



## AN ABSTRACT OF THE THESIS OF

Kelli M. Swanson Jaecks for the degree of Master of Arts in Interdisciplinary Studies in Speech Communication, Speech Communication, and Education presented on May 29, 2007. Title: Interdisciplinary Collaboration: The Dental Hygienist's Role.

Abstract approved: \_\_\_\_\_  
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Recent scientific studies show strong correlations between oral and systemic disease, creating a crucial need for increased collaboration between the medical and dental professions. Interdisciplinary collaboration between medical and dental providers is emerging as a critical component to effective patient care. The role of the dental hygienist in interdisciplinary collaboration has been underutilized and understudied. The objectives of this research are to assess dental hygienists' perceptions of (1) their role in interdisciplinary collaboration, (2) the barriers to effective collaboration, and (3) communication skills needed to better participate in interdisciplinary collaboration.

Data were gathered using a quantitative survey instrument. Variables measured regarding the dental hygienist's role included experience, confidence, importance, leadership, knowledge utilization, and the future of interdisciplinary collaboration. Participants consisted of a volunteer sample of Oregon dental hygienists (N=103), recruited from two large dental hygiene meetings. The overall response rate was 60%. To better understand the nature of relationships

between variables, and to make comparisons among groups, statistical analyses included correlation and comparison analysis.

Results show that dental hygienists perceive their role in interdisciplinary collaboration as valuable, both now and in the future. Barriers to collaboration include insufficient time and insufficient knowledge of medical diseases.

Speaking, listening and leadership skills are necessary to effectively participate in interdisciplinary collaboration. Analyses of these findings elucidate a call for greater education in communication skills. The results of this study will be used to develop skill-building interventions to train dental hygienists in effective interdisciplinary collaboration.

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Interdisciplinary Collaboration: The Dental Hygienist's Role

By

Kelli M. Swanson Jaecks

A THESIS

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Kelli M. Swanson Jaecks, Author

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## **CHAPTER ONE**

### **INTRODUCTION**

In today's healthcare environment, medical professionals increasingly utilize interdisciplinary collaboration to reach optimal decisions regarding patient care. In fact, collaborative healthcare teams are part of patient care in most medical settings (Yeager, 2005). Consider the patient who is referred to an oral surgeon by his general dentist, after a suspicious lesion is found on the soft palate. This patient is subsequently diagnosed with oral cancer. The collaborative team may consist of the medical oncologist, radiologist, oral surgeon, social worker and dentist. All these professionals will work together collaboratively to make the best decisions regarding treatment for this patient.

Recent scientific studies show strong correlations between oral and systemic disease, indicating a need for increased collaboration between the medical and dental professions. In fact, interdisciplinary collaboration between medical and dental professionals is emerging as a critical component to effective patient care (Hirokawa, DeGooyer, & Valde, 2003). For example, a forty five year old female dental patient is diagnosed with periodontal disease in the dental office. She has no known medical conditions. After the dental hygienist has performed non-surgical therapy on the patient's teeth and gums, she is released with home-care instructions. At the four-month recall appointment, the patient tells the dental hygienist that she has been very thirsty lately and has to frequent the restroom more than she ever remembers. The dental hygienist makes a note of

this in the patient's chart and checks her oral cavity. The periodontal therapy seems to have made no difference, and the patient's gums are bleeding profusely upon probing. The dental hygienist suspects the patient may be suffering not only with periodontal disease, but diabetes as well. Periodontal disease and diabetes exhibit bi-directional links within the body. Diabetes increases the prevalence and severity of periodontal disease and Periodontitis decreases glycemic control in diabetics (Salvi et al., 2005; Taylor, Burt & Becker, 1996).

The dental hygienist discusses her concerns with the patient and refers the patient to her primary care doctor for appropriate blood glucose tests. Thus begins the process of interdisciplinary collaboration between the dental office and the general physician or internist's office. Medicine and dentistry must come together in collaboration, to best achieve optimal outcomes for this patient.

Collaboration is a defining feature of the workplace, where interdisciplinary teams interact and make decisions to accomplish their goals (Klein, 2005; Parker, 1994). Collaboration in medicine is similar to collaboration in any workplace, with parallel components necessary for effectiveness, however, the collaborative process in medicine is primarily engaged in the outcome goal of achieving optimal patient care (Martin, O'Brien, Heyworth, & Meyer, 2005).

Interdisciplinary collaboration within and between the medical and dental professions has increased in importance due to disease connections between the oral and systemic systems. As the earlier story illustrates, periodontal disease in the oral cavity can severely compromise a diabetic's effort to achieve correct

blood sugar levels, and conversely, a diabetic with uncontrolled blood sugar levels can have extreme difficulty controlling their periodontal disease. Oral/systemic links such as this require communication between medical and dental team members in order to achieve optimal care for the patient.

In recent years, diabetes, cardiovascular disease, pre-term, low birth weight babies and certain respiratory disease have all been linked to the inflammation caused by periodontal disease, or poor oral health (Lamster & Lalla, 2004; Reynolds, 2005). This evidence places the dental hygienist in a unique position within the interdisciplinary team, as it is often his/her role to initiate communication within the dental team and with the medical office concerning the care of the patient. Out of all the dental team members, the hygienist regularly spends the most time with the patient. She/he updates the health history and listens to individual medical stories and conditions. The dental hygienist's assessment is an important piece of the interdisciplinary collaboration. Consequently, the role of the dental hygienist in interdisciplinary health care collaborations deserves inquiry.

### **Purpose of Study**

The purpose of this study is to assess dental hygienists' perceptions of their role in interdisciplinary collaboration. What is their experience in collaborative efforts, with whom do they collaborate, and what do they believe the future holds for dental hygienists in interdisciplinary collaboration? Do dental hygienists perceive a difference when collaborating with medical versus dental

professionals? Hygienists can identify the barriers to their involvement in collaboration and what skills are needed to be effective in collaborative work. This research seeks to understand how dental hygienists view their role in interdisciplinary collaboration and how they experience interdisciplinary collaboration in their work setting.

To this end, a quantitative survey is administered to a volunteer sample of dental hygienists within the State of Oregon. Data are compiled and analyzed to find out what respondents think about their role in interdisciplinary collaboration, barriers to that role and communication skills needed to further their participation within a collaborative role.

### **Significance of the Study**

Due to the science of the oral/systemic link, there is a need for increased interdisciplinary collaboration between dental and medical professionals (Rhodus, 2005; Vissink, & Brand, 2006). Articles highlighting the science behind these oral/systemic links show up repeatedly in monthly peer-reviewed dental hygiene journals and trade magazines. However, the role of the dental hygienist in interdisciplinary collaboration is understudied. Before defining the role of dental hygienists in interdisciplinary collaboration, it is important to discover what their current experience is in collaboration. This exploratory study will provide a starting point for elucidating the role of the dental hygienist in interdisciplinary collaboration.

The American Dental Hygienists' Association (ADHA) considers original research to be an important factor in achieving their mission to advance the art and science of dental hygiene (American Dental Hygienists' Association, 2007). I intend to submit this research study to the National Research Center of the ADHA.

Finally, this research is significant to me personally. I hope that by studying interdisciplinary collaboration, I may, in the future, be able to speak for and affect change in the dental field. My interest in interdisciplinary collaboration stems from my eleven years of practicing as a registered dental hygienist in the State of Oregon and the many patients I have treated with both dental and medical diseases. From the results of this study, I intend to develop skill-building interventions to train dental hygienists in effective interdisciplinary collaboration.

### **Preview of Subsequent Chapters**

Chapter Two presents a review of the literature, presented in four sections. They are: collaboration in the workplace, the nature of collaboration in medicine, the science behind the oral/systemic link of inflammation and periodontal disease and a brief history of the profession of dental hygiene. Chapter Three focuses on research methodology. This chapter discusses survey design, participant population, and administration of the survey, data analysis methods and the four research questions. Chapter Four reports results of the data collected according to the four research questions guiding this investigation. Chapter Five addresses



overall findings and conclusions of the research. This chapter also includes limitations, future research and recommendations for application of the research findings.

## **CHAPTER TWO**

### **REVIEW OF THE LITERATURE**

Chapter one introduced the topic of interdisciplinary collaboration and the specific role of the dental hygienist as the focus of this study. As a practicing dental hygienist for eleven years and a member of the American Dental Hygienist's Association, I have read multitudes of peer-reviewed literature regarding this profession. I initially assumed I would find relevant research for this study in dental hygiene peer-reviewed journals. In my search, however, I found a plethora of literature covering areas of clinical practice, and a paucity of literature focusing on workplace environment or interdisciplinary collaboration. Consequently, I studied other disciplines for relevant research.

Literature concerning workplace collaboration and the science of the oral/systemic link provides the foundation for this study. There are four purposes to this literature review. The first is to present an overview of collaboration in the workplace, and second, to explore interdisciplinary collaboration in medical settings. Third, the science behind the oral/systemic link of inflammation and periodontal disease will be reported with its connections to heart disease, diabetes and pregnancy. Lastly, the review presents a brief history of the profession of dental hygiene, focusing on the educational requirements of the dental hygienist and the collaborative nature of the profession.

## **Collaboration in the Workplace**

Collaboration in the workplace took hold during World War II, where institutions and specific centers were formed to help solve the crisis of providing war materials and resources to the military. This production called for wide-scale collaborative efforts in order to produce and manufacture items on a short time cycle (Klein, 2005). By the 1970's and 1980's areas of manufacturing, computer science, biomedicine and high technology relied on interdisciplinary collaboration to compete in the growing international economic environment (Klein, 1990). Today, in business, technology and science, collaborative, adaptive organizational structures are the increasing norm (Parker, 1994).

Collaboration is defined as both a process of interaction and an outcome of decision-making. Collaboration as a process includes open communication between parties, allowing for constructive exploration of differences in search of workable solutions (Gray, 1989; Klein, 2005). A collaborative project can bring together members from multiple disciplines or fields of knowledge to collectively engage in critical thinking for the purpose of meeting their goal. Through collaborative interaction, individuals with differing competencies and skill sets can combine knowledge and experience to create outcomes and answers that no one individual could accomplish alone (Parker, 1994). Collaborative process centrally involves attributes of a democratically oriented flow of communication transactions; this process involves a sharing of information that is beneficial to the outcome goals of the group (McCallin, 2003).

Collaboration as an outcome is defined as how decisions are made within a group. Collaborative decision-making can be measured by shared power, collective responsibility and meaningful opportunities for input by group members (Walker & Daniels, 2005). An exchange of information occurs, leading to completion or closure of the collaborative problem (Kuhn & Poole, 2000). Optimally, the opinions of all are respected, and individual biases are secondary to the goals of the group (Hirokawa et al., 2003).

For the purpose of this study, interdisciplinary is defined as two or more academic or professional disciplines, coming together to engage in the process and outcomes of collaboration. Interdisciplinary can also be referred to as interprofessional, multidisciplinary or cross-disciplinary and cross- professional (Bronstein, 2003; D'Amour, Ferrada-Videla, San Martin Rodriguez, Beaulieu, 2005). These various synonyms are used interchangeably within the literature. Interdisciplinary groups are ones where the members try to integrate knowledge from the different disciplines represented (O'Donnell & Derry, 2005). In this way, a broader knowledge base is drawn from to better facilitate decision-making. Interdisciplinary collaboration, therefore, is an interactive process of multiple entities working together to make effective and workable decisions.

### ***Conditions of Collaboration***

Collaborative process and outcome goals include both organizational factors and interpersonal elements from group members. Competency, clear roles and responsibilities and a shared goal are key to successful collaboration.

#### *Competence.*

Individual members of an effective collaborative team need to be competent in their fields of knowledge and display critical thinking skills (Hargrove, 1998; Tjosvold, 1993). The collaborative team needs members with skill, knowledge and the expertise from their disciplines coupled with a willingness and ability to share (Parker, 1994). Competence needs to be recognized and respected by other team members, evidenced by mutual trust and respect (Lindeke, & Sieckert, 2005; Yeager, 2005). Competency is best accompanied by a diversity of team members. Heterogeneous members who differ in background, expertise, outlook and opinion strengthen the decision-making process (Klein, 2005; Tjosvold, 1992).

#### *Roles/Responsibilities.*

Clear roles and responsibilities are also important to effective collaboration. Team members need to understand clearly their designated responsibilities and roles. Often, individuals within groups will self-organize according to their own specialties and interests (Hargrove, 1998; Tjosvold, 1993). Leadership and facilitation are roles that can contribute to the success or failure of the collaboration (Hirokawa, et al., 2003; Horder, 2004). Standard professional

roles are learned through education, and the setting in which professional training is done (Apker, Propp & Zabava Ford, 2005; Bronstein, 2003; D'Amour et al., 2005). For example, dental hygienists trained in a dental school setting often have opportunity to collaborate with dental students regarding shared patients.

Collaborative efforts then become part of the learning process. Collaborative team members must have constructive conversations about one another's roles within the group in order to understand what those roles are and how they will function.

#### *Shared goals.*

A shared understood goal is an essential component of successful collaboration. Gray (1989) defines creating a shared goal or problem setting as the first step in a collaborative process. There must be a common definition of the problem, and a commitment to collaborate for a desired outcome. Tjosvold (1993) stresses the need for cooperative goals. These are goals that mutually benefit the group and the individuals within the group. Success of the group collaboration brings success to the individual.

Strategic collaborative members are individuals respected by their peers who understand their roles and responsibilities and are committed to the shared understood goals of the group. Willingness to collaborate, positive attitudes towards communication, effective communication skills and hard work are individual contributions important to realizing collaborative goals (Epstein, 2005; Hirokawa et al., 2003).

*Work environment.*

While the individual is important in collaboration efforts, outside support from administration or management is also vital. The institutional or work environment can encourage or disrupt collaborative efforts. For example, Epstein's (2005) study of interdisciplinary collaboration among university researchers concludes that the specific climate or culture within an institutional or business setting can greatly hinder or enhance the collaborative effort. Hirokawa et al.'s (2003) work on interdisciplinary healthcare teams concurs, stating that workplace environment can add or detract from successful collaborative efforts. External feedback and support from administration feeds collaborative success, where administrative nonsupport can doom a collaborative effort to failure.

*Time.*

One component of administrative or managerial support is time. Interdisciplinary collaborative tasks such as goal setting, relationship building and knowledge integration take time. In a supportive educational setting, researchers may be relieved of other duties in order to have time to collaborate with colleagues (Epstein, 2005). In healthcare settings, a supportive administration can encourage collaborative meetings and interactions, by releasing individuals from other duties. Employees with time to effectively collaborate are more likely to generate positive outcomes in decision-making (D'Amour et al., 2005; Hirokawa et al., 2003).

### ***Barriers to Collaboration***

Just as there are conditions for effective collaboration, there are also impediments to collaboration. Impediments or barriers can be broadly defined as any organizational or individual factor that gets in the way of collaborative process or outcome (Klein, 2005).

#### ***Conflict.***

Conflict is an inherent part of any team or organization and collaborative work is no exception (Tjosvold, 1993; Klein, 2005). The challenge is in learning to recognize and manage conflict. Conflict arises when parties have differing underlying interests or goals (Wilmot & Hocker, 2007). A key component of successful interdisciplinary collaboration is a shared common goal. When individuals in a work group have incompatible goals, effective decision-making is hindered (Wilmot & Hocker, 2007). Conflict needs to be managed or resolved for effective collaboration to happen.

Kuhn & Poole (2000) have studied conflict management in collaborative work groups. Results suggest that collaborative groups establish specific patterns of behavior in dealing with conflict. These differing behaviors in managing conflict will affect the outcome goals of the group, and its decision-making effectiveness. Often individuals are rigid in their approaches to dealing with conflict, or will avoid conflict (Tjosvold, 1992). Team members who resist dealing constructively with conflict exhibit individualistic behavior rather than integrative or mutual behavior, therefore, inhibiting collaborative process.



True collaboration “transforms adversarial interaction into a mutual search for information and solutions that allow all those participating to insure that their interests are represented” (Gray, 1989, pp. 7). Solutions to conflict can be attained by the collaborating parties realizing their interdependence. Perceived interdependence is necessary for meaningful interaction (Daniels & Walker, 2001), as each party realizes how each is needed by the other to reach solutions. Parties who recognize their interdependence are more likely to be motivated to solve conflict collaboratively (Wilmot & Hocker, 2007).

#### *Self-Preservation.*

Another impediment to collaboration is an attitude of self-preservation. Often, fear of involvement or of being incorrect holds back a collaborative team from fulfilling its potential (Klein, 2005). Peter Senge, in *The Fifth Discipline* (1990) describes this self-preservation in two ways. First, individuals who take their professional value only from what they do and not as part of a greater enterprise. Individuals with a task-oriented mindset often disengage from any larger purpose and exhibit little sense of responsibility over their work environment or future. They go to work, do their job, go home. For example, the dental hygienist who has no interest in the greater purpose of advancing the profession of dental hygiene, because her mindset is one of ‘I just want to punch the clock and get paid for doing my job’.

Another limiting mindset is the fear of true collaborative involvement. Senge refers to this as “The Myth of the Management Team”. Active

collaborative process often does not happen as individuals avoid actions or ideas that will make them look bad. Disagreement and collective inquiry are seen as threatening to some individuals, and therefore avoided. In this type of work group, joint decisions are often watered-down compromises, or the strong opinion of one individual. This is a pseudo-collaborative team, one who portrays the image of collaboration, while actually squelching critical thinking and a shared, understood goal.

Self-preservation is also evident when individuals feel their own perception of the situation is the most important perspective, and therefore, oppose differing viewpoints (Haythornwaite, 2006; Epstein, 2005). Disciplinary arrogance is apparent when individuals display attitudes of superiority and territorialism towards opinions to proposed solutions. Unlike Senge's pseudo-collaborator, these individuals exhibit professional elitism and do not recognize the interdependent nature of the collaboration and the contribution of each team member. When this occurs, individuals may privilege their own value judgments over others and maintain orthodox expert roles, rather than acknowledging and accepting input from all group members (Klein, 2005). To combat issues of disciplinary elitism, it is important to establish democratic communication parameters and encourage mutual respect and trust in the competency of all group members.

*Bridging knowledge communities.*

Bridging knowledge communities refers to the process of building understanding between differing professions regarding how problems are explored and solutions are achieved. Caroline Haythornthwaite, in her extensive literature review of constraints to collaborative practice (2006) explains;

Members bring with them disciplinary and role specificities that require a certain way of approaching problems, finding evidence, proposing a hypothesis and presenting results. These specificities signal practices that are rooted in individual disciplines and professions, which, when left unexplored, can lead to difficulties in achieving collaborative activity. (p. 764)

Each discipline defines what is expected and valued in a professional, and may reject what is viewed as foreign or different. Each profession or discipline embodies cultural attitudes, along with knowledge and expertise. Enculturation occurs naturally, as individuals engage in the educational process and workplace environments of their specificities (Epstein, 2005). Disciplinary culture can sometimes be a barrier to accepting more than one way to view a problem or achieve solutions.

Bridging knowledge communities may require understanding different profession's language and communication practices. Often, the very language used to define or describe a situation is foreign to other professionals (Kaye &

Crittenden, 2005) For instance, in a medical/dental collaborative effort regarding patient care, the term ‘plaque’ has different connotations depending on location within the body. Plaque in the mouth and plaque in the arteries are both destructive biofilms, but the outcomes and treatment are very different. It is important to distinguish between the two.

Haythornthwaite (2006) describes this barrier as crossing domain constraints in communicating with other professions. Each profession uses distinct knowledge -based language, which is second nature to them, but must be articulated clearly to others outside their specific discipline. For instance, variation in language used to describe patient conditions, tests and treatments can be viewed as exclusive codes of discourse and have the ability to separate collaborators, rather than unifying them (Ray, 1999).

It is important for differing disciplines to be able to articulate precisely what they mean. The more diverse the members of a collaborative team, the more time may be needed to get clear understanding of the input of each individual and specificity of their professional language (Horder, 2004; Epstein, 2005).

True interdisciplinary collaboration requires crossing professional boundaries into what is often unfamiliar territory. Interdisciplinary collaboration also challenges parties to drop preconceived notions of other professions, learn new languages, and see problems through a different lens (Kaye & Crittenden, 2005). Journet’s work on interdisciplinary discourse suggests that integrating and communicating across disciplines requires a “boundary rhetoric,” one that

encompasses the language of the various collaborating disciplines (as cited in O'Donnell & Derry, 2005, p.73).

Barriers to interdisciplinary collaboration can arise from the limiting attitudes of self-preservation, and the difficulties of working with multiple disciplines. Conflict is inherent in collaboration, and must be integratively managed to produce solutions with mutual benefit for all team members.

### **The Nature of Collaboration in Medicine**

Interdisciplinary collaborative practice is not new in medicine. In fact, collaborative healthcare teams are part of patient care in most medical settings (Yeager, 2005). Consider the hospital, where a team may consist of surgeon, critical care nurse, radiologist and social worker. In the medical office, the collaborative team may simply be the general MD, nurse and medical assistant. Medical team members engage in the process of collaboration for the outcome goals of better patient care.

Active execution of this type of collaboration began in the 1970's and burgeoned in the 1980's due to increased evidence suggesting that collaboration between medical professionals generated better patient treatment coordination and treatment outcomes (Yeager, 2005). Today, healthcare is undergoing rapid change, evidenced by increased costs, the ready availability of medical information from the Internet, and growth in specialty care (Hirokawa, DeGooyer, Jr., & Valde, 2003; Lawrence, 2002; Schmitt, 2001). These changes

create an environment where collaboration is needed to help reduce medical costs and provide information to patients about best treatment modalities and care.

Collaboration in medicine is similar to collaboration in any workplace, with the need for individual competence, clear roles and responsibilities, outside support of the working environment and shared understood goals. The primary outcome goal of collaborative process in medicine is achieving optimal patient care (Martin, O'Brien, Heyworth & Meyer, 2005). Quality of life, or life itself is often at stake. Therefore, the collective ownership of goals and shared responsibility for outcomes is especially relevant (Martin et al., 2005; Mattessich & Monsey, 1992).

### ***Characteristics of Effective Healthcare Teams***

Studies on collaboration in medical teams highlight individual attributes and outside administrative support. Hirokawa, et al. (2003) have investigated characteristics of effective health care teams. Stories were solicited from medical team members about their communication in collaborative efforts. After analyzing these stories, researchers identified five characteristics associated with success or failures of effective health care teams. They recorded (1) external support of administration and management, (2) member attributes, (3) interpersonal relationships within the group, (4) organization, including clarity of roles and responsibilities and, (5) process, defined as effective communication between members.

Similar to Hirokawa et al.'s research (2003), Martin et al. (2005) conducted semi-structured interviews of healthcare professionals, specifically a diverse team of physicians and advanced practice nurses serving patients in 40 nursing homes in the Midwest region of the United States. Each of the physicians interacted regularly with one to four nurses in two to four nursing homes. The research team concluded that there were five primary elements to interdisciplinary collaboration: autonomy, interdependence, professional role enactment, proactive problem solving and, action learning. Both studies support the importance of individual team member attributes, clear roles and responsibilities and communication skills allowing for learning and problem solving.

Member attributes and interpersonal relationships include issues of trust, mutual respect for others opinions and attitudes of cooperation (Martin et al., 2005; McCallin, 2003). In medicine, collaborative team members need to recognize the unique contribution each profession offers to the process and be willing to focus on joint goals and success rather than those of the individual (Bronstein, 2003; Yeager, 2006). Mattesich and Monsey (1992), in their meta-analysis of literature on cross-discipline collaboration, found collective ownership of goals and interdependence as key components to successful collaboration. Goal setting and interdependence are also emphasized in Hughes and Mackenzie's (1990) research on physician- nurse practitioner collaboration. Interdependence is a perceptual and behavioral construct exhibiting respect for the other, with an attitude of collective need (McCallin, 2003).

### ***Work Environment***

In all interdisciplinary collaborative efforts the work environment is an important component. The support of the administration or management fosters the collaborative process. Collaboration happens when practitioners can communicate across disciplines and freely use their expertise, knowledge and skills to make appropriate clinical judgments for patient care (Yeager, 2006). A work environment supportive of collaboration better ensures positive outcomes, for both patient care and practitioner satisfaction (D'Amour et al., 2005; Hirokawa et al., 2003; Oliver & Peck, 2006). Conversely, an unsupportive management or administration stifles the collaborative process (Hirokawa et al., 2003).

### ***Status and Power***

Impediments to the collaborative process and outcomes include barriers previously mentioned: dealing constructively with conflict, concerns of self-preservation, and crossing knowledge domains. In medicine, issues of power and status need to be recognized and addressed. By the very nature of job responsibilities and education levels, medical teams are hierarchal. The history of medical professions is built on differing levels of power and status (O'Donnell & Derry, 2005; Makary et al., 2006 ).

Within medicine, communication has typically reflected an authoritarian model, with the doctor's orders being carried out explicitly, and patients and other healthcare



workers taking a passive role (McCallin, 2003; McWilliam et al., 2003). Today's medical environment is quite different, with the focus on collaborative care and the patient positioned as an active member of the collaborative team (Hirokawa et al., 2003; Lawrence, 2002).

When authoritarian directives come from the higher status team member, typically the doctor, nurses often feel angry and frustrated. Collaboration cannot happen when individuals demean or ignore the other's contributions to the collaboration (Cloonan, Davis & Bagley Burnett, 1999). A recent study (Apker et al., 2005) measuring status, role and power within medical professional interactions, found that nurses typically feel tension between the role of expecting to provide quality input into collaborative efforts, while carrying less professional power or status within the team. Nurses did not feel they were able or allowed to collaborate equally in decision-making. Makary et al (2006) studied physicians and nurses in surgical room settings. They concluded that there were substantial differences in the perceptions of collaborative teamwork between the two professions. The higher status physicians described good collaboration as having the nurses anticipate their (the physicians) needs and follow instructions. The nurses described good collaboration as having their input respected by the physicians. These studies highlight difficulties that may be present in medical collaborative teams. An attitude of superiority is not conducive to collaborative process as all members of the team need to have mutual and reciprocal respect for all other members regardless of their differing roles or status (Bronstein, 2004; Walls, 2005). Despite the benefits of working in collaborative teams, nurses often still

feel controlled in their work environment by higher status physicians and surgeons (O'Donnell & Derry, 2005).

### ***Interdisciplinary Education***

Increasing interdisciplinary education and shared learning experiences in healthcare education are ways to advance interdisciplinary collaboration (Yeager, 2005). In an evaluation study of interdisciplinary teams working together in education, health care students from medicine, nursing and pharmacology report that continuous exposure to other professions lead to improved attitudes towards teamwork and a better understanding of what differing professions offer to the collaboration (Curran, Mugford, Law & MacDonald, 2005).

Another pilot study tested a simulated training program with interprofessional student teams comprised of medical and nursing students. After working together on patient needs and scenarios, it is concluded that important learning and collaborative processes happen between differing professionals when they work together. This learning includes reflection on personal roles and understanding of the other's role (Kyrkjebo, Brattebo, & Smith-Strom, 2006).

Interdisciplinary education can help promote mutual respect and trust in the competence of others. Creating an awareness of the skills, knowledge and attributes that each profession brings to the interaction serves to dispel barriers to collaboration such as status posturing and self-preservation (Pringle, Levitt, & Horsburgh, 2000). Rafter et al (2006) reviewed current literature on

interprofessional education and conducted a preliminary survey on seven academic health centers. Research recommends that topics such as ethics, communication skills, and evidenced-based practice could effectively be taught in an interprofessional setting. Currently, some academic health centers are attempting to develop interprofessional education programs, however, most of these efforts do not include dental students with medical students.

At Georgetown University, students and faculty in medicine and nursing have developed an interdisciplinary curriculum in clinical ethics. The goal is to bring students together collaboratively in order to prepare future clinicians for the realities of practice. Clinical decision-making and patient care are increasingly collaborative endeavors dependent on multiple disciplines working together (Cloonan et al., 1999).

Bridging knowledge communities is easier if one better understands what expertise each discipline is bringing to the collaborative process, and how they might work together towards a common goal. For instance, students in medicine, nursing, pharmacy and dentistry need to learn to work together as a team in order to provide efficient, high quality patient care. Cross-discipline education at all levels of training for healthcare providers would help achieve and sustain interdisciplinary collaboration in healthcare (Yeager, 2005).

Hopefully, interdisciplinary education will become the norm in healthcare education. The changing face of medicine, with increased patient expectations, the growing complexity of medical care, and the developing science of discovery

require the collaborative expertise of many disciplines working together (Hirokawa et al., 2003; Lawrence, 2002).

### **The Oral/Systemic Link**

As scientific research on the correlation between oral and systemic health problems has increased in recent years, medical and dental professionals have become more aware of the implications of oral disease to systemic disease. These oral/systemic disease connections suggest a need for greater interdisciplinary collaboration between medical and dental professionals in order to maximize appropriate patient diagnosis and treatment plans.

### ***Inflammation***

In a very real sense, oral/systemic disease correlations can be explained through the body's normal host response of inflammation (Carpenter, Eversole & Kaplowitz, 2004; Reynolds, 2005). Anaerobic bacteria present in periodontal disease damage the hard and soft tissues of the oral cavity (Hein, 2005; Lamster & Lalla, 2004). When injury and tissue destruction happens, the body responds on the cellular and tissue levels to combat the injurious actions. This protective response is called inflammation. An increase in the inflammatory response is the body's way of destroying, diluting or walling off the injurious agent or bacteria to allow for healing (Nejat, Nejat & Nejat, 2005). The changes wrought by inflammation are well documented in medical annals. The classic signs of inflammation are redness, heat, swelling, and pain (Carpenter et al., 2004). A

good example of this is when a person gets a splinter in their finger. The area becomes red and puffy, perhaps hot to the touch and painful. This is the body's inflammation response in action. The goal of the response is to wall off that area where the splinter resides, fight the bacteria that have been introduced and promote healing to the injured site.

While the inflammatory response is considered of prime importance to the body's immune system in fighting disease, it can also have deleterious effects. The inflammation response is carried out at the cellular level with many different agents joining in the fight. One action during inflammation is an increased vascularity, or blood flow, to the infected area. This increase allows cellular components to enter and travel through the bloodstream to different parts of the body (Carpenter et al., 2004; Reynolds, 2005). These cellular components contain bacteria from the injured site. This is a basic explanation of how bacteria from the oral cavity can travel to other parts of the body.

### ***Periodontal Disease***

Periodontitis is an infection of the hard and soft tissues that surround and support the teeth. It is a major cause of tooth loss in adults. The chief causal agent is plaque, the sticky film of bacteria that continually coats the teeth. These bacteria create toxins that work to destroy the gum tissues. Scientists estimate the Periodontitis affects about 80% of Americans over the age of 65 (American Dental Association, 2006) In 2000, then U.S. Surgeon General David Thatcher

called this disease the ‘silent epidemic’, and stressed the negative correlation between oral disease and systemic disease (Satcher, 2000).

Periodontitis is the most destructive oral disease, because unlike gingivitis, it’s effects are not reversible. Periodontitis is a chronic infection that often progresses slowly and painlessly. It can go undetected for years, and patient compliance to treatment recommendations is limited (Lamster & Lalla, 2004). Due to the chronic nature of periodontal disease, chronic inflammation results. This long-term, never ending host response of inflammation harms the body, even as it works to protect it. There is a landslide effect of bacteria being carried away from the infected site in the blood veins and to other bodily parts and systems (Van Dyke & Serhan, 2006). Another way periodontal bacteria can spread from the oral cavity is by the physical activities of chewing and brushing one’s teeth. With these physical disruptions, small bacterial microbes break free from the inflamed gum tissues and can seep into the bloodstream (Guynup, 2006).

The ability of bacteria to move about the body, and the effects of chronic inflammation are the causal agents in the link between oral and systemic disease. There are multiple systemic diseases and conditions that have strong connections with oral disease, including obesity, respiratory diseases and osteoporosis (Al-Zahrani, Bissada, & Borawski, 2003; Genco, Grossi, Ho, Fusanori, & Murayama, 2005; Krall, 2001; Lamster & Lalla, 2004; Nejat et al., 2005) Although research is increasing in these areas, the largest body of research concerning the

oral/systemic connection focuses on three systemic conditions; cardiovascular disease, diabetes and adverse pregnancy outcomes.

### ***Cardiovascular Disease***

The relationship between cardiovascular disease and periodontal disease has been widely studied in recent years. The host, or body's response to the bacteremia of periodontal disease is the bridge from the oral cavity to the cardiovascular system. This stimulation of the host response to oral infections may result in two major events that play key roles in heart disease, vascular damage and blood clotting (Renvent, Pettersson, Ohlsson, & Rutger Persson, 2006). When the body perceives the burden of bacterial abuse within the mouth, signals are sent to the liver to produce certain cellular mediators, with C-Reactive Protein (CRP) being primary (Genco, 2004; Paquette, Nichols, & Williams, 2005; Reynolds, 2005). CRP is associated with higher incidence of heart disease, as elevated CRP levels have been shown to weaken the walls of blood vessels. When vessels are compromised, any plaque build-up within the vessel can more easily break off, leading to a cardiovascular event and blood clotting.

Bacteria pathogens themselves may also invade the heart and coronary arteries, which weakens cell walls and can lead to thrombosis formation (Gibson, Yumoto, Chou, & Genco, 2006). Specific oral bacteria have been found in vascular and heart tissue. *P. gingivalis*, a chief bacterium in oral disease, can reside in heart tissues and plaque build-ups within vessels (Paquette et al., 2005). In one

study, *P. gingivalis* was found in 42% of arterial plaques (Chiu, 1999). The chief correlations between cardiovascular disease and periodontal disease are the body's host response of inflammation and cellular mediators and the oral bacteria itself. Blood vessel walls are weakened and plaque build-up within arteries is affected (Gibson et al., 2006; Lamster & Lalla, 2004; Nejat et al., 2005).

Individuals with periodontal disease are 30% more likely to have cardiovascular disease than their orally healthy counterparts (Paquette et al., 2005). In the United States, 37% of all deaths annually are attributed to cardiovascular disease (American Heart Association, 2006). The link between these two disease processes presents a strong argument for increased collaboration between dental and medical professionals concerning patient care and treatment plans. Patients who present with symptoms of cardiovascular disease should be referred to a dental office for an oral disease assessment. Conversely, patients in a dental office presenting with oral disease should be educated about systemic disease correlations (Nejat, et al., 2005; Paquette et al., 2005).

### ***Diabetes***

Diabetes is a systemic disease that affects the metabolism of carbohydrate, protein and fat. According to the American Diabetes Association, 20.8 million Americans currently have diabetes (American Diabetes Association, 2007). There are two types of diabetes, Type I, which is caused by defective production of insulin (a hormone secreted by the pancreas), and Type II diabetes,



which is the body's inability to correctly process and use needed insulin (Nejat, et al., 2005; Centers for Disease Control and Prevention, 2005). When the body does not have sufficient stores of insulin, sugars build-up in the bloodstream and cannot be transported to other tissue cells. With Type II diabetes, either the pancreas does not produce enough insulin, or the insulin does not function properly at the cellular level. This leads to the condition known as insulin resistance, where again, the sugars cannot be transported to outlying tissues, causing tissue starvation and an unhealthy build-up of sugars in the blood (Mealy & Rose, 2006). Diabetes is associated with several systemic complications, including retinopathy, nephropathy, neuropathy, angiopathy and wound healing (Salvi, Kandylaki, Troendle, Persson & Lang, 2005). In 1993, periodontitis was proposed as the sixth complication of diabetes (Loe, 1993). This addition is significant because with diabetes and periodontal disease, the connection is bi-directional; meaning certain responses and aspects of each disease directly affects the other (Najjar, Rutner, & Shwartz, 2004; Mealey & Rose, 2007).

Inflammation plays a key role in the bi-directional connection of periodontal disease and diabetes. First of all, diabetes increases the prevalence and severity of periodontal disease by stimulating an increase in the body's inflammatory response, which, over time, creates micro vascular complications (Salvi et al., 2005). When the tiny vessels in the mouth are weakened through inflammation (micro-vascular complications), periodontal bacteria are not readily removed or disrupted causing increased severity of the disease. Second, as energy

pathways are less effective due to the body's inability to process sugars, glycogen end products are produced. These are the waste products of the energy cycle. These glycogen end products serve to transform important inflammatory cells into more destructive cells. These cells cause increased damage to the oral tissues (Najjar et al., 2004; Mealey & Rose, 2007).

Diabetes also results in changes in the function of immune cells, which weaken the immune system (Mealey & Rose, 2007). A weakened immune system is one explanation for the diabetic complication of decreased wound healing. Periodontal pocketing within the mouth consists of persistent bacterial wounds. The body cannot efficiently mount a successful immune campaign to properly heal the infection or insult. Therefore, a weakened immune system cannot effectively fight periodontal infection, leaving the body vulnerable to increase in severity. Studies conducted over the past twenty years have concluded overwhelmingly that diabetes is a significant risk factor in developing periodontitis (Taylor, 2001). In fact, diabetes can be considered the number one systemic risk factor for Periodontitis (Loe, 1993).

How then does periodontal disease affect diabetes? Through the conduit of inflammatory pathways, for instance, previously in this study inflammation has been identified as a result of periodontal disease. Due to the increased inflammation associated with periodontal disease, certain inflammatory mediators are released into the blood. These mediators work to exacerbate insulin resistance, which is detrimental to the diabetic (Mealey & Rose, 2007; Moritz & Mealy,

2006)). Increased insulin resistance leads directly to a decrease in glycemic control, which is the chief issue diabetics seek to manage. A study in the *Journal of Periodontology* reported that patients with severe periodontal disease have a higher risk for worsening glycemic control over time, compared to diabetics without periodontal disease. Those with severe periodontal disease proved to have an increased risk of worsening glycemic control 6-fold in a two year period (Taylor, Burt & Becker, 1996). Diabetics with uncontrolled or poorly controlled glycemic indexes have a compromised immune system and an increase in glycemic waste products, which restrict actions necessary for healing, and limit bacterial removal and eradication. Thus, the diabetic has decreased resistance to oral infections. Periodontal disease affects the metabolic actions needed for glycemic control within the diabetic (Moritz & Mealy, 2006).

Clinical practice reveals that the more poorly controlled the diabetes is, the more severe the periodontal disease is likely to be. The duration of diabetes within a patient, and the degree of glycemic control, are closely associated with the severity of periodontal disease (Ryan, Carnu, & Kamer, 2003). Diabetics with uncontrolled glycemic indices will find it difficult to control their periodontal disease. Conversely, diabetics with uncontrolled periodontal disease will find it difficult to keep their glycemic indices controlled. Because periodontal disease is among the most common chronic inflammatory diseases and diabetes is strongly associated with inflammatory pathways, both diseases are uniquely intertwined and greatly affect one another (Mealey & Rose, 2007).

Due to the strong correlation between periodontal disease and diabetes, patients could benefit from dental/medical collaboration on appropriate treatment plans. From the medical side, all diabetic patients should be routinely referred to a dental specialist for oral health assessments and treatment, as a part of overall disease management. Medical professionals should inform and educate their diabetic patients on the risks of and for periodontal disease. The dental professional should screen a patient's medical history for the possibility of diabetes and if needed, refer them for appropriate laboratory and medical tests for definitive diagnosis and treatment (Moritz & Mealy, 2006; Paquette et al., 2005). Excellent oral healthcare needs to be emphasized to diabetic patients as a strategy to better control their overall health.

### ***Adverse Pregnancy Outcomes***

Preterm birth is considered the leading perinatal problem in the United States (Gibbs, 2001). Preterm birth is defined as delivery at less than 37 weeks gestation and low birth weight is defined as a birth weight less than 2,500 grams (World Health Organization, 2007). Increased morbidity and mortality is often the result of preterm birth. Those babies who survive have increased risk of respiratory diseases and neurodevelopment problems (Gibbs, 2001; Offenbacher, 2004). In fact, preterm births account for 12.5% of all U.S. births and 70% of all perinatal deaths. Preterm birth is the primary adverse outcome of pregnancy (Goldenberg & Culhane, 2006).

Periodontal disease has been investigated as a contributor to preterm, low-birth weight babies. Scannapieco, Bush, & Paju (2003) conducted a systematic review to investigate and evaluate evidence linking periodontal disease to preterm, low-birth (PTLB) babies. Twelve studies were assessed; six case-control studies, three longitudinal or cross-sectional studies and three intervention studies. They concluded that periodontal disease may be a risk factor for PTLB, and that preliminary evidence suggests that periodontal treatment and intervention may reduce adverse pregnancy outcomes.

In 1996, a case-control study was done comparing mothers with PTLB babies to those with normal weight babies. An odds ratio of 7.9 showed a clear association between periodontal disease and PTLB babies (Offenbacher et al., 1996). Further studies have substantiated this association with outcomes stating that pregnant women with periodontal disease are four to eleven times more likely to have PTLB babies than mothers free of periodontal disease (Jeffcoat et al., 2001; Madrianos et al., 2001). Periodontitis is now associated with the increased risk of the adverse pregnancy outcomes of preterm low-birth weight babies (Jeffcoat et al., 2003; Michalowicz et al., 2006).

How does periodontal disease affect pregnancy outcomes? Once again, the actions of inflammation are cited. Periodontal disease triggers a chronic inflammatory state, resulting in many systemic actions. The liver is signaled to produce certain cellular mediators, with C-Reactive Protein (CRP) being primary (Genco, 2004). CRP levels in general are found to be 65% higher in pregnant

women, than in non-pregnant women (Pitipat, et al., 2006). This heightened state of naturally occurring inflammatory response in pregnant women is the mechanism by which labor occurs. When the inflammation abuse of periodontal disease is added to the existing systemic inflammatory state, an overload is created, often sending the body into premature labor (Gibbs, 2001; Offenbacher, 2006).

Periodontal bacteria and its by-products also affect adverse pregnancy outcomes. The gram- negative anaerobic bacteria of periodontal disease have been found in the amniotic fluid, placenta, and amniotic membranes of the uterus. This is evidence of direct transmission of oral bacteria to the fetus (Han et al., 2004; Offenbacher, 2006). When oral bacteria reach the fetus and surrounding membranes, the fetus is stressed and a new inflammatory response is activated towards the infection. The mediators of the inflammatory response can cause the cervix to dilate and trigger uterine contractions, prompting premature labor (Offenbacher, 2006; WHO, 2007).

Recent studies show that periodontal therapy is safe for pregnant women. Treatment of this disease appears to reduce the relative incidence of preterm births by 3.5 (Jeffcoat et al., 2003; Michalowicz et al., 2006; Offenbacher et al., 2006).

Periodontal disease and the inflammation it causes can be serious risk factors for preterm, low-birth weight babies. Treating periodontal disease in pregnant women may lead to healthier outcomes in newborn babies. An increased

dialogue between pregnant women, their obstetricians and their dental professionals, could better protect against adverse pregnancy outcomes.

### **Profession of Dental Hygiene**

This research seeks to understand how dental hygienists view their role in interdisciplinary collaboration and how they experience interdisciplinary collaboration in their work setting. Due to the science of the oral/systemic link, there is a need for increased interdisciplinary collaboration between dental and medical professionals (Rhodus, 2005; Vissink, & Brand, 2006).

The dental hygienist is a well-educated, licensed and registered member of the dental care team. The history of the profession, strict educational standards and the theoretical base of collaborative practice makes the dental hygienist a critical, competent and strategic member of the interdisciplinary team.

### ***History***

In the 1880's Dr. Alfred C. Fones, a dentist who believed in the need for the public to have dental education, started a movement within the profession of dentistry. He saw the extreme dental needs of his patients and realized that the public could greatly benefit from education and preventive services for their teeth and mouth. He decided to train women to go into homes, schools and public places to teach dental prevention and good oral care. Thus, Dr. Fones is considered the Father of Dental Hygiene; he trained the first class of 'dental nurses'. The term 'nurse' was quickly dropped, because of its connotation with

disease, and the term hygienist was coined, to more closely resemble the focus on oral health (Motley, 1988). These early hygienists worked primarily in schools offering prophylactic care, and instruction in brushing and flossing. Additionally, they provided education in nutrition and general hygiene (Motley, 1983). While public health is still a strong arm and focus of the profession of dental hygiene, the majority of dental hygienists work as clinicians in private practice, employed by one or more dentists.

The American Dental Hygienists' Association (ADHA), founded in 1923, serves as the professional voice for dental hygienists (Motley, 1983; ADHA, 2006). In 2006, the ADHA released an updated model of the roles dental hygienists assume in today's healthcare environment. This model includes roles of clinician, educator, advocate, administrator/manager, and researcher, with public health being an integral component of all (ADHA, 2006). Today, many hygienists operate in managerial positions within healthcare companies, or direct and carryout research in university settings. The role of patient advocate has received significant attention in recent years, as dental hygienists have gone to state and federal legislators, working to pass laws that provide more access to care for underserved populations.

Dental Hygiene Education programs were first accredited in 1952. A collaborative effort of three professional organizations, the American Dental Hygienists Association, the National Association of Dental Examiners and the American Dental Associations Council on Dental Education, generated the



educational standards. The accreditation standards have been revised five times, with the latest being in 1988 (American Dental Association Commission on Dental Accreditation, 1988).

Since the inception of the profession, dental hygiene has been under the responsibility and authority of dentists. Today, individual dental boards within each state govern the profession of dental hygiene. For example, the Oregon Board of Dentistry (OBD) governs Oregon hygienists. The OBD is the governing body which disciplines dental professionals, oversees scope of practice issues and sets educational standards for dentists, hygienists and dental specialists. The mission of the Oregon Board of Dentistry is to assure that the citizens of Oregon receive the highest possible quality dental care (Oregon Board of Dentistry, 2007a).

Depending on the specific practice laws and rules within each state, hygienists may now provide prophylactic care, education, assessment, non-surgical periodontal therapy, sealants, fluorides, local anesthetic, nitrous oxide, and place and carve alloy and composite fillings.

### ***Education***

Dental Hygiene education follows rigorous standards from programs that are accredited by the Commission on Dental Accreditation (CDA), which is a specialized review body recognized by the United States Department of Education. The CDA operates under the auspices of the American Dental Association. The Commission on

Dental Accreditation sets the standards for dental hygiene education programs by mandating curriculum content and graduate competencies (Rowley, 2007).

Dental hygiene accredited curriculum must include at least two academic years of full-time instruction at the postsecondary college level. In two- year college programs the dental hygiene graduate must receive an associate degree. Programs within four-year universities and colleges may be awarded associate degrees, certificates or baccalaureate degrees (ADACDA, 1988). In addition, each dental hygiene student must pass a National Dental Hygiene Exam and a state or regional specific clinical exam in order to be registered and licensed within individual states.

Dental Hygiene curriculum must include content in four areas, general education, biomedical science, dental science, and dental hygiene science. The following are more specified requirements in each of the content areas.

- General Education: speech communication, writing, psychology and sociology
- Biomedical Science: anatomy and physiology, immunology, chemistry, biochemistry, microbiology, pathology, pharmacology and nutrition
- Dental Science: head and neck anatomy, tooth morphology, periodontology, oral embryology and histology, pain management, oral pathology, radiography and dental materials
- Dental Hygiene Science: patient management, patient assessment,

treatment planning, oral health education, infection control, instrumentation, special needs patients, legal/ethical issues, community dental health and medical emergencies

Each accredited dental hygiene program must integrate these content areas with sufficient scope and depth to prepare students to achieve competence in all the components of dental hygiene education. In addition to these content areas, the dental hygiene student must complete over 500 hours of supervised clinical practice with a diverse patient population (ADACDA, 1988). Dental hygiene graduates must be competent in treating patients of all ages, including children, adolescents, adults and geriatric patients. This diversity includes patients with mental, physical or psychological needs and those with all classifications of periodontal disease from slight to moderate and severe. Upon completion of the required education components, dental hygiene graduates are expected to be competent in assessing the needs of the patient, planning their treatment, providing dental hygiene treatment and evaluating treatment outcomes (Rowley, 2007).

### ***Collaborative Practice***

The collaborative practice model is taught as one of the foundations of dental hygiene practice. This model teaches that dentists and dental hygienists work together, each offering professional expertise to reach the goal of optimal patient care (Darby, 1983, 1989). The relationship should be one of co-therapists,

each with unique and differing roles. In the collaborative practice model, the dental hygienist is viewed as the expert in dental hygiene interventions, treatment planning and evaluating (Darby & Walsh, 2003). In dental hygiene educational settings, the student works closely with the clinical dentist in collaborative decision-making. However, in real life practice settings, the collaborative model of care is highly dependent on the attitude of the employer dentist.

Dentists and dental hygienists work in an interdependent professional relationship. Dentists typically need hygienists because they are the preventive arm of dentistry and serve as the touch point for most patients within a dental practice. The hygienist can assess the medical and dental health of a patient, while providing prophylaxis and preventive services much more economically than the dentist can. Often, patients have a much closer relationship with the dental hygienist, as he/she is the one who typically spends more time with them during the dental appointment. Patients appreciate this consistency in care and the dentist profits from this hygiene - patient relationship.

Hygienists are dependent on dentists for employment and therefore, any monetary and non-monetary benefits. While this relationship is subordinate – superior, the hygienist often has collaborative freedom to communicate with the front office personnel and other dental specialists about patient needs and care.

Increasingly, someone from the dental team needs to communicate with medical professionals concerning shared patients (Rhodus, 2005; Vissink & Brand, 2006). Thus, the collaborative model that is taught in dental hygiene

curriculum, and often is at work between the dentist and dental hygienist, needs to be expanded to include communication and collaboration with other medical specialists. The increasing need for interdisciplinary collaboration is driven by the current science connecting oral and systemic diseases, providing new concerns for the whole health of the patient.

### **Research Questions**

In light of research and literature in the areas of collaboration in the workplace, and in medicine, the oral/systemic link and the profession of dental hygiene, this study is examining four research questions.

#### **R1: How do dental hygienists view their role in interdisciplinary collaboration within their professional setting?**

- a. What is their experience with interdisciplinary collaboration?
- b. How important is interdisciplinary collaboration to the dental hygienist?
- c. To what extent do dental hygienists take a leadership role in interdisciplinary collaboration?

#### **R2: How do dental hygienists differentiate between dental and medical professionals when considering interdisciplinary collaboration?**

- a. To what extent do dental hygienists need to collaborate with medical/dental professionals?
- b. To what extent do dental hygienists initiate interdisciplinary collaboration with medical/dental professionals?
- c. Do they feel their opinion respected by medical/dental professionals?
- d. Do they feel medical/dental professionals perceive their input as valuable?
- e. Who are dental hygienists most likely to communicate with regarding patient care from the medical/dental team?

**R3: What barriers do dental hygienists face in becoming an active participant in interdisciplinary collaboration?**

**R4: What communication skills do dental hygienists perceive as important to interdisciplinary communication?**

## **CHAPTER THREE**

### **METHODS**

#### **Orientation**

Interdisciplinary collaboration is both a process of interacting and an outcome of decision-making. Collaboration between medical and dental professionals is important for dealing with corollary connections between oral disease and systemic conditions such as cardiovascular disease, diabetes and pre-term, low birth weight babies. Optimal patient care and treatment plans are greatly enhanced by interdisciplinary collaboration (Martin et al, 2005; Yeager, 2005).

This phenomenon places the dental hygienist in a unique position within the interdisciplinary team. The dental hygienist frequently communicates about patient care to other members of the dental office. When medical information is needed concerning a dental patient, the hygienist will often be the dental team member who contacts the appropriate medical office. Dental hygienists typically spend quality time with patients, updating their health histories, listening to their medical stories and conditions and performing needed prophylactics and treatment. Consequently, the dental hygienist can make clear assessments of the patient's probable conditions and

needs. The dental hygiene assessment consists of significant information needed for optimal patient care. How does this information get communicated? Does the dental hygienist feel comfortable and confident with interdisciplinary collaboration?

This research seeks to understand how dental hygienists view their role in interdisciplinary collaboration and how they experience interdisciplinary collaboration in their work setting. The study examines the barriers to involvement in interdisciplinary collaboration and communication skills needed for effective collaboration.

The study employs an original survey to gather information on these issues. Chapter Two concluded with the presentation of the research questions. The objective of this chapter is to discuss the method used to provide answers to those questions.

### **Survey Design**

To address the research questions, I initially researched dental, medical and dental hygiene journals and publications to find surveys dealing specifically with interdisciplinary collaboration issues. I failed to discover any. I then consulted with the American Dental Hygienist Associations' Director of Research for possible surveys. He provided a 2004-archived survey, written and administered by the Nebraska Dental Hygiene Association dealing with demographics (Smith, M. personal email, 2006). I modified the Nebraska survey



for use in the demographic section of my research instrument. Survey design was further crafted and detailed with the help of the director of the Oregon State University's Writing Center.

This study uses an original survey entitled, The Swanson Jaecks Interdisciplinary Collaboration Survey (SJICS). The SJICS was presented to Oregon dental hygienists, a volunteer population I could access easily.

The survey begins with the operational definitions of collaboration, interdisciplinary and interdisciplinary collaboration within the context of dental patient care. Five sections follow, each with corresponding instructions, for a total of thirty-seven questions on content and eight questions on demographics. The survey instrument appears in Appendix A.

Section one, Foundation Questions, is divided into two parts. Part one consists of 14 Likert scale questions that address current interdisciplinary practices, the need for interdisciplinary collaboration and perceptions of confidence when collaborating with both medical and dental personnel. Part two asks respondents to evaluate who within the dental team should collaborate with other medical and dental personnel when dealing with the specific diseases and conditions of cardiovascular disease, diabetes and periodontically involved pregnant women.

The second section, Roles, is divided into two parts. Part one consists of ten Likert scale questions focusing specifically on issues of leadership, value and respect when collaborating. Part two asks respondents to rank roles

fulfilled in patient care. These questions include roles the hygienist fulfills personally, roles the profession of dental hygiene fulfills and how those roles might change in the future.

Barriers, the third section, focuses on perceived obstacles to becoming an active voice in interdisciplinary collaboration. Twelve choices are presented and participants are asked to place check marks next to those that apply. The directions encourage elaboration on any point. Barrier choices include: insufficient education, lack of confidence in using professional language, being taken seriously, not one's job, insufficient knowledge of medical diseases/conditions, insufficient knowledge of dental disease/conditions, unable to identify correct contact person, need more professional freedom, unsupportive work environment, insufficient time, willingness of other professionals to collaborate with a dental hygienist, and, other.

Section four, Communication Skills, centers on communication skills needed to better participate in interdisciplinary collaboration. The first part consists of eight possible communication areas and participants are asked to place a check mark beside all that apply. The eight include: motivation/persuasion strategies, negotiation, power/influence strategies (e.g., how to get others to see/hear your viewpoint), listening skills, speaking skills, dealing with difficult people, how to work effectively in teams and leadership skills. The remaining questions in section four ask participants if they have had communication skill training, and if so, what topics were covered and where the training occurred.

Respondents are also asked if their employer paid for this training and if their work environment is supportive of this type of communication training.

The final section deals entirely with demographics. There are eight questions presented designed to discover data such as what part of the state participants live in, where do they practice dental hygiene, in what type of practice or business do they primarily work in and what are their primary responsibilities in their work. Participants are asked their level of education and other job titles they may hold within their practice setting.

An introductory letter accompanied the survey. This letter briefly described my graduate student status, the significance of the study, and its purpose. Informed consent and the volunteer nature of the study were explained. Respondents were assured of anonymity and thanked in advance for their participation. The introduction letter appears in appendix B.

### **Pilot Test/Preview**

After Institutional Review Board approval from Oregon State University, the survey was presented to eight Oregon dental hygienists with diverse educational levels and practice backgrounds. The group consisted of hygienists with associate degrees, bachelors' degrees and masters' degrees. Employment and experience ranged in settings from private practice to educators and public health.

All of these hygienists were personal acquaintances of the researcher and were specifically asked to complete or review the instrument. Critiques were solicited regarding how much time was required to complete the survey, and how effective was the language, style and content in measuring the intended variables. Very specific comments were gleaned from the pre-test participants, which directed important changes to the instrument. Elements of content were made clearer, language usage changed and style of questioning was focused. This increased the measurement validity of the instrument.

## **Data Collection**

### ***Participants***

The survey sample is cross-sectional, voluntary, and non-random sample. It consists solely of dental hygienists registered to practice within the State of Oregon. Volunteer sampling was selected because I had access to meetings where prospective participants were gathered. Anonymity was assured through the survey design and administration. Respondents freely chose to participate in the research. The Swanson Jaecks Interdisciplinary Collaboration Survey was administered at two events. At these meetings, I explained the purpose of the study and requested volunteers.

### *Administration*

The first event was the Annual House of Delegates of the Oregon Dental Hygienists Association (ODHA), held October 26-28, 2006 in Salem Oregon. This series of meetings included continuing education activities, legislative assemblies, professional issues forums and reference committee hearings. Throughout the various meetings during this October weekend, I gave announcements briefly explaining the research project, the potential risks and benefits to participants, issues of confidentiality and anonymity and asked for volunteer participants to complete the survey. A specific receptacle was placed near the exit doors of the meeting rooms and participants dropped off completed surveys there.

The second event was a meeting of the Marion County Dental Hygiene Study Club (MCDHSC) held November 13th, 2006. The MCDHSC has over 100 dental hygiene members, providing a potentially large group of participants. I gave an announcement at the beginning of the meeting briefly explaining the research project, the potential risks and benefits to participants, issues of confidentiality and anonymity and asked for volunteer participants to complete the survey. A specific receptacle was placed near the exit doors of the meeting room and participants dropped off completed surveys as they left the meeting.

### ***Response Rate***

At the ODHA meetings, 104 surveys were distributed and 61 returned, for a response rate of 58.6 %. At the MCDHSC meeting, 68 surveys were distributed with 42 returned, for a response rate of 61.7 %. From the 172 surveys distributed, a total of 103 were completed and returned. The overall response rate was 60%. Respondents returned the surveys directly to a marked receptacle at the end of the meetings, or mailed them back to me in a self-addressed pre-stamped envelope.

### **Data Analysis Methods**

All statistical analyses were performed using the data analysis tools in Microsoft Excel version 11.2 (Microsoft Excell, 2006). Descriptive statistics and histograms were generated for all responses. I performed a Spearman's rank correlation analysis to investigate correlations between appropriate variables to determine positive or negative relationships and the relative strength of those relationships. For instance, what is the nature of the relationship between the perceived need to collaborate with medical professionals and the level of experience in collaborating with medical professionals?

Finally, to address my research questions regarding issues of experience, confidence, leadership practices, and the perceived need for interdisciplinary collaboration, I utilized Mann Whitney U tests. For example, Do dental

hygienists who live in urban areas have more experience in interdisciplinary collaboration than those dental hygienists living in rural areas? The results appear in the next chapter.

## **CHAPTER FOUR**

### **RESULTS**

This research examines dental hygienist's views of interdisciplinary collaboration, including barriers to collaboration and communication skills needed for involvement. It does so by asking dental hygienists for their perceptions regarding a variety of interdisciplinary collaboration factors in their profession. This study uses an original, quantitative survey entitled, The Swanson Jaecks Interdisciplinary Collaboration Survey (refer to Appendix A). All statistical analyses have been performed using data analysis tools in Microsoft Excel version 11.2 (Microsoft, 2006). Analyses include frequencies, measures of central tendency, correlations and comparisons.

The discussion of results will begin with a demographic profile of participants. Data will then be organized and reported according to the four research questions presented at the end of Chapter Two.

#### **Profile of Study Participants**

Participant descriptive data provide a foundation for understanding survey results. 103 participants returned completed surveys. The demographic section asked participants questions ranging from years in practice to primary responsibility in their work setting.



Survey respondents generally work in urban and suburban areas and vary from having limited professional experience to over 25 years in practice. The majority of respondents (68%) live in the northwest corner of Oregon. The surveys were distributed at two meetings, both in northwest urban settings. This would account for the lower number of respondents from rural practice areas and from differing parts of the state.

Respondents overwhelmingly answered clinician (77%) when asked about their primary work responsibility. Private practice was the primary type of work setting reported (67%), followed by dental HMO, education and independent practice, each with (10%). Respondents report a fairly equitable distribution of years in practice, 0-10 years (38%), 10-25 years (35%), and 25+ years (27%).

Almost one-half of study participants hold bachelor degrees (48%). Over one-third have associates degrees and almost one in eight have earned master's degrees. The majority of dental hygiene schools in Oregon are associate degree programs. There are currently four AA programs and two BS programs within the state. Historically, the Oregon Health and Science University carried a Bachelor of Science Dental Hygiene (BSDH) program, which closed in 2000. However, in August of 2006, Pacific University in Forest Grove, OR started a new BSDH program, to help fill the void of baccalaureate degree programs.

Finally, over two-thirds of respondents are members of the American Dental Hygienists' Association. Member hygienists have access to current

professional information and therefore may be more aware of trends and issues of current research affecting the profession of dental hygiene.

### **Research Questions**

To address this study's purpose, four research questions are featured. Respondent data are presented according to those questions.

#### ***Research Question One:***

#### **How do dental hygienists view their role in interdisciplinary collaboration within their professional setting?**

The first research question addresses dental hygienist's perceptions of their role in interdisciplinary collaboration. Aspects of role include experience, importance, leadership, knowledge utilization, and future. Results of role perceptions are presented in Table 4.1.

#### ***Role factors.***

Three items generated mean scores above 4, or reasonably strong agreement. Hygienists noted the importance of interdisciplinary collaboration, the future of interdisciplinary collaboration and knowledge utilized as key factors. Respondents agreed that the role of the dental hygienist is important in interdisciplinary collaboration even though they only occasionally have experienced it in daily practice. They concur that their knowledge is utilized when they engage in interdisciplinary collaboration and that the dental hygienist will have a greater role in interdisciplinary collaboration in the future. The lowest

ranked variable is experience in interdisciplinary collaboration, although the collective response indicates a modest degree of agreement.

**Table 4.1 Role Factors in Interdisciplinary Collaboration (IC)  
(n=103)**

<b>ROLE FACTORS</b>	<b>X</b>	<b>S.D.</b>
I have experience in IC	3.27	0.98
My knowledge is utilized in IC	4.2	0.73
The role of the dental hygienist is important in IC	4.58	0.55
The dental hygienist will have a greater role in IC in the future	4.42	0.70
I take a leadership role in IC within my work setting	3.82	0.98

*Correlations.*

Correlation analysis was performed on a number of variables. Only those correlates that are statistically significant ( $p \leq 0.05$ ) are reported. Experience relates positively to the importance of the dental hygienist's role ( $r=0.345$ ,  $p \leq 0.000$ ), and to taking a leadership role in interdisciplinary collaboration ( $r=0.429$ ,  $p \leq 0.000$ ). The importance factor is also positively correlated to taking a leadership role in interdisciplinary collaboration ( $r=0.306$ ,  $p \leq 0.002$ ).

*Primary role perceptions.*

Respondents were questioned about how both individual hygienists and the hygiene professional community view the hygienist's primary role. They ranked roles from both perspectives. This role ranking was undertaken both in light of their current practice and what they foresee for the future. The ranking choices were Patient Advocate, Patient Educator, Clinician, Treatment Coordinator and Communication Facilitator. Not all survey participants answered this question, so n= 83. Table 4.2 and 4.3 present survey responses.

More than half of survey participants identified 'Clinician' as the most important role, for both individual hygienists (54%) and the profession of dental hygiene (55%). The role ranked as least important for both the individual hygienist and for the profession of dental hygiene was 'Treatment Coordinator'. The role identified as increasing the most in the future was 'Patient Advocate', for the individual and the profession, however 'Clinician' stills ranks as most important and 'Communication Facilitator' and 'Treatment Coordinator' rank last. These findings are interesting, given previous response dental hygienists having an increased role in interdisciplinary collaboration in the future. If no change is expected in the primary role of clinician, where will the increased collaboration be evidenced?

**Table 4.2 Roles of the Individual Dental Hygienist, Now and Future  
(n=83)**

<b>ROLES: INDIVIDUAL</b>	<b>PRESENT</b>		<b>FUTURE</b>	
	Frequency	%	Frequency	%
Clinician	45	54%	32	39%
Patient Educator	22	27%	26	31%
Patient Advocate	6	7%	14	17%
Communication Facilitator	5	6%	6	7%
Treatment Coordinator	5	6%	5	6%

**Table 4.3 Roles of the Profession of Dental Hygiene, Now and Future  
(n=84)**

<b>ROLES: PROFESSION</b>	<b>PRESENT</b>		<b>FUTURE</b>	
	Frequency	%	Frequency	%
Clinician	46	55%	29	35%
Patient Educator	23	28%	24	29%
Patient Advocate	10	12%	20	24%
Communication Facilitator	3	4%	3	4%
Treatment Coordinator	1	1%	7	8%

***Research Question Two:***

**How do dental hygienists differentiate between dental and medical professionals when considering interdisciplinary collaboration?**

The second research question compares collaboration factors with dental professional versus collaboration factors with medical professionals.

Aspects of collaborating with medical and dental professionals include the need to collaborate, experience in collaborating, self-confidence in collaborating, respect for opinion and input, and initiative. The results are presented in Table 4.4.

*Collaboration factors.*

Hygienists indicate that collaboration factors are more evident when working with dental professionals than with medical professionals. Respect for one's opinion and valuing one's input are particularly salient. These findings are not surprising given that dental hygienists work daily with dental professionals and are often involved with giving input regarding patient care. Working with medical professionals is not a daily activity in most clinical hygiene work settings. However, respondents feel fairly sure of themselves when they do collaborate with other professionals.

Collaborating with medical professionals involves bridging knowledge communities. Dental hygienists may need more confidence in and knowledge of medical diseases and the professional language used to discuss them (Haythornthwaite, 2006). Training in both of these areas could potentially

increase dental hygienists' perception of themselves and their role when collaborating with medical professionals.

*Correlations.*

When examining correlations among these variables, three warrant comment. Positive correlations exist between the amount of experience in interdisciplinary collaboration and the need to collaborate with medical professionals ( $r=0.568$ ,  $p \leq 0.01$ ), and the need to collaborate with dental professionals ( $r=0.289$ ,  $p \leq 0.01$ ). The more experience a respondent has in interdisciplinary collaboration, the more they will see a need to collaborate with both medical and dental professionals.

Respondents who perceive a greater need to collaborate with dental professionals also have more experience doing so ( $r=0.507$ ,  $p \leq 0.01$ ). These correlations are reported in Table 4.4.

Years of practice are positively associated with experience in interdisciplinary collaboration among medical professionals ( $r=0.226$ ,  $p \leq 0.05$ ). The longer a hygienist has been in practice, the more experience she/he will have in interdisciplinary collaboration. Years of practice are also positively correlated with initiating collaboration between workplace and other dental specialists ( $r=0.226$ ,  $p \leq 0.05$ ). Results of these correlations are reported in Tables 4.5 and 4.6.



**Table 4.4 Collaboration Factors Concerning Medical and Dental****Professionals (n =103)**

<b>COLLABORATION FACTOR</b>		<b>X</b>	<b>s.d.</b>
I <b>need</b> to collaborate with Dent/Med professionals	<b>Dental</b>	<b>3.66</b>	<b>0.96</b>
	<b>Medical</b>	2.97	0.79
I have <b>experience</b> in collaboration with Dent/Med professionals	<b>Dental</b>	<b>3.35</b>	<b>1.06</b>
	<b>Medical</b>	2.75	0.93
I am <b>unsure</b> when collaborating Dent/Med professionals	<b>Dental</b>	1.85	0.77
	<b>Medical</b>	<b>2.46</b>	<b>1.03</b>
My <b>opinion</b> is respected when collaborating with Dent/Med professionals	<b>Dental</b>	<b>4.10</b>	<b>0.64</b>
	<b>Medical</b>	3.60	0.86
My <b>input</b> is valued when collaborating with Dent/Med professionals	<b>Dental</b>	<b>4.11</b>	<b>0.61</b>
	<b>Medical</b>	3.47	0.79
I take <b>initiative</b> when collaborating with Dent/Med professionals	<b>Dental</b>	<b>3.68</b>	<b>1.11</b>
	<b>Medical</b>	3.85	1.00

**Table 4.5 Spearman Rank Correlation Coefficients: Experience and Need**

	<b>Experience</b>	<b>Need With Dental</b>
I need to collaborate with Dental Professionals	0.289	
I need to collaborate with Medical Professionals	0.568	0.332
I have experience in collaboration with Dental Professionals	0.607	0.507

**Table 4.6 Spearman Rank Correlation Coefficients: Years of Practice, Experience and Initiating**

	<b>Years In Practice</b>
Years in Practice	1.000
Experience in collaboration - dental	0.130
Experience in collaboration - medical	0.226
Unsure when collaborating - dental	-0.188
Unsure when collaborating - medical	-0.106
Initiating collaboration - dental	0.226

### *Comparisons.*

Associations between collaboration factors and years in practice, location of practice and level of education were explored through comparison analysis. The number of years a dental hygienist has been practicing (1-10 years vs. 10-25 years) does not impact how much experience a dental hygienist has in interdisciplinary collaboration with dental or medical professionals. Self-confidence and feeling respected in collaboration with dental or medical professionals are also not associated with years in practice (Mann-Whitney U test  $p \leq 0.05$ ).

Location of practice (urban vs. rural) has no relation to experience in interdisciplinary collaboration or the need to collaborate with dental or medical professionals. Level of education (associate vs. baccalaureate) does not impact self-confidence, feeling respected or taking a leadership role when collaborating with dental or medical professionals (Mann-Whitney U test  $p \leq 0.05$ ).

### *Who collaborates?*

Questions six through eleven asked respondents to specify with whom on the medical and dental team they collaborated when needed. When contacting a dental specialists' office, hygienists reported that they collaborated often with administrative personnel, seldom with another dental hygienist, and never with a dentist. When contacting a medical office, hygienists reported collaborating often with a nurse, occasionally with the administrative personnel and never with a doctor.

These results further support the collaboration variables findings presented in Table 4.4. If the dental hygienist never collaborates with a doctor, it stands to reason that experience in, confidence in and feeling their input is valued and respected in collaborating with medical professionals would be lower. Respondents also have reported never speaking with a dentist when collaborating with a dental specialist's office. However, the dental hygienist works closely with dentists in their educational process and in daily practice, thus affording more opportunity for positive experiences when collaborating with dental professionals.

*Diabetes, cardiovascular disease and pregnancy.*

Respondents were asked to identify the best dental team member to work collaboratively with other dental and medical team members in cases involving diabetes, cardiovascular disease (CVD) and periodontically involved pregnant patients. Response options were the dentist, the dental hygienist (DH) and the front office personnel (Admin). Results are reported in Tables 4.7 and 4.8.

**Table 4.7 Medical Collaboration with Diabetes, CVD and Pregnancy**

	<b>Dentist</b>	<b>Dental Hygienist</b>	<b>Admin</b>	<b>Best</b>
<b>Diabetes</b> (n=96)	43% (41)	55% (53)	2% (2)	Dental Hygienist
<b>CVD (n=96)</b>	49% (47)	49% (47)	2% (2)	Dental Hygienist/Dentist
<b>Pregnant</b> (n=96)	28% (26)	68% (66)	4% (4)	Dental Hygienist

**Table 4.8 Dental Collaboration with Diabetes, CVD and Pregnancy**

	<b>Dentist</b>	<b>Dental Hygienist</b>	<b>Admin.</b>	<b>Best</b>
<b>Diabetes</b> (n=96)	44% (42)	55% (53)	1% (1)	Dental Hygienist
<b>CVD (n=94)</b>	52% (49)	48% (45)	0% (0)	Dentist (marginally)
<b>Pregnant</b> (n=96)	27% (26)	72% (69)	1% (1)	Dental Hygienist

When working with medical professionals concerning diabetic patients and periodontically involved pregnant patients, the dental hygienist is the dental team member of choice. But when collaborating about patients with cardiovascular disease, the dentist and dental hygienist responses are preferred equally.

Similarly, when partnering with dental professionals about diabetic patients and periodontically involved pregnant patients, the dental hygienist is identified as the best team member to engage in collaboration. However, when working together concerning patients with cardiovascular disease, the dentist is marginally selected over the dental hygienist.

In general then, respondents think the dental hygienist is the best person from the dental team to collaborate with dental and medical professionals regarding patients with diabetes and periodontically involved pregnant patients. For those patients with cardiovascular disease, the responses are virtually identical between the dentist and dental hygienist. The respondents concur that the dental hygienist should be doing the collaborating on behalf of medically compromised patients most of the time, which correlates positively with the responses to previous questions that they seldom feel unsure of themselves when collaborating with dental or medical professionals.

***Research Question Three:***

**What barriers do dental hygienists face in becoming an active participant in interdisciplinary collaboration?**

Respondents identified barriers to participation in interdisciplinary collaboration regarding patient care. Two categories of barriers are addressed. Organizational barriers are those obstacles inherent in the work environment and the behavior of others. Individual barriers are those the hygienist controls.

Respondents were asked to check all barriers that applied to them. Results are summarized in Table 4.9

**Table 4.9 Barriers to Interdisciplinary Collaboration (n=103)**

<b>BARRIER</b>	<b>YES % (#)</b>	<b>NO % (#)</b>
Insufficient Time	72% (74)	28% (29)
Willingness of other professionals to collaborate	67% (69)	33% (34)
Need more professional freedom	51% (53)	49% (50)
Insufficient knowledge of medical diseases	50% (51)	50% (52)
I won't be taken seriously	42% (43)	58% (60)
Unsupportive work environment	41% (42)	59% (61)
Lack of confidence in using professional language	39% (40)	61% (63)
Insufficient education	29% (30)	71% (73)
Unable to identify correct contact person	18% (19)	82% (84)
It is not my job	14% (14)	86% (89)
Insufficient knowledge of dental diseases	13% (13)	87% (90)
Other	12% (12)	88% (91)

*Organizational barriers.*

Survey participants identified insufficient time, willingness of other professionals to collaborate and a need more professional freedom, as the most common barriers. These barriers are not in direct control of the individual hygienist, but rather involve workplace expectations and behaviors of others. For example, insufficient time points to the fact that the employer expects dental hygienists to do many tasks regarding patient care in the time allowed for an

appointment. Finding additional time to make a call to another dental or medical office for collaboration often isn't there.

Willingness of others to collaborate is a variable controlled by all individual dental and medical team members. If other medical and dental personnel do not see value in working together with dental hygienists, collaboration will not occur.

Interdisciplinary education seeks to address this barrier by training medical and dental professionals the value of collaborating with other disciplines (Rafter et al., 2006). Finally, needing more professional freedom is an issue the American Dental Hygienists Association is addressing through education and legislation.

*Barriers under individual control.*

Barriers the individual dental hygienist controls include insufficient knowledge of medical diseases and lack of confidence using professional language. Education in medical conditions such as diabetes, cardiovascular disease and pregnancy can increase a dental hygienist's knowledge and confidence in collaborating. An individual can seek out education courses to gain familiarity with medical terms and to increase their vocabulary skills in professional language to decrease these barriers.

Only 14% of respondents checked "it is not my job". On some level then, most respondents think that interdisciplinary collaboration is their job. This corroborates previous findings of this study that dental hygienists believe they are



the best person from the dental team to collaborate with other dental and medical professionals.

***Research Question Four:***

**What communication skills do dental hygienists perceive as important to interdisciplinary communication?**

Participants identified communication skills they deemed necessary to better participate in interdisciplinary collaboration. They were asked to check off any and all that applied to them. Results are summarized in Table 4.10.

**Table 4.10 Communication Skills Necessary for Interdisciplinary Collaboration (n =103)**

<b>Communication Skill</b>	<b>Yes % (#)</b>	<b>No % (#)</b>
Speaking Skills	79% (81)	21% (22)
Listening Skills	72% (74)	28% (29)
Leadership Skills	66% (68)	34% (35)
Effectively Working in Teams	64% (66)	36% (37)
Dealing w/Difficult People	61% (63)	39% (40)
Power/ Influence Strategies	60% (62)	40% (41)
Motivation/Persuasion	58% (60)	42% (43)
Negotiation	43% (44)	57% (59)

*Communication skills.*

Survey respondents marked speaking skills, listening skills, leadership skills, working effectively with teams, dealing with difficult people, power and influence strategies and motivation and persuasion strategies at 58% and above. Negotiation was the only communication variable marked in less than half the surveys. These findings highlight the need for advanced training in these areas. Although communication is part of dental hygienists' required curriculum (Rowley, 2007), these results underscore specific areas of communication training that dental hygienists perceive as important for effective collaboration.

Three other questions were asked in the communication skills section.

Results are reported in Table 4.11.

**Table 4.11 Training and Employment (n=103)**

<b>Question</b>	<b>Yes % (#)</b>	<b>No % (#)</b>
Have you had training in communication skills?	62% (64)	38% (39)
Did your employer pay for the training?	57% (59)	43% (44)
Do you feel your work environment supports this type of training?	77% (79)	23% (24)

The majority of respondents (62%) have had some communication skills training, and over half (57%) reported that their employer paid for that training. In

general, survey respondents indicated that their work environment is supportive of this type of communication skills training. A supportive work environment is an important component for effective interdisciplinary collaboration (D'Amour et al., 2005; Hirokawa et al., 2003).

*Topics and place of communication training.*

Respondents, who answered yes regarding communication training, were then asked to identify training topics and the location of training. Some topic categories are grouped together for ease in reporting. The specific list of communication topics appear in Table 4.12.

Respondents report having had the most training in speaking and listening skills (34%). These two skills were also the highest reported communication skills necessary for better interdisciplinary collaboration, as detailed in Table 4.10.

Location of training was identified in five categories. Results of training location are presented in Table 4.13.

**Table 4.12 Previous Training in Communication Topics**

<b>Communication Topics</b>	<b>Yes % (#)</b>
Speaking and Listening Skills, Dealing with Difficult People	34% (35)
Working effectively with Teams, Leadership	17% (17)
Motivation/ Persuasion Strategies, Power/Influence Strategies	7% (07)
Media Training and Counseling	6% (06)
Negotiation and Conflict Management Skills	5% (05)
Intercultural Communication	2% (02)
Rhetoric	1% (01)
Health Care Communication	1% (01)
General Communication Major	1% (01)

**Table 4:13 Location of Communication Topics Training**

<b>Location</b>	<b>Yes % (#)</b>
Community College	23% (24)
University	18% (19)
Civic Organizations and Workplace	12% (12)
Health Related Classes	7% (07)
Professional Organization	6% (06)

Respondents report 41% of communication training happens at the college (23%) and university level (18%), as part of the dental hygiene general education curriculum. As all respondents were finished with school, they seem to infer that when working out in the 'real world', much more training in communication skills is needed. Professional organizations only ranked 6%, pointing out a need for the professional organization of dental hygiene, the American Dental Hygienists Association to provide communication training in order to better equip dental hygienists for interdisciplinary collaboration.

In conclusion, this chapter provides detailed reports and brief discussions of the data gathered from the two administrations of The Swanson Jaecks Interdisciplinary Collaboration Survey. A descriptive profile of study participants was provided and data were organized according to the four research questions. Result highlights will be discussed in the final chapter, along with implications for the profession of dental hygiene.

## **CHAPTER FIVE**

### **CONCLUSIONS**

The purpose of this investigation is to discover dental hygienists' views on interdisciplinary collaboration. Specifically, this study examines dental hygienists' role perceptions in interdisciplinary collaboration, barriers to collaboration, and the communication skills necessary to effectively engage in collaboration. A review of pertinent literature revealed that interdisciplinary collaboration is defined as both a process of interaction and an outcome of decision-making. Recent scientific studies delineate strong correlations between oral and systemic disease, generating a need for increased collaboration between the medical and dental professions. The four research questions presented in this study address the gaps in the literature regarding the role of the dental hygienist in interdisciplinary collaboration.

The results reported in the previous chapter were organized in relation to the research questions guiding this investigation. This conclusion chapter will be organized in four parts: implications, limitations, suggestions for future research, and recommendations/reflections.

### **How Do Hygienists Regard their Role?**

The factor receiving the highest response is the importance of the dental hygienist's role in interdisciplinary collaboration. Those who believe their role is important are more likely to initiate or engage in the experience of interdisciplinary collaboration, and are more likely to take a leadership role in collaboration.

Literature states that collaborative team members need to recognize the unique contribution each profession offers to the process (Bronstein, 2003; Yeager, 2006). Dental hygienists, then, need to perceive their role as important, in order to be valuable in the collaborative process. Members of effective healthcare teams are eager to contribute and cooperate in the decision-making process (Hirokawa et al., 2003; Martin et al., 2005). Respondents in this study are poised for greater involvement in interdisciplinary collaboration because they see their role as important.

### ***Primary Role***

Both currently and in the future, respondents overwhelmingly view their own specific role and the professions' primary role as generally equal- a clinician. The majority also agree that dental hygienists will have a greater role in interdisciplinary collaboration in the future. Does this mean dental hygienists believe that engaging in interdisciplinary collaboration is part of being a clinician? These reports highlight a disconnect between what respondents

perceive is the future of their role in interdisciplinary collaboration and their own participation in that future role. How will they have a greater participation if nothing changes in their primary role of clinician?

Treatment coordinator and communication facilitator are the least frequent answers regarding current and future role. Yet, these titles seem to encompass interdisciplinary collaboration better than clinician. Respondents identify lack of time is the primary barrier to collaboration. If hygienists already feel there is lack of time to collaborate with others regarding patient care, how do they suppose an increased role of interdisciplinary collaboration will fit into their schedule? A supportive work environment is one where employees are allowed the time necessary to effectively collaborate (D'Amour et al., 2005; Hirokawa et al., 2003). Further study of the culture and expectations in the dental workplace will help answer these questions and hopefully clarify the apparent disconnect between dental hygienists experience and their perceived future involvement.

This section has addressed the general role perceptions in interdisciplinary collaboration. Experience in interdisciplinary collaboration is the best predictor for positive responses compared with other significant factors, such as initiation, leadership, and confidence. However, more opportunities need to be created to give dental hygienists experience in interdisciplinary collaboration. A disconnect exists between the increased need for interdisciplinary collaboration in the future and their unchanged primary role of clinician. Next, interdisciplinary



collaboration will be discussed in relation to differences in perceptions when communicating with dental versus medical professionals.

### **How Do Dental Hygienists Differentiate between Medical and Dental Professionals in Collaboration?**

This second group of questions asks respondents to differentiate between their perceptions regarding collaborating with dental versus medical professionals. This is important to understand because collaboration across the disciplines of dentistry and medicine are on the rise due to the expanding science of the oral/systemic link.

In virtually all variables assessed, respondents report higher scores when collaborating with dental professionals compared to medical professionals. Dental hygienists collaborate with dental professionals during their education and training (Darby, 1983). However, the quality and experience in that training may differ greatly depending on the institution. While the dental hygienist learns many medical terms in a dental hygiene program of study, she/he does not often have opportunity to collaborate with medical professionals during training.

Respondents report having less experience in, and feeling less value and respect when collaborating with medical professionals. These factors can be minimized with greater training in interdisciplinary collaboration. Bridging knowledge communities is part of interdisciplinary collaboration and may require new understanding of the differing professional language and communication

specificities (Kaye & Crittenden, 2005). Dental hygienists would benefit from receiving training in medical/dental education centers, with opportunities to collaborate with medical professionals on individual patients.

Correlation analysis was performed on collaboration factors between medical and dental professionals. One hypothesis examined was that the number of years a hygienist has practiced would correlate positively with experience and confidence in interdisciplinary collaboration. The findings of this study did not find a positive correlation. Years in practice cannot predict levels of experience, feeling respected, or having confidence in collaboration with medical or dental professionals. Another hypothesis advanced was that the level of education would positively compare with self-confidence and experience in collaboration. This hypothesis was also not substantiated.

### ***The Dental and Medical Office***

Respondents reported that most often collaboration happens between a dental hygienist and an administrative person in another dental office, or between a dental hygienist and a nurse in a medical office. At neither office does the dental hygienist collaborate with a dentist or doctor directly.

Although the dental hygienist collaborates with neither the dentist nor doctor, respondents report higher levels of confidence, experience, and feeling respected when collaborating with dental professionals. This may reflect that the dental hygienist works in dental settings and is therefore more comfortable with

how the greater world of dentistry operates. Also of interest are the barriers reported, where there is very little barrier regarding knowledge of dental diseases (13%) but a high barrier of insufficient knowledge of medical diseases (50%). Feeling comfortable with medical diseases and the appropriate language or cultural protocol will greatly enhance dental hygienists' experience in every collaborative variable.

### ***Diabetes, Cardiovascular Disease and Pregnancy***

Diabetes, cardiovascular disease and adverse pregnancy outcomes are all clearly linked to the dental disease of Periodontitis in the literature (Jeffcoat et al., 2003; Najjar et al., 2004; Renvent et al. 2006). Respondents think the dental hygienist is the best person from the dental team to collaborate with dental and medical professionals regarding patients with diabetes and periodontically involved pregnant patients. For those patients with cardiovascular disease, the respondents are split between the dentist and dental hygienist.

These findings point to a conflict regarding interdisciplinary collaboration. The dental hygienist considers her/himself to be is the best person from the dental team to be collaborating with dental and medical personal yet has relatively low scores on all collaboration variables. If they believe it is part of their job to collaborate, why aren't they experiencing it more? Why don't they experience confidence and respect when collaborating? Why don't they take more of a

leadership role in the office regarding collaboration? Why don't they initiate more interdisciplinary collaboration more?

There are two primary reasons dental hygienists are not more proactive in initiating and leading collaborative efforts. First, they are pressed for time during hygiene appointments and second, interdisciplinary collaboration is not a conventional role. The profession of dental hygiene emerged from traditional, dominant patriarchal role of a male dentist and a subservient female hygienist in a helper or auxiliary role (Motley, 1988). Even today, hygienists are referred to as auxiliary to the dentists. While the dental workplace culture is beginning to develop more gender equality, a strong patriarchal attitude still exists in many dental practice settings. Answers to the above questions are explored by the third research question regarding barriers to interdisciplinary collaboration.

### **What Barriers Exist?**

Discovering perceived barriers to interdisciplinary collaboration is an important step towards active participation in collaborative efforts. Barriers must be recognized and addressed.

#### ***Organizational Barriers***

The top three barriers reported have to do with organizational or work setting practices. Insufficient time, willingness of other professionals to collaborate, and a need for more professional freedoms are all barriers outside of the direct control of the individual hygienist.

*Insufficient time.*

Insufficient time is the number one barrier reported by respondents (72%). Literature reveals that having adequate time to collaborate is a key to successful communication (Epstein, 2005). Lack of time is a universal complaint of dental hygienists, because their job description involves multiple tasks for each patient limited to allotted treatment times. These tasks include updating a medical health history, needs assessment, treatment procedures, and and communicating recommended home-care regimens (Hodges, 2003). Educating the patient on oral/systemic link(s), and/or initiating collaboration with the appropriate dental/medical professional adds more tasks to an already limited time interval.

It is inconsistent that respondents think the role of the dental hygienist will increase in interdisciplinary collaboration, yet their primary role of clinician will not change. Perhaps respondents did not answer positively regarding collaboration variables such as leadership and initiation, because they are already too busy with requisite hygiene responsibilities to get involved in interdisciplinary collaboration. 41% of respondents report working in an unsupportive environment. The literature is very clear that a supportive work environment is a critical component of successful collaboration (Tjosvold, 1993). If the dental hygienist is to be a key player in interdisciplinary collaboration, changes in expectations and time management strategies of the individual hygienist and their employer entities will be essential.

*Willingness of other professionals to collaborate.*

Although the oral/systemic link is frequently discussed in scientific literature, interdisciplinary collaboration between dental and medical professionals is not yet a regular, expected part of patient care. Respondents have a valid point concerning the willingness barrier. No matter how much education and understanding the dental hygienist has regarding the patient who needs referral, if the dental or medical professional on the other end does not want to collaborate, and/or does not see the necessity of collaboration, proper consultation will be blocked. For example, a dental hygienist sees a patient who has recently had a hip replacement. According to the guidelines of the American Heart Association (AHA, 1997), this patient must be pre-medicated with antibiotics for routine dental appointments. Often, the patient is not aware of this guideline and consequence of surgery because either the message was not heard or not articulated at the post-op medical appointment. Interdisciplinary collaboration is needed, but the medical specialist's office may not be easy to reach, the dental hygienist's calls may not be returned in a timely manner, or the specialist may not consider the conversation important. When this happens, the dental hygienist's contribution may be marginalized creating a negative perception of the willingness of others to collaborate.

*Need more professional freedom.*

The American Dental Hygienists' Association has been addressing professional freedom and scope of practice on a national level through public

education and aggressive legislative activities. Dental hygienists who wish to engage in the removal of this barrier can join their professional organization and volunteer on a local level to effect change in their state. Over half of respondents view lack of professional freedom as a barrier. Approximately 30% of registered dental hygienists are members of the ADHA nationally, however, in Oregon less than 20% (507 out of 2,593) of registered dental hygienists are members of their professional association (Kao-Young, 2007, personal email). Interestingly, 68% of the respondents for this study report being members of the American Dental Hygienists' Association.

Since the inception of the profession, dental hygiene has been under the responsibility and authority of dentists (Motley, 1988). Many within the profession of dental hygiene are working to gain more autonomy, self-regulation and governance. As these changes are accomplished at the association level, individual hygienists will see change an increase professional freedom within their work setting.

### ***Barriers Under Individual Control***

Top reported barriers of individual control are insufficient knowledge of medical diseases and lack of confidence in professional language. These barriers can be greatly diminished or eliminated by personal action. The individual hygienist needs to seek available educational opportunities that will help reduce these deficiencies of knowledge, vocabulary, and confidence.

*Insufficient knowledge on medical diseases.*

50% of respondents reported insufficient knowledge of medical diseases as a barrier. Gaining education in medical conditions that have a strong link to dental disease such as diabetes, cardiovascular disease and pregnancy will increase a dental hygienist's knowledge and consequently increase his/her confidence in collaboration. Multiple dental hygiene journal articles are devoted to these issues every month. Internet access provides an excellent avenue for the dental hygienist to find a wealth of information on any medical condition. Dental hygiene is a profession characterized by life long learning. Each state requires continuing education hours with each licensure cycle. The insufficient knowledge barrier is easily removed by increased education.

*Lack of confidence in professional language.*

This barrier was reported by 39% of respondents. It is important to be skilled when using professional and medical terms when collaborating, particularly when speaking across disciplines (Haythornthwaite, 2006). Although professional language is learned and used during the dental hygienist's education prior to licensure, specific medical terms are not always needed in the everyday practice. While dental hygienists are not medical specialists, they have had multiple hours of training in medical issues and systems. Brushing up on current literature and finding ways to increase interaction opportunities between the dental and medical fields would greatly reduce this lack of confidence while increasing credibility and professionalism.



Continued education is the key to removing this barrier. Interactive courses need to be written and presented to dental hygienists, providing vocabulary review and the opportunity to practice professional language skills (Swanson Jaecks, 2007). An example of a lesson plan for this type of adult education can be found in Appendices C and D.

### ***Non-Barriers***

Two additional findings from research question three are worth highlighting. They are, “it is not my job” and “insufficient knowledge of dental disease”. The fact that these are not considered barriers is significant.

First, only 14% of respondents reported that interdisciplinary collaboration was not their job. This result would imply that on some level, most dental hygienists believe engaging in interdisciplinary collaboration is part of their job. This positive attitude toward interdisciplinary collaboration is an encouraging sign for the future of patient care. The literature strongly suggests that the quality of patient care increases with interdisciplinary collaboration (Martin et al, 2005). While respondents report a belief in the value of collaboration, other barriers prevent them from participating.

Second, 87% of respondents do not think insufficient knowledge of dental diseases is a barrier. A rigorous education prepares dental hygienists to be well versed in the science and understanding of dental diseases. The larger assumption is that dental hygiene journals, blogs, and continuing education courses are

sufficiently providing updates and reviews of dental disease. This is a stark contrast to the barrier of insufficient knowledge of medical disease, reported by 50% of respondents.

Barriers to interdisciplinary collaboration are found organizationally and individually. The individual dental hygienist can practice agency in removing barriers by increasing their education in medical disease and professional language. She/he can join forces with the ADHA in affecting change towards more professional freedom, while educating patients and other members of the dental team regarding the need for interdisciplinary collaboration.

### **What Communication Skills are Needed?**

Discovering specific communication skills respondents perceive as important to collaboration can provide direction for future training interventions. Increased communication training in accredited dental hygiene programs should be promoted. Respondents identify training in nearly every communication skill as highly important, with percentages from 58% (motivation and persuasion strategies), to 79% (speaking skills). This high response rate speaks to an enormous need for education in communication skills. Technical skills in dental hygiene may be exemplary, but communication skills should not be neglected nor under estimated.

### *Speaking and Listening Skills*

Oral and written communication training is part of the general education required for dental hygienists by the Commission of Dental Accreditation (ADACDA, 1988). However, most dental hygiene programs require only 3 credit hours in these subjects (Rowley, 2007). The need for education in speaking (79%) and listening (72%) proficiencies are the top two communication skills identified by respondents. Curiously, these are the same two skill sets topping the list of previous training. Because their daily practice involves much more than technical skills, dental hygienists see a great need for communication training. A competent dental hygienist can motivate, educate, and build relationship with patients. She/he can present a case for referral to other dental specialists and often is expected to take a leadership role in office activities. All of duties revolve around excellence in communication skills.

41% of communication training takes place at the college and university level, as part of the dental hygiene general education curriculum. As all respondents were graduates, they seem to infer that when working out in the 'real world', much more training in communication skills is needed to better equip them for interdisciplinary collaboration.

### ***Continuing Education***

Oregon dental hygienists are governed by the Oregon Board of Dentistry, which sets requirements for re-licensure. Continuing education in communication skills is not required.

Each dental hygienist has to complete of 24 hours in continuing education every two years. Continuing education must be directly related to clinical patient care or the practice of dental public health. (Oregon Board of Dentistry, 2007)

This is a barrier to continuing education in communication skills. For example, courses on treating periodontal disease, scaling instrumentation, and nitrous oxide sedation all fall under the constraints of clinical patient care. However, courses focusing on leadership or speaking skills are not covered under this provision. If the dental hygienist cannot get credit from the Oregon Board of Dentistry for a particular course, she/he will be much less likely to take it. The key to communication courses being covered by this statute is to build courses emphasizing direct patient care. For example, if the continuing education course focuses on professional language in medical/dental interactions, a case must be made that this learning intervention directly affects the patient care the dental hygienist gives in the clinical setting.

Currently, education in areas such as leadership and motivation skills do not fall into the category of directly relating to clinical practice; therefore taking a

class in these subjects cannot be counted towards the bi-annual license renewal. One possible solution to this barrier is combining communication training with clinical practice by also presenting skills as they relate to patient care. For instance, a class on speaking skills may focus on speaking to other healthcare professionals in order to advocate change for patient care. Or, a class on listening skills may be focused on how to hear what your patient is telling you through non-verbal cues. Classes such as these would still have to get Board approval in order to receive continuing education credit.

### ***Power and Influence Strategies***

This communication area strikes a cord with dental hygienists because of their position within the profession of dentistry. 60% of respondents feel power and influence strategies are necessary for effective interdisciplinary collaboration.

The history of dental professions is built on differing levels of power and status, due to various levels of degrees and licensure. Since the inception of the profession, dental hygiene has been under the responsibility and authority of dentists. These power differentials sometimes place the dental hygienist in a unique position. She/he is positioned between the role of expecting to provide quality input regarding patient care, yet knowing that her/his input can be completely ignored or marginalized because of power differentials within the dental team. This tension is mirrored in literature regarding doctors and nurses (Apker et al., 2005). When any

member of the team exercises power and control over another, barriers to effective communication are inevitably present.

Yukl and Tracey (1992), leading researchers in influence tactics, identify alternative strategies for influencing others that will be beneficial for dental hygienists to learn. Four of their strategies have direct application to dental hygienists. They are (1) building coalitions with others of like mind, (2) using calm persistence in communicating, (3), using rational persuasion, which is defined as using logical arguments and factual evidence to help persuade others that your point of view or request is feasible, and (4) legitimizing, using logical arguments and factual evidence to persuade others that your point of view is viable. Education in these power and influence strategies will help the dental hygienist in interdisciplinary collaboration, by building their confidence and agency in interactions.

All of these communication skills relate directly to interdisciplinary collaboration and teamwork. The literature is clear that these skills add to the effectiveness of the collaboration (Martin et al., 2005; McCallin, 2003). The profession of dental hygiene is very communication-oriented in both patient care and the dental team environment. Enhancing these communication skills is an important action to further the experience of and confidence in, interdisciplinary collaboration.

## **Limitations**

Limitations of this research include sample size, demographic questions and the researcher's association with participants. The generalizability of this study is limited because of the small sample size and the demographic characteristics of the sample population. Due to time and access limitations, a random, stratified sample was difficult to obtain. The cross-sectional, voluntary sample of participants numbered 103. The total number of registered dental hygienists in Oregon is 2,593 (Oregon Board of Dentistry, 2007, Personal telephone conversation). The sample size is a small distribution of the whole and is skewed to represent the northwest, urban, private practicing, and clinician dental hygienist.

When comparisons were analyzed regarding years in practice, and urban versus rural practice, there were no significant differences in responses from either group. The area where the hygienist lives seems to have little bearing on the issue of interdisciplinary collaboration. The possibility exists that this sample is a true representative sample of all dental hygienists in the state of Oregon, because most do live in urban, suburban areas and practice in private dental settings as clinicians. Yet, because of demographic issues and sample size, it is difficult to generalize these findings with certainty.

Other minor limitations occur in the demographic section. One, in the list asking where respondents primarily practice, educator and independent practice categories were omitted. This oversight was recognized when six respondents

wrote in educator and five wrote in independent practice. Second, respondents were asked if they held any other titles at their workplace besides dental hygienist. Over half of the respondents did not answer the question at all. The question may have been poorly written and/or inconsequential to the study.

Finally, a limitation may exist regarding the researcher's association with respondents. At both events where the survey was presented and participants were solicited, many dental hygienists knew me on a personal and professional level. The first event was the Annual House of Delegates of the Oregon Dental Hygienists' Association (ODHA), held October 26-28, 2006 in Salem, Oregon. As an active member of the ODHA, I have served the local component and state constituency through my involvement as President of the Marion-Polk-Yamhill Dental Hygienists' Association, serving on the state-wide Government Relations Council and serving as state Delegate and Alternate Delegate to the annual session of the American Dental Hygienists' Association. At this particular weekend in October 2006, I ran and was voted in as the ODHA Vice-President. It is safe to assume that many if not all of the participants of this event had some level of knowledge regarding me personally.

The second event was a meeting of the Marion County Dental Hygiene Study Club (MCDHSC) held November 13th, 2006. I have been a member of this study club for most of the last for ten years, at times serving on the Board of Directors, and for two years I was the Liaison between the ODHA and the MCDHSC. While not all members of the study club know who I am, it is safe to



say many of them do. Most members know that I am active in the profession of dental hygiene, involved in positions of authority and mentorship. These perceptions and relationships of the researcher may have caused respondents to answer in ways they assumed I would want to receive. They could have under or over-estimated their responses, effectively skewing results.

While this may have been a limitation, actions were clearly taken to receive unbiased, voluntary and honest results from respondents. First, I was physically present at both meetings, available to answer any question or concerns about the study. Second, the voluntary and anonymous nature of the study was stressed. A clear explanation was given of the research goals, and there was no direct benefit given to those who chose to respond. (See survey cover letter in Appendix B). These measures helped eliminate some aspects of this limitation. Conversely, by having a relationship with both of these hygiene groups, a high response rate was achieved. I believe my enthusiasm for the research and experience within the profession of dental hygiene positively affected the response rate.

Nevertheless, the limitations of this study make it difficult to generalize to larger populations of dental hygienists. Even with these limitations, the overall study is effective and necessary as a foundation to build the discussion of the dental hygienists' role in interdisciplinary collaboration. Because no similar previous study could be found, this thesis can serve as a template for further research.

### **Suggestions for Future Research**

Subsequent research in this area could address different dental and medical profession occupation groups. For example, the Swanson Jaecks Interdisciplinary Collaboration survey or a similar instrument could be given to dentists. Considering in most circumstances dentists are the employers of dental hygienists, and also an integral part of the dental team, their opinion on what dental hygienist's role is would be illuminating. These findings could fuel future discussion and professional change regarding roles and interdisciplinary teams.

One of the surprising disconnects of this study lead to questions for future research. 77% of respondents identify their primary role as clinician, and all respondents overwhelming conclude that clinician is the chief role of dental hygienists, both now and in the future. 86% of respondents believe interdisciplinary collaboration is part of their job. However, respondents report only occasionally experiencing interdisciplinary collaboration. So, how does interdisciplinary collaboration fit with the role of clinician? How does the clinician find the time to collaborate? Does the employer think interdisciplinary collaboration is the job of the dental hygienist? These questions can be addressed in future research targeting workplace culture and expectations. Focus groups comprised of dentists and dental hygienists could provide deeper understanding into how interdisciplinary collaboration can best be facilitated.

The professional roles of the dental hygienist according to the American Dental Hygienists' Association include, but are not limited to those of clinician,

educator, advocate, administrator/manager, and researcher (ADHA, 2006). Surely participating in interdisciplinary collaboration on the patients' behalf is advocacy, or operating in the role of manager. In this study, these roles were identified as treatment coordinator or communicator facilitator, both of which were given the lowest scores in the survey. Unbundling this role of clinician as it relates to interdisciplinary collaboration would provide new insights into how hygienists view their role and how to promote change regarding role in the future.

### **Recommendations/Reflections**

The focus on interdisciplinary collaboration will usher in new ideas concerning the dental hygienist's primary role in the future. As barriers are removed and communication skills are learned, the answers to these role questions will shift. The literature states that people act out their role according to what has been learned through education, what they feel is expected from them, and the setting in which professional training is done (Apker et al., 2006; Bronstein, 2003; D'Amour et al., 2005). The role of the dental hygienist in interdisciplinary collaboration will change as dental and medical education centers embrace interdisciplinary or cross-disciplinary training. There is an increasing call for this type of education, as collaborative team members must have an understanding and adequate knowledge of one another's professions (Ponzer et al. 2004).

Change will also be effected when and if governing dental boards see the value in interdisciplinary collaboration as being in the best interest of the patient. These governing boards exist to serve and protect the public, and to this end create policy and practice acts with the public's interests in mind. As the science of the oral/systemic link increases in visibility and general understanding, practice acts need to change to keep in step. I hope that the Oregon Board of Dentistry will soon see the value in increased training in communication skills, in order for dental practitioners to better serve the public.

Of the disconnects revealed and conclusions drawn from this research, three stand out in particular.

1. Dental hygienists need communication skills training in order to better participate in interdisciplinary collaboration. Dental hygiene education currently requires only three credits in communication training. This seems inadequate when faced with real life practice, complex patients, and traditional work environments. In the future, more quality communication training should be required, particularly on the Bachelor Degree level.

2. The biggest surprise from this research was that years in practice, area of practice, and levels of education had no bearing on factors of confidence, need and experience in interdisciplinary collaboration. Based on my professional experience, I had predicted that (1) that those with higher degrees would have more confidence in interdisciplinary collaboration, (2) that those who had practiced longer would have more experience in collaboration, and (3) that either

rural or urban hygienists would report higher levels of needing interdisciplinary collaboration. The data of this study, however, showed no relationships.

Therefore, all hygienists, regardless of their level of education, years in practice or location of their practice, need communication skills training and more experience in interdisciplinary collaboration.

3. Like the respondents of this survey, I believe the dental hygienist is the ideal professional from the dental team to collaborate with other dental and medical specialists. This requires moving beyond the role of clinician to embracing patient advocacy and an increased performance of case-management. For example, I see a hospital employing a dental hygienist as an oral/systemic interdisciplinary collaboration specialist, assisting cancer patients in receiving the appropriate dental and medical care pre and post surgery, chemotherapy, and/or radiation therapy. As the oral/systemic interdisciplinary collaboration specialist, the hygienist would help facilitate communication between patients and the multiple dental and medical specialists involved in their care. The oral/systemic interdisciplinary collaboration specialist could also educate patients on how their medical disease affects their oral disease and how their oral disease affects their medical disease. This education will help patients assimilate the multiple layers of information important for their total health.

My goals for this investigation were to better understand how dental hygienists perceive their role in interdisciplinary collaboration, to identify barriers to collaboration, and to discover the communication skills needed for

collaboration. Although this was an exploratory study, I feel these goals were accomplished. I look forward to groundbreaking changes in the profession of dental hygiene. This study challenged me to continue my efforts for change on a national level and to nurture individual hygienists as they explore the broad vista of interdisciplinary collaboration.

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## **APPENDICES**

## **Appendix A**

## The Swanson Jaecks Interdisciplinary Collaboration Survey

Collaboration is defined as working jointly with others towards a mutual goal, for example, optimal patient care.

Interdisciplinary is defined as any practice or body of knowledge drawn from two or more scientific disciplines, for example, medicine and dentistry.

Interdisciplinary collaboration refers to two or more people from differing professions, working together towards a common goal regarding patient care.

***Before beginning this survey, please recall different times in your career when you have had to communicate with another dental/medical professional about a patient.***

### I. Foundation Questions.

***Directions: For questions 1 through 14, please circle the number/phrase that most closely represents your thoughts on the statement. Feel free to comment or elaborate further on any question(s). You can write on the front or back of the survey.***

#### 1. I have experienced interdisciplinary collaboration in patient care.

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

#### 2. I need to collaborate about patient care with other *dental* professionals.

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

#### 3. I need to collaborate about patient care with other *medical* professionals.

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1



**4. I have experience in interdisciplinary collaboration with other *dental* professionals.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**5. I have experience in interdisciplinary collaboration with other *medical* professionals.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**6. When contacting a *dental* specialist's office, I collaborate with another hygienist.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**7. When contacting a *dental* specialist's office, I collaborate with a receptionist or front office employee.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**8. When contacting a *dental* specialist's office, I collaborate with a dentist.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**9. When contacting a *medical* office, I collaborate with a nurse.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**10. When contacting a *medical* office, I collaborate with a receptionist or front office employee.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**11. When contacting a *medical* office, I collaborate with a doctor.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**12. I am more confident collaborating with *dental* professionals than with *medical* professionals.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**13. I am unsure of myself when collaborating with *medical* professionals.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

**14. I am unsure of myself when collaborating with *dental* professionals.**

	Very Often	Often	Occasionally	Seldom	Never
	5	4	3	2	1

***Directions: For questions 15-20 please put a check mark on the line that most closely represents your thoughts on the statement.***

**15. When treating a diabetic patient, the best person from the *dental* team to collaborate with another *dental* specialist's office about patient care is...**

- ☐ DENTIST  
☐ DENTAL HYGIENIST  
☐ FRONT OFFICE PERSONEL

**16. When treating a diabetic patient, the best person from the *dental* team to collaborate with a *medical* office about patient care is the...**

- ☐ DENTIST
- ☐ DENTAL HYGIENIST
- ☐ FRONT OFFICE PERSONEL

**17. When treating a patient with cardiovascular disease, the best person from the *dental* team to collaborate with another *dental* specialist's office about patient care is the...**

- ☐ DENTIST
- ☐ DENTAL HYGIENIST
- ☐ FRONT OFFICE PERSONEL

**18. When treating a patient with cardiovascular disease, the best person from the dental team to collaborate with a *medical* office about patient care is the...**

- ☐ DENTIST
- ☐ DENTAL HYGIENIST
- ☐ FRONT OFFICE PERSONEL

**19. When treating a periodontally involved pregnant patient, the best person from the *dental* team to collaborate with another *dental* specialist's office about patient care is the...**

- ☐ DENTIST
- ☐ DENTAL HYGIENIST
- ☐ FRONT OFFICE PERSONEL

**20. When treating a periodontally involved pregnant patient, the best person from the *dental* team to collaborate with a *medical* office about patient care is the...**

- ☐ DENTIST
- ☐ DENTAL HYGIENIST
- ☐ FRONT OFFICE PERSONEL

## II. Roles.

*Directions: Note the answer phrases have changed. For questions 21 through 30, please circle the number/phrase that most closely represents your thoughts on the statement. Feel free to comment or elaborate further on any question(s). You can write on the front or back of the survey.*

**21. The role of the dental hygienist is important in interdisciplinary collaboration.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**22. My opinion/viewpoint is respected when collaborating with other dental professionals.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**23. My opinion/viewpoint is respected when collaborating with other medical professionals.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**24. The dental hygienist's knowledge is utilized in collaborative efforts within my work setting.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**25. Other dental professionals view my input as valuable.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**26. Other medical professionals view my input as valuable.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**27. I take a leadership role in interdisciplinary collaboration within my work setting.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**28. I initiate communication between my workplace and other *dental* specialists, regarding patient care.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**29. I initiate communication between my workplace and the appropriate *medical* office, regarding patient care.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

**30. The dental hygienist will have a greater role in interdisciplinary collaboration in the future.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	5	4	3	2	1

*Directions. For questions 31 and 32, answer the questions by ranking the answers in order of importance, with number 1 being most important and number 5 being the least important.*

- 31. Dental hygienists currently fulfill many roles in patient care. Please rank the importance of the following roles, first from the perspective of your practice and then from the perspective of the profession.**  
Rank 1-5 with 1 being most important and 5 being the least important.

<b>Roles you Fulfill</b>	<b>Rank Order</b>	<b>Roles the Profession Fulfills</b>	<b>Rank Order</b>
Patient Advocate	_____	Patient Advocate	_____
Patient Educator	_____	Patient Educator	_____
Clinician	_____	Clinician	_____
Treatment Coordinator	_____	Treatment Coordinator	_____
Communication Facilitator	_____	Communication Facilitator	_____

- 32. How, if at all, do you see these rankings changing in the future, both for yourself and the hygiene profession in general.** Please rank 1-5 with 1 being most important and 5 being the least important.

<b>Roles Changing for Yourself</b>	<b>Rank Order</b>	<b>Roles Changing for the Profession</b>	<b>Rank Order</b>
Patient Advocate	_____	Patient Advocate	_____
Patient Educator	_____	Patient Educator	_____
Clinician	_____	Clinician	_____
Treatment Coordinator	_____	Treatment Coordinator	_____
Communication Facilitator	_____	Communication Facilitator	_____

***Directions. In sections III and IV, check all that apply. Please feel free to elaborate on any point.***

**III. What barriers or obstacles does the dental hygienist face in becoming an active voice in interdisciplinary collaboration regarding patient care?**

Check all that apply.

- ☐ Insufficient education
- ☐ Lack of confidence in using professional language
- ☐ I won't be taken seriously
- ☐ It is not my job
- ☐ Insufficient knowledge of medical diseases/conditions
- ☐ Insufficient knowledge of dental diseases/conditions
- ☐ Unable to identify correct contact person
- ☐ Need more professional freedom
- ☐ Unsupportive work environment
- ☐ Insufficient time
- ☐ Willingness of other professionals to collaborate with a dental hygienist
- ☐ Other \_\_\_\_\_

**IV. What communication skills are important to learn to better participate in interdisciplinary collaboration? Check all that apply.**

☐ Motivation/Persuasion Strategies

☐ Negotiation

☐ Power/Influence Strategies (e.g., how to get others to see/hear your viewpoint)

☐ Listening Skills

☐ Speaking Skills

☐ Dealing with Difficult People

☐ How to Work Effectively in Teams

☐ Leadership Skills

Have you had training in communication skills? ☐ yes ☐ no

If yes, what was (were) the topic(s), and where did the training take place?

---

Was the training paid for by your employer? ☐ yes ☐ no

Do you feel your work environment supports this type of communication training?

☐ yes ☐ no



## V. Demographics

*Directions: Please answer the following questions by placing a check mark in the appropriate blank. The information that you provide will help us better understand the survey results but will not affect the anonymity of your response.*

### 1. How many years have you been practicing as a registered dental hygienist?

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> 1) 0-5yrs   | <input type="checkbox"/> 4) 16-20yrs |
| <input type="checkbox"/> 2) 6-10yrs  | <input type="checkbox"/> 5) 21-25yrs |
| <input type="checkbox"/> 3) 11-15yrs | <input type="checkbox"/> 6) 26+ yrs  |

### 2. In what type of area do you work?

- ☐ 1) Urban  
☐ 2) Suburban  
☐ 3) Rural

### 3. What area of Oregon do you live in?

- |                                       |   |                                       |
|---------------------------------------|---|---------------------------------------|
| <input type="checkbox"/> 1) Northwest | <input type="checkbox"/> 3) North Central | <input type="checkbox"/> 5) Northeast |
| <input type="checkbox"/> 2) Southwest | <input type="checkbox"/> 4) South Central | <input type="checkbox"/> 6) Southeast |

### 4. What is your highest level of education in addition to your dental hygiene license?

- ☐ 1) Associate Degree  
☐ 2) Baccalaureate Degree  
☐ 3) Master's Degree  
☐ 4) Doctoral Degree

### 5. What is your primary responsibility as a dental hygienist in your current work setting? (check only one)

- ☐ 1) Clinician  
☐ 2) Public Health  
☐ 3) Educator  
☐ 4) Researcher  
☐ 5) Sales/Corporate/Business  
☐ 6) Student  
☐ 7) Retired  
☐ 8) Other (please specify) \_\_\_\_\_

**6. Where do you primarily practice?**

- ☐ 1) Private Practice  
☐ 2) Public health  
☐ 3) Dental HMO  
☐ 4) Dental specialist's **Error! Contact not defined.**(please circle)  
                     periodontist    pedodontist    oral surgeon    orthodontist  
                     endodontist  
☐ 5) Other (please specify)  
 \_\_\_\_\_

**7. Do you hold any other titles, besides hygienist, in your work setting?**

**For**

**example:**

- ☐ 1) OHSA officer  
☐ 2) HIPAA compliance officer  
☐ 3) Lead Hygienist  
☐ 4) Trainer  
☐ 5) Infection Control Monitor  
☐ 6) Other (please specify)\_\_\_\_\_

**8. Are you a member of the American Dental Hygienists Association?**

☐yes      ☐no

**Thank you for your time and thoughtfulness! Please return the survey to the researcher, or mail it in the addressed, stamped envelope.**

## **SURVEY RESULTS and FURTHER RESEARCH**

**This page will be removed from the survey prior to reading it to assure your anonymity.**

**If you would like to receive a copy of the survey results, please give your contact information.**

**Name:**

**Email:**

**Address:**

**Phone:**

**I may be conducting further research in these areas. If you are interested in being contacted for interviewing in the future, please mark yes. This does not commit you to anything at this time. If further research is undertaken, you will be contacted regarding your interest in participating. (If you mark yes, please make sure your contact information is given.)**

**\_\_\_\_\_ Yes, I am interested in participating in future research**

**Again, thank you for being a part of this scientific research project!**

## **Appendix B**

## Survey Cover Letter

Dear Participant:

I am a registered dental hygienist here in Oregon and am pursuing my graduate degree from Oregon State University, in Communication and Adult Education. I need your help in completing my research for my graduate thesis. Recently, I have received permission to ask you for your views on the hygienist's role in interdisciplinary collaboration. As you know, collaboration concerning patient care within and between the medical and dental professions is on the rise. This communication has increased in importance due to scientific, evidence based disease connections between the oral and systemic systems. This evidence places the dental hygienist in a unique position, as her/his assessment is an important piece of the collaboration regarding patient care. It is significant then, to understand what dental hygienists feel their role in interdisciplinary collaboration is, and what it should be. I also want to discover what you think are barriers to and skills needed for interdisciplinary collaboration.

It should take approximately 15-25 minutes to complete the survey. All participants' responses will be anonymous. Those who choose to give their contact information for further research or to receive a copy of the results will be assured confidentiality, as any personal information will be separated from the survey results. **At no time in any data report or write-up will the identity of participants be revealed. Your participation in this survey is completely voluntary and you may choose not to answer any question(s), for any reason.** By returning the completed survey, either to myself personally, or through the mail, your consent to participate will be assumed. There are no foreseeable risks to you as a participant and no direct benefits; however, I hope you will take the time to participate, as every opinion is important and extremely valued.

Any questions you may have regarding this survey can be directed to me at 503-315-2222 or by email at [swanskel@onid.orst.edu](mailto:swanskel@onid.orst.edu), or my professor, Dr. Gregg Walker at 541-737-2461 or [gwalker@oregonstate.edu](mailto:gwalker@oregonstate.edu). If you have any questions about your rights as a participant in this research project, please contact the Oregon State University Institutional Review board (IRB) Human Protections Administrator at 541-737-4993 or [IRB@oregonstate.edu](mailto:IRB@oregonstate.edu).

Thank you for your help! I appreciate your cooperation.

Sincerely,

Kelli Swanson Jaecks, BS, RDH  
Student Researcher

Gregg Walker, Ph.D.  
Department of Speech Communication, Oregon State University

## **Appendix C**

## Swanson Jaecks Course Design April 18, 2007

The O/S Link: Inflammation, Periodontal Disease and Heart Disease  
Objectives:

- Participants will be able to describe the connection of inflammation, periodontal disease and heart disease to patients, professionals and family members.
- Participants will increase their understanding of inflammation vocabulary

Process	Materials	Time
<b>Beginning</b>		
<p>Introduce content and objectives. Ask questions, “How well could you explain the link/connection between oral and heart disease? How confident do you feel with vocabulary surrounding inflammation”?</p> <p><b>Activity</b> Ice-breaker; human chain All team members link arm in arm in a straight line. Feet of members must stay ‘glued’ to each other Place line on floor with rope or tape Objective: get all members across the line without breaking arms or feet</p>	Tape or Rope	<b>8 min.</b>
<p>Use ice-breaker to discuss systems thinking. Apply systems thinking to our bodies; all parts of one whole, each part or sub-system affects the whole system. Connectivity Introduce Oral/Systemic link - focus on periodontal disease and heart disease</p>		<b>2 min.</b>
<b>Middle</b>		
<p><b>Lecturette I</b> O/S link- the mouth and heart Inflammation, definition, role; cardinal signs. Mediators</p>	Computer/ Projector	<b>10 min.</b>

<b>Activity</b> Vocabulary Matching. Divide into groups of 2 or 3. Pass out inflammation vocabulary puzzle pieces. Have groups unscramble definitions and correctly match definitions with vocabulary words	Vocabulary Words and Definition Puzzle Pieces	<b>10 min.</b>
<b>Lecturette II</b> Periodontal Disease. Definition, signs, mechanism of action; CVI, Heart disease, facts, arteries, walls, plaques, mechanism CVI from p. bacteria and inflammatory cells.	Computer/ Projector	<b>30 min.</b>
<b>Activity</b> Draw progression of link on whiteboard Have participants draw on 8X11 paper, Sideways Mouth/Tooth --- Inflammation --- Liver --- In. fighting cells & bacteria --- to the blood --- Artery walls --- Inflamm. cells=knock off plaques, bacteria=weaken cell walls=CVI= heart attack	Flipchart/ Whiteboard	<b>5 min.</b>
<b>Activity</b> Role play intervention - behavioral rehearsal - Set up scenario; Explain the inflammation pathway and the periodontal and heart disease connections. Decide who will play what role. Switch roles so everyone has the opportunity to verbalize the connections 1. Hygienist to patient 2. Hygienist to Cardiologist 3. Adult child to Parent	Vocabulary Words and Definition Puzzle Pieces	<b>15 min.</b>
<b>End</b>		
<b>Discuss/Debrief role-play.</b> Did you feel comfortable communicating this knowledge?? What other information do/might you need to better communicate? What can you take away from this role-play?		<b>5 min</b>
Debrief entire lesson with; Verbal feedback- Usefulness? Clarity? Changes needed? Written feedback - Fill out scoring guide	Scoring guide	<b>5 min</b>
	<b>Total Time</b>	<b>90 min.</b>



## **Appendix D**

### Vocabulary Definition Puzzle

Macrophage	Large phagocyte cells that engulf foreign agents, Chief scavengers of inflammatory response.
Cytokines	Messengers of the Immune system. Polypeptides secreted by the immune system. Can stimulate or inhibit cellular activity
Interleukin 1 (IL1)	Stimulates antigen specific T-cells to divide, makes clones of antigen. Recruits osteoclasts to remove bone matrix
Interleukin 6 (IL6)	Functions to increase fibrinogen for clotting action
Fibrinogen	Clotting factor, can help injured blood vessels and/or create thrombi in vessels
Tumor Necrosis Factor-Alpha (TNF-A)	Increases CRPs release into circulatory system Increases syntheses of triglycerides from the liver
C-Reactive Protein (CRP)	Large cells markers of inflammation, which can damage smooth muscles in blood vessel walls

