particularly after 10 years; common ergonomic problems included instruments and chairs. Important nonphysical workplace problems include role ambiguity (eg, employee vs. independent practitioner), inadequate recognition, role identity (eg, distinction from dental assistants), role conflict (eg, with dentists and spousal office managers), and social isolation. **Conclusions:** Work organizational factors (eg, frequent part-time work, inadequate breaks, perception as a “second team” distinct from the dentist and dental-assistant team) impede the remediation of ergonomics and other problems. Job flexibility encourages hygienists to change work hours or location rather than deal with work conditions. Occupational health interventions should address social environment and work organization. (J Occup Environ Med. 2005;47:623–632)

Dental hygienists provide important preventive oral health services.¹ As described by the American Dental Hygiene Association, their work includes the following:²

- “perform oral health care assessments that include reviewing patients’ health history, dental charting, oral cancer screening, and taking and recording blood pressure;
- expose, process, and interpret dental x-rays;
- remove plaque and calculus (tartar)-soft and hard deposits-from above and below the gum line;
- apply cavity-preventive agents such as fluorides and sealants to the teeth;
- teach patients proper oral hygiene techniques to maintain healthy teeth and gums;
- counsel patients about plaque control and developing individualized at-home oral hygiene programs; and
- counsel patients on the importance of good nutrition for maintaining optimal oral health.”

In 1998, there were 140,000 hygienists in the United States with a 1.1 to 1 ratio of dentists to dental hygienists.³ Health concern factors, particularly ergonomics, have been studied.^{4–7} In this study, we report results of several national focus groups concerning their occupational health.

Several types of occupational effects upon the health of dental hygienists have been reported. Studies have suggested that ergonomic exposures, such as repetitive motion, adverse postures,^{7–10} and vibration^{11–13}

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lead to cumulative trauma problems.^{4,6,14–19} Several surveys have evaluated the quality of work life^{20–23} and described perceived stress.^{24,25} Some have used questionnaire surveys,^{8,15,20,26,27} whereas others have employed ergonomic observational methods.^{6,7,10}

In this study, we employed a qualitative research technique (semi-structured focus groups) rather than using formal epidemiologic survey methods or ergonomic measurements for several reasons. First, this research approach allowed us to investigate a broader array of possible concerns. Second, it provided a semistructured format for obtaining input from the dental hygienists themselves. Third, this method permitted detection of heretofore unexpected themes, whereas a predefined questionnaire is limited to evaluating those areas explicitly included within the questionnaire. (As shown in the results section, the dental hygienists themselves suggested many areas that had not received attention previously).

Materials and Methods

Five focus groups were conducted during June of 2003. A total of 51 dental hygienists participated; four sessions had 11 participants and one session had 7 attendees. Mailing labels were purchased from the American Dental Hygiene Association (ADHA) for all dental hygienists who were preregistered to attend the 2003 annual National Dental Hygienist Conference in New York City. Labels also were purchased from the California Dental Hygiene Association (CDHA) for members in Los Angeles and Orange Counties. Three focus groups were held in New York City, New York (in conjunction with the ADHA's national meeting), and one each in Los Angeles and Irvine (both in California). A mailed recruitment flyer and an ad placed on the CDHA web site were used for local recruitment. Subjects received nominal compensation for their time.

The sessions were held following the standard focus group methodology.^{28,29} The purpose of this study was carefully explained at the start of the session. Questionnaires were presented in a sequential manner. Less sensitive "introductory" questions were then followed by questions dealing with more specific workplace topics. A series of topics and questions were developed based upon review of published studies and discussion with persons familiar with the work. General areas of interest were chosen, and specific questions were developed. Three types of questions were implemented: (1) Open-ended "uncued" questions to encourage participants to present new ideas (eg, "How does work affect your health?"; "What do you like about your work?"); (2) Cued questions calling for relatively short answers in a more narrowly defined range (eg, "how frequently do you miss work due to pain?"; "describe relationships with other office staff."³⁰ For several of these, every participant was asked to respond.); and (3) several questions used closed format responses (eg, "Who determines how many patients per day you see; dentist, other office staff, you, jointly, other?"). Answers were recorded on each subject's notepad. Subjects also completed a brief written demographic questionnaire.

Each subject participated in only one session, which lasted approximately 2 hours. Subjects provided written consent to participate. To protect their identities, participants were assigned a number at the start of the session to identify themselves whenever they spoke. A research staff member served as a session moderator and another staff member served as observer/associate moderator. The moderator (facilitator) followed a predesigned sequence of questions; these allowed either semi-structured or open-ended responses. Based upon the first session, we identified areas of major interest and modified questions to be more fo-

cused; this iterative approach is recommended by focus group experts.³¹

Several methods were used to capture the information presented in the sessions. Each session was tape-recorded for later analysis. In addition, the moderator and the associate moderator/observer both took notes. The principal investigator attended several of the sessions and also took notes. The preliminary analysis was conducted soon after the sessions so that memory could supplement the recordings and notes.

Analysis was conducted using standard methodology.^{28,30} When multiple focus groups are used, the unit of analysis can be either the group overall or individuals.³⁰ Because of the observed general consistency across groups, this study used the individual as the unit of analysis. A combination of note based and tape based data coding was used; although we did not create a full written transcript of all recordings, each was reviewed in total by at least two individuals to assure consistency of capturing information. After all sessions were completed, the research team delineated a series of six major themes and specific items for each by a consensus discussion. The session tape coders tallied how many times each item was mentioned. To account for intersession differences, the standard tally approach was modified. The Qualitative Response Scale (QRS) reflects the number of times each item was mentioned, averaged across session and raters. Each member scored comments on a theme summary worksheet. The six major theme areas were health, impact, physical environment, work organization, social environment, and career paths. These were later collapsed into three major theme areas for purposes of summary.

Results

Subject characteristics are summarized in Table 1. All held a college degree; 35% held an AA or AS degree, 43% BA or BS degree and 22% had MS or PhD as their highest

TABLE 1
Characteristics of Focus Group Participants

Total No. Participants	51
Women	100%
Age (years)	
Average	48.7
Min	23.0
Max	68.0
Total number of years in dental hygiene practice	
Average	24.2
Min	0.6
Max	48
First year of practice	
Average	1978
Min	1955
Max	2002
Current work hours per week	
Average	31.6
Min	8
Max	50
Number of hours of patient contact	
Average	29.7
Min	2
Max	50
Percent of work time devoted to patient contact	
Average	95%
Highest degree	
AA or AS	18 (35.3%)
BA or BS	22 (43.1%)
Masters	10 (19.6%)
PhD	1 (2.0%)
Years of classroom training in dental hygiene	
Average	2.5
Years of supervised training in dental hygiene	
Average	2
No. offices work per week	
One	24 (47.1%)
More than one	27 (52.9%)

degree. Results of the qualitative analysis and synthesis are shown here. The most frequently reported themes and those that suggest significant new hypotheses are summarized. Some of the descriptions are supplemented by the QRS measure of frequency and by quotes of illustrative phrases used by subjects. Table 2 summarizes the major themes.

Health Impacts

Many spontaneously reported that the work is physically demanding. (eg, “extremely physical [job] and very hard on one’s body”). Musculoskeletal symptoms were very common (Table 3A). Hand/finger area, neck, shoulder, and back symptoms were most common. Wrist symptoms

were less frequently mentioned despite the a priori beliefs of the investigators. Elbow pain also was infrequent; very few mentioned other areas (wrist, arm, feet, knees and ears) unless explicitly prompted. Many said that discomfort continued into the evening after they left work. Many use medications (eg, nonsteroidal anti-inflammatory drugs), and several reported using splints at night, chiropractic treatment, massage therapy, or acupuncture.

Nearly all recognize that work either causes or aggravates symptoms. In addition, the majority reported that workplace changes, including both changes to the physical environment and social environment, might

ameliorate such symptoms (Tables 4A and 4B).

Most felt that these symptoms, as well as the consequent that reduction in work time caused by physical discomfort, develop only after many years of practice rather than within the first few years (Table 5). Nearly all felt that physical discomfort occurred very frequently after 10 years but not after 5 years. Additionally, their schooling does not prepare them for the physical burden of full-time practice. Many new graduates “meet the harsh physical reality of full-time practice.” Many hygienists leave the field quickly because of the physical stress of full-time work; those who do not leave in the very early period remain at work for many years. Participants also reported that either they or their colleagues had other specific health problems, such as latex allergy, carpal tunnel syndrome (CTS), tendonitis, muscle spasms, eyestrain, headache, and fibromyalgia (Table 3B).

Many dental hygienists continued practicing despite significant discomfort. Several reported that their colleagues continued to work with pain, because “they needed the money” (especially because many hygienists are single parents) or because of fear of job loss if they were absent. When one participant said, “can’t miss work, I have no sick time,” many in the session agreed. Professional esteem and the belief that pain “was expected as a part of the job” were raised as reasons to tolerate pain as well. Many (31%) said they work less now than previously because of physical symptoms. They tended to work fewer days per week instead of fewer hours per day.

Despite the reported high frequency of work-related symptoms, virtually no one reported ever filing a worker’s compensation claim. Although some knew other hygienists who had done so, overall they felt this was a rare occurrence. Some avoided filing a claim because of fear of job loss or retaliation. Others felt it would be difficult to file a

TABLE 2

Summary of Major Themes Reported

Health impacts

Musculoskeletal symptoms

Hand/finger, neck, shoulder, back are common
Elbow, wrist less common

Musculoskeletal symptoms develop late (after 10 years of practice) Impacts:

Reduction in work hours
Self-treatment
Workers compensation filing relatively uncommon

Physical environment

Patient chairs

Cannot be adequately lowered
Some patients refused to recline

Operator room

Too small
Poor lighting

Instruments

Hygienists receive “leftover” instruments
Designed for male dentists
Too few Cavitron instruments available

Eye loops (magnifiers) often not supplied (could reduce adverse postures)

Psychosocial environment

Work in multiple offices every week

Part-time status, limiting benefits

Inflexibility of scheduling time per patient

Time pressure

Loss of work breaks and lunch breaks

Inadequate involvement in office decisions

Social isolation

No professional peers in office

Misunderstanding of their role, particularly by dental assistants and office administrative staff

Functional independence separates them from dentists and assistant team

Perceived inadequate management skills of dentists

successful claim because they work at many different offices.

Physical Environment

Chairs. Many hygienists expressed concerns about both the *patient chair* and the *operator’s (hygienist’s) chair*. Most felt these chairs lacked an adequate range of adjustments (QRS = 9.00), were not “ergonomic” (QRS = 12.25), and were not “user friendly.” The most frequent complaint was that the chair often could not be lowered adequately toward the ground. This flexibility is particularly important for female dental hygienists, who often are short in stature. The inability to lower and adjust the chairs requires them to work in awkward postures or to stand up to work. They felt they are often given “leftover” equipment. Whereas dentists’ patient chairs are new and more adjustable, hygienists typically use the oldest ones in the office. Patient characteristics also exacerbate the problem of inadequate chairs. Many patients are obese, making it difficult to reach over the corpus without standing up. Also, even if the patient’s chair reclines, the patients sometimes refuse to recline.

Operatories. Hygienists resoundingly reported that the *operator rooms* were too small (QRS = 13.5). This limited their ability to navigate their chair around the room or the patient’s chair, also forcing them into awkward postures. Because many hygienists work in several different offices, they often cannot adjust a room to their needs and have to readapt frequently to different room and equipment configurations. Some also complained about *room temperature* of the operatory.

Instruments. Several complained that their instruments were not sharp enough and not adequately maintained despite their efforts. Some said they received “hand-me-down” instruments and opined that the instruments were heavier and with thicker handles designed with male dentists in mind. Several suggested

TABLE 3

Qualitative Response Scale (QRS) Scores for Health Effects Domain

A. QRS Scores for Body Part Symptoms

Body Part With Symptom	QRS Score
Hand/finger	11.7
Back	10.0
Neck	9.9
Shoulder	9.2
Eye	3.5
Hip	3.0
Head	3.0
Elbow	2.3
Knee	1.5
Wrist	0.5
Ear	0.3
Foot	0.0
Arm	0.0

B. QRS Scores for Conditions

Condition	QRS Score (Self)	QRS Score (Others)
Latex allergy	5.8	3.5
Tendinitis	5.3	0.8
Carpal tunnel	4.3	2.7
Fibromyalgia	2.0	1.0
Chronic fatigue/Epstein Barr virus	2.0	0.5
Spasms	1.0	0.0
Headaches	1.0	0.0
Arthritis	0.8	0.5

The table shows the QRS scores for the health effects domain. For body parts all data is shown; for conditions, only items that had a QRS > 0 for self are shown.

TABLE 4

Suggested Changes to Work Environment

A. Workplace changes	%
Operatory size/design change	30.4%
Patient or operator chair	24.6%
Ergonomic equipment/instruments	23.2%
Better lighting	7.2%
More time per patient	5.8%
B. Social-organizational changes	%
More teamwork	14.3%
More control over scheduling/more patient time	14.3%
Stronger leadership/management from dentist	11.4%
Feedback/communication from dentist/staff	11.4%
Better salary and/or benefits	8.6%
Respect from dentist/other staff	8.6%
Autonomy/treated as partner with dentist	8.6%
Less ambiguity (defined role)	5.7%
Less waiting for dentist	5.7%

This table summarizes the categories of written suggestions derived from free text responses to two questions about suggested workplace and social-organizational changes. (A total of 69 and 39 responses to the questions respectively were recorded; each subject could make up to 2 suggestions). % represents the percentage of respondents making a suggestion within the category.

that manufacturers target male dentists as the purchasers and business owners when they design tools and chairs for the offices, although dentists generally spend less time with each patient than do hygienists. Several also described use of a cavitron instrument, which they felt would make their activity easier, but which was not always available. Hygienists also said that most “sticks” occur during instrument processing/removal from the sonicator rather than during patient procedures.

Visual Ergonomics. Several aspects of *visual ergonomics* also were raised. Some mentioned that the operatory’s *lighting* was too dim. Many often felt they could benefit from *magnifying loops* (eyeglass-like devices to magnify their work). They feel that magnification allows them to avoid ergonomically awkward postures. This would also allow them to “not be right up in the patients face.” Despite overwhelming consensus about their utility, very few said they actually employed them. Many noted that this occurs because they must personally purchase them, as they are not “full-time employees.”

Other Physical Hazards. Some hygienists expressed concerns about the *noise/pitch* (QRS = 4.8) generated from the Cavitron and other instruments. The problem of *vibration* was less frequently mentioned in response to open-ended questions about “ergonomic stresses” or “physical factors or instruments of concern.” They expressed more concern about instruments’ lack of sharpness (QRS = 4.8), fumes/odors, (QRS = 2.8), radiation (QRS = 3.3) or chemical exposure (QRS = 5.3) than about vibration (QRS = 2.5).

Psychosocial Environment

Work Organization. Dental hygienists have a unique practice pattern. Most (52%) work in multiple offices, even though each office may have the equivalent of one or more full-time hygienists. Many felt that this occurs because dentists do not want to pay the benefits associated with full-time employment (sick leave, medical insurance, retirement), but other hygienists opined that their desires also contribute to this situation. They like easily moving from location to location. Dental hygiene is marketed to students as a

TABLE 5

Reduction in Work Time Attributable to Physical Problems

Response	After 5 Years (%)	After 10 Years (%)
Most	0.0	7.5
<75%	0.0	5.0
<50%	0.0	47.5
<25%	70.6	35.0
Rare	29.4	5.0

The table shows the percentage of respondents selecting each response to the question,

“In your experience, what percentage of hygienists reduce their work due to physical discomfort, after _ years of working?”

part-time, flexible job. They also like the possibility of working only several days per week, particularly in their child-rearing years. Although both employers and employees perpetuate this situation, most hygienists favored a full-time or >50% time position providing medical benefits, a retirement plan, and the increased office status more often afforded to full-time staff.

Scheduling. Hygienists report inadequate control over schedule, time per patient, and number of patients per day. Most states require that a dentist check each patient, and they are therefore required to work according to the dentist’s schedule. Frequently the office is closed for several weeks during the dentist’s vacation.

The time pressures, which are aggravated by their lack of schedule control, have both physical and emotional impact. Hygienists said they typically treat 8 or 9 patients per day with little control over scheduling of patients (QRS = 12.75). Lack of control over scheduling interferes with their ability to take work breaks (QRS = 6) or bathroom breaks (QRS = 5.75). Many reported considerable time pressure to work through or shorten their lunch hour (QRS = 8.5). Additionally, some hygienists reported having to wait 10 minutes or more for the dentist to come in and check their work.

Overall, the stress of continual time pressures and lack of breaks was mentioned as frequently as physical stress by the hygienists. This stress affects their home life as well. Some said that when they went home they would “complain” or “be mean,” or as one said, “I’ve been nice all day and can’t do it anymore.”

Lack of Control. Other office staff generally schedule patients on a fixed time basis without consideration for the needs of the specific patient. For example, patients who have not seen a dentist or hygienist for quite some time require a much longer visit. Patients with heavy plaque require extensive manual scaling and cause extreme physical stress to the hygienist. They also desired the ability to have the patient come back for another visit if needed. The hygienists uniformly expressed the view that because they were professionals familiar with each patient, they should be able to schedule their own time.

Those hygienists who reported having some control over schedule had to stay with the same dentist for many years and changed practices multiple times in search of a more accommodating dentist. For example, one stated that, “there is a huge difference if you’ve been with one employer for a long time, you have more control, a few more benefits.” Increased levels of control seemed to lead to more general satisfaction and a willingness to stay in the profession, despite having pain. Despite having an average of 24 years of practice and being the major users, only 18.2% of the hygienists said they exerted “major control” over equipment and instrument purchases.

Social Isolation. Several factors lead to social isolation in the work setting. Dental hygienists are less likely than other dental workers to feel that they are an integral part of a particular office because hygienists often do not work in only one office (unless they are part-time workers). They “feel treated like contract workers” who do not merit as much

input into office operations and who may not merit the benefit structure that other office staff receives. Hygienists note a lack of professional peers in the workplace; even if they work in the same office as other hygienists, they often work on different days. The lack of breaks also impedes the ability to talk to other hygienists and other staff members.

Differences in work structure and pay create a chasm between hygienists and other staff. Other office staff does not understand their responsibilities or their education level and therefore does not understand why the hygienists earn much more. The other office staff may show their resentment by refusing to assist the hygienist in any of their work or by scheduling them heavily.

Although hygienists see patients alone, the dental assistants work directly with dentists. The hygienists felt that the dentists often seem to favor the assistant in times of office conflict. This adds to the social isolation.

In several sessions, participants volunteered without any prompting that there was a “spouse problem.” It is common for dentists to have either their spouse or another family member working as the office manager who is in charge of personnel, payroll, and purchasing. Several cited the family member(s) as a source of conflict because they had control over personnel issues even if rarely present in the office and because they restricted equipment purchases despite lack of professional knowledge.

Several opined that social stress explains the relative paucity of men in the profession. For example, some hygienists state that “Men wouldn’t put up with what we do,” and some “know male dental hygienists who have left.”

Inadequate Recognition. The hygienists rated the level of recognition of their work by patients, dentists, and other office staff with a three-level closed scale. Both patients (73%) and dentists (65%) recognized

their work “very well.” In contrast, only 42.5% reported that office staff recognized their work “very well.” Fifteen percent of hygienists felt that the other office staff had “very little” recognition for them.

Professional Satisfaction. The focus group participants generally had long careers in the profession (24.2 ± 8.8 years). Factors they felt contribute to longevity in the profession include membership in a professional organization (ADHA) and involvement in its activities, including influencing policy and law, building long-term relationships with individual clients, studying advanced topics in the field of dental hygiene, and having outside interests and hobbies.

Working in multiple workplaces provides more opportunity to have varied practice experiences and to escape from unacceptable work situations. However, several hygienists, especially those outside of California, indicated that the job market was often very tight in their areas, limiting mobility among offices.

Dentists as Managers. Most hygienists felt that dentists were weak managers. Lack of interest and lack of managerial training were both cited as causes. Dentists are perceived as incapable of dealing with staff squabbles. This lack of managerial skills led to “cutting corners to make as much profit as possible” and “not put back into their business.” They also felt that dentists did not provide them with enough positive reinforcement.

Career Paths. Most hygienists felt that you “can make good money coming out of school” but were very concerned about the subsequent lack of growth in the profession. As one hygienist said, “peers have passed me by, those in other professions.” Although hygienists felt their education level places them closer to being peers with dentists, the inadequate professional growth opportunities restrict their careers. There was also a concern over the evolving “mega practice”; some fear that the future

norm will be “50 chairs per office.” Several hygienists also discussed the evolving practice of having lesser-trained individuals perform certain cleaning tasks.

Discussion

Several occupational health aspects of dental hygiene work have been previously investigated. Many studies have emphasized ergonomic factors, including vibration, tool design, and similar factors.^{7,11,15,16,32} Others have looked at the workload and consequent stress.^{24,25,33,34} Our current study was initiated with similar concerns, but early in the course of the focus group sessions, the hygienists themselves suggested a broader series of concerns. The current study, applying qualitative research methods, indicates that the unique organizational structure of this occupation significantly affects the workers and impedes remediation of workplace hazards.

Focus group members described the organization of work in the profession: Frequently, dental hygienists work on a part-time basis in several offices, although in aggregate they may work full-time. Individual offices may employ several hygienists at different times of the week. Many attribute this to dentists' desire to avoid paying benefits typical for full-time employees, whereas some hygienists believe their desire for flexible work schedules and work locations is also a root cause.³⁵ A study of dental hygienists in Tennessee found that only 33% had health benefits,³⁶ whereas a study in Texas found that only 58% received paid vacation, 25% medical insurance, and 37% sick pay.³⁷ Most of the work of hygienists is done as independent professionals, although they generally must be officially supervised by dentists.

Musculoskeletal disorders were frequent and often led to reduction of work hours. The disorders tended to develop late in the career, making it difficult to change to another profession. The reports of the focus group

participants are compatible with those reported in previous epidemiologic studies.^{8,9,14,16–19} The participants identified several factors forcing them to maintain awkward postures: operatory room size, inadequate ability of patient chair to be lowered, refusal of some patients to recline, and unavailability of eye loops. Vibration was not seen as a primary concern, although this has been emphasized in some investigations.^{11,32}

The organization of work creates several obstacles to remediating these problems: (1). Hygienists are given older, less preferable instruments and chairs; (2) better designed equipment tends to be used by the dentists and by the dental assistants with whom the dentists work more closely; (3) many hygienists believe they have “second-class” status in the office because they are perceived as independent and apart from the dentist and his/her closely affiliated staff members; and (4) because hygienists have part-time status in each office, efforts to customize equipment and room design to their individual needs and characteristics are not pursued.

In addition to physical workplace factors, they emphasized several *social factors*. These may be characterized as: role ambiguity, role identity, role conflict, threats to their roles, and social isolation.

Role Ambiguity. Some view dental hygiene as a lifetime profession, whereas others, “view it as a job, not as a profession.” A survey of hygienists in North Carolina demonstrated this heterogeneity. Career satisfaction was associated with younger age, fewer years of experience, having experience in fewer private practice offices, and having an associates degree as opposed to a higher degree.²⁰ There is also role ambiguity between their functional independence and their employee status. Although they practice largely independently, state licensing laws typically require that their work be “checked by” a dentist. This role definition

ambiguity may account for the desire of many to work in this setting other than private offices; a study in Indiana found that 65.9% would like to work in a setting other than a private practice office (eg, school-based practices, public health clinics, and dental hygiene education).³⁸

Role Identity. The public often does not adequately differentiate between dental assistants and dental hygienists. Dental assistants often resent the hygienists and exhibited “a lower level of professionalism” according to many hygienists.

Role Conflicts. They described considerable role conflict between the professions of dental hygiene and dentistry. Hygienists felt both professions possess unique skills and have different attitudes toward oral health; “We (hygienists) are more interested in prevention, whereas the dentist is more interested in treatment.” Dental hygienists wish that dentists treated them more like professional “partners.”

Threats to Role. Hygienists feel threatened by attempts to develop a new occupational category of practitioners with limited training who clean teeth but only above the gum line. They often mentioned that many dentists try to practice dental hygiene and do cleaning and scaling themselves without competency. Sometimes, the dentists offer these tasks to dental assistants to reduce their payroll costs.

Social Isolation. The theme that offices had “two teams” was common in all of the focus group sessions. The main team consisted of the dentist(s), dental assistants, and office support staff; the hygienists were the “second team.” They have little contact with professional peers in the course of their work. Even if a dental office employs several hygienists, they are rarely present at the same time. Interaction with other office staff is limited by the frequency of missed breaks and lunchtimes, where social interaction might occur. Their part-time status also distances them from the full-time em-

ployees. Many dental hygienists feel uniquely isolated from the dentists, who work much more directly with the dental assistants and others in the office. A published survey showed that only half of the dentists felt that they provided feedback to the hygienist all of the time, whereas only one third of the hygienists felt they received feedback all of the time.²¹

Implications for Prevention

Optimizing health and productivity in the dental hygiene profession requires understanding and overcoming impediments to change. First, because hygienists find the patient care extremely satisfying, they tolerate some adverse effects. Both our study and the published literature showed that global assessment of satisfaction is very high.^{35,22} Second, the hygienists are well paid in the early part of their careers, making them less likely to seek other employment when they could more easily change careers. Third, they appreciate the opportunity to work less than full-time; most are women, and this arrangement is particularly attractive when they have childcare responsibilities. Greater emphasis upon occupational health during the formal training may help set expectations to counterbalance these factors.

They feel alone and unable to address the ergonomic issues; greater interaction, such as by enhancing regional and national meetings, may overcome this isolation. Dental hygienists are also isolated within each office because of their frequent part-time employment status and the "second team" perception. Nevertheless, many of their health concerns are relevant to other office staff; effective communication needs to be established to overcome misunderstandings so they may form common alliances. Enhanced education for dentists as managers may also overcome this obstacle.

External forces that encourage ergonomic redesign may be less operative for dental hygienists. In most

other occupations, workers who develop musculoskeletal or other work-related disorders are likely to seek medical care, file workers' compensation claims, and encourage employers to change worker practices and equipment. However, dental hygienists exercise a unique option when there are problems in an office: they may simply reduce their hours in that particular office and pick up work in another setting. Hence, they are less compelled than most workers to institute actions leading to change.

Strengths and Limitations of Research Approach

The study used focus group methodology. Major advantages of this approach in comparison to fixed format questionnaires include: serving as a complement to quantitative data; helping to generate questionnaire items for a survey instrument; evaluating information poorly explainable from a survey; helping to generate hypotheses.³⁹ Focus groups also offer some advantages over individual one-to-one interviews. First, they are much more time efficient (allowing collecting information simultaneously for multiple persons). Second, they allow the moderator to pursue new areas of interest in a more structured format than with a single subject at a time. Third, participants may be less inhibited in a supportive group session. Finally, focus groups involving the most affected individuals have good face validity.³⁹

The study has several limitations, many of which are inherent in focus group studies.³⁹ The study population does not represent all dental hygienists. Participants had longer duration of work in the field and had volunteered to participate in focus groups. Furthermore, three of the groups were held in conjunction with the national meeting of their professional organization, thereby limiting the participation to those who attend meetings. However, the participants

represented a range of geographic locations, practice settings, and length of practice. Further, the group facilitators encouraged subjects to express and differentiate both their own opinions as well as their beliefs about what is generally true in the field.

Most information was obtained in a group setting. Responses possibly may differ from those obtained if each individual was interviewed in private. However, we encouraged openness in several ways: Participants were generally strangers with little likelihood of communicating information to others (eg, supervisors). Numbers rather than names were used to identify each person. The moderators carefully restrained overly sensitive discussions that might contain negative information about specific individuals (eg, anecdotes about a particular dentist). Specific personal information (such as age) was collected in a written format.

Each individual's responses may have been affected by comments of others. Two approaches were used to reduce the possibility that a dominant individual would bias the results: First, multiple sessions were conducted, reducing the likelihood that an outspoken individual in one session would bias the results. Notably, most of the conclusions were consistent across the sessions, although they were conducted completely independently without any interaction among participants. Facilitators encouraged all participants to express opinions, and for several of the semi-structured questions, they had each individual in seated order present an opinion. Indeed, collecting information in a group format offers particular advantages by having group members suggest new areas for individuals to address.

Focus group data are more difficult to code than traditional closed format epidemiologic questionnaires. The QRS method employed in this study is only semi-quantitative because all subjects did not respond to

every question. Consistency of information coding was facilitated in several ways: (1) themes and labels were selected in advance (2); the analysis and coding was conducted by several individuals; and (3) each tape was reviewed by two individuals, allowing resolution of significant differences. Furthermore, most elements of conclusion were supported by several different discussion items, often from different question segments of the focus groups. Some questions designed to address one area actually were subsequently noted to be particularly relevant to other thematic areas (facilitating "axial coding").⁴⁰

Unlike epidemiologic studies, the sample size was relatively small. However, both the number of groups (5) and number of subjects per group are consistent with recommendations of experts.³⁹

The current study, which used less structured qualitative research methods, provides insight into the underlying causes for problems in the profession. Failing to recognize the importance of work organization impedes the ability to remediate ergonomic and other problems. Retention in a particular office depends on work organization, management practices, the level of control exacted by the hygienists over their own schedule and availability of a broader scope of work and the overall social environment.²³ Understanding the work situation and the organization of the industry is needed to delineate the factors that perpetuate hazards and serve as barriers to change.

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