The Effects of Tobacco on Dental Implants

Abstract

The purpose of this research is to analyze what the healthcare community understands about how tobacco affects recovery and implant performance after surgery. An additional goal was to decipher if (and to what level of clarity) the risks are being communicated to the patients. Many Americans with dental implants use tobacco products or know someone who does. This behavior could be an indicator that tobacco users may not fully understand the effects of tobacco on their dental work. A review of the literature was completed to understand what is known, what is presumed, and what is not known. According to the Centers for Disease Control, nearly 90% of smokers had their first cigarette by the legal voting age. Starting a habit this young means Americans are more likely to be using while getting a dental procedure. A review of primary sources, scientific journals, databases, and government sites were researched to determine the understanding on how tobacco impacts oral health, especially following a surgical procedure. Further complicating the issue, healthcare providers are notorious for their poor social skills which only allows more room for error. Since there is such a wide range of variables that to lead to implant failure, understanding whether or not (or to what extent) tobacco plays is much more complicated that what one might think. Tobacco is detrimental to oral health and performance of dental implants in ways that are not always apparent to the patient.

Keywords: dental implants, tobacco, oral health, performance, communication

The Effects of Tobacco has on Dental Implants

Most Americans know that tobacco is harmful to one's health, specifically causing cancer of the mouth or lungs. The bombardment of tobacco warnings is so ubiquitous that young Americans have developed calcium deposits on the ear drums whenever this message arises. The repeated warnings possibly convinced users that they know all the complications of the drug, however, they still don't abide by the warnings. This presumption may be a concern for patients with dental implants that are not specifically advised of how tobacco may injure bone health or complicate implant performance. The use of tobacco may not just lead to the deterioration of oral hygiene, but can result in teeth loss, making dental implants a necessity to maintain a full complementary dentition. If the smoking trends do not change, then 5.6 million Americans younger than age 18 will reach an early death due to complications caused by the habit; this is roughly 8% of Americans within that age range (CDC). A major problem is that tobacco users might be convinced they know all complications of the drug, making this presumption a concern for patients with dental implants that are not specifically advised of how constant usage may injure bone health or complicate dental performance. Intervention to remedy presumptions and knowledge gaps would involve 3 layers of standardized protocol created by the most respected scientists in their fields instead of relying on each individual dentist or surgeon to design a program. The three layers outline by these experts consist of a (1) thorough and informative data collection, (2) battery of tests, and (3) educational literature for all patients regardless to whether or not they admitted to smoking. The quality of care would improve by implementing material created by leading researchers instead of relying on individual providers to know the latest research and communicate it with skill. It is imperative to know how much we know and what is left to discover. By implementing a standard of the latest knowledge and providing the

information in ways that can bypass shortages in social skills, care is given a higher standard and a stronger foundation that encourages growth and shared knowledge. By setting a bar created by experts, this improves upon the current standard of relying too heavily on each individual provider to know exactly (1) what data to collect, (2) which tests are the most informative to date, and (3) how to communicate the knowledge in a way that merits results. The outcome consists of more informed providers and patients, effective communication, and an assurance that all the appropriate medicals tests have been utilized. By researching how tobacco impacts implants and implementing a program designed by experts, the dental community will have a platform that encourages the highest quality of care, the latest research, and effective communication channels.

Review of Literature

Mustafa indicated that the negative effects of smoking alone are not cause enough to avoid dental implant surgery; not all smokers are created equal. Smoking duration, intensity and history are important considerations. As osseo-integrated implants have become more popular, the oral and maxillofacial industry has opened up to a more stringent scrutinization of its risks and deficiencies. Specifically, many are concerned with tobacco's effect on the body's ability to heal after major dental surgery such as tooth extraction. Repeated tobacco use may be linked to weak alveolar bone and periodontal disease. Mustafa's researched how tobacco affects dental implants. In 2000, almost 5 million people died as a result of this highly addictive drug. Measuring and quantifying the risk factors and the likelihood of implant success can seem like comparing apples to oranges. For example, the risks a social smoker assumes is less than the risks of chain smoker. Risk factors sprout from several angles. The patient's health, genetics, oral hygiene and daily habits must be considered. The quality of the

implant (name brand versus generic, material, design, condition). Not all locations in the jaw are provide the same level of bone density and surgical ease. Lastly, the expertise, dexterity and quality of surgical precision and technique of the provider. Lesser known side effects of smoking that patients should learn before they get surgery: gingivitis, wound healing, periodontitis, plaque buildup, tooth loss, deterioration of the alveolar ridge. Procedures that are highly sensitive to external dangers are bone grafts, sinus lifts, and recent implantations. In addition to nicotine, smoking flushes the oral cavity with heat, hydrogen cyanide, and carbon monoxide—all negatively impact the quality of oral health and implant performance. Research showed levels of implant failure in smokers regardless of whether or not the patients had bone grafts (Mustafa 2017).

Piotr et al points out that smoking cigarettes attributes to perio- implant bone loss, it does not explain implant therapy failure, but bone loss is mostly associated with the process of osseointegration. Tobacco smoking is not a sole reason for missing teeth treatments with dental implants, but a detailed explanation of the addiction related risk is best for both the client and dentist. A successful dental implant is based on the implant correctly combined with the bone and working effectively for numerous years. Tobacco use is a factor that affects the success of dental implants, however there are several other contributing factors. The other contributing factors that play a role for a dental implant failure include person's age and medical and dental health conditions both contribute to the success of dental implants. Piotr's researched the impact of cigarette smoking and the degree of bone loss and the success rate of the dental implant. This study was conducted by comparing only a small sample of people and an unbalanced sample of men and women over a 4-year time period. The parameters of the studies also did not clearly define how many cigarettes on average an addicted smoker smoked. The study results came back that a smoker bone loss was the same compared to the non-smokers in

the study. Investigating the impact of bone loss on the treatment success in every one of the patients, paying little mind to their smoking or non-smoking tobacco use, a factually noteworthy connection between the contemplated factors was discovered. In spite of incomplete bone loss found in the larger part of patients (more than 90%), dental implants were osseo-integrated and the embed treatment was totally effective. The examination of the relationship between cigarette smoking and implant treatment achievement did not demonstrate the impact of smoking on the treatment achievement. The contrasts between the smoking sample and the non-smoking samples were not factually noteworthy. The current study showed that although smoking tobacco caused more bone loss around the dental implants it was not a significant factor in the success rate of implantation (Piotr, G. Agnieszka, K. Agnieszka, Maciej and Jolanta, 2016).

Shavena analyzed 3260 subjects to understand the effects of smoking; 132 of the 3128 implants failed. The implants were tested using different sizes and placed in different locations inside the mouth (mandible and maxilla). The study evaluated the impact of smoking over a 6-year period. The sex of the test subjects were divided as 2610 men and 650 women of ages 26 – 58. Only subjects with ample jaw bone density were studied. Patients with the following conditions were eliminated from the evaluation: systemic disorders, drug dependency, radiation therapy, and psychological issues. To understand how smoking effects the implants, a thorough history of smoking was considered, such as frequency, amount of time, and quantity of cigarette use. Several parameters determine the quality of prosthetic fulfillment. Some causes (parameters) of implant failure include occlusal overload, pathological bone tissue, poor bone quality, and disease. Since smoking impacts the life of the prosthetic, patients should be notified. Bone healing after a major surgery or prosthetic insertion is extremely complicated: creation and activation of matrix proteins, angiogenic stimulators and other growth determinants

play a role in bone mechanics and stability. Shenava concluded that the duration of a smoking habit has a much more significant impact on the life of the implant. However, the quantity of tobacco was not a major influence on the performance of the prosthetic (Shenava 2016).

Clochesy et al testifies that monitoring patients' understanding and behavior is vital, especially for mediations and patient self-administration (following doctors' orders or discharge instructions). There's been hardly any reports of client's point of view in determining what steps can be taken to provide better correspondence with their medical service provider. Provider offices should implement structured communication tools that have been proven effective in maintaining strong and open communication between professionals and patients. Such tools overcome communication and knowledge barriers caused by a myriad of circumstances and unites provider-to-provider and patient-to-provider transmissions. These tools were created by researchers and scientists who specialize in communication between healthcare providers and patients. This improvement means patient fulfillment and less malpractice (Clochesy, John M; Dolansky, Mary A; Hickman, Ronald L, JR; Gittner, Lisaann S, 2015).

Methods and Procedures

Dental Implants

This topic was selected because there is a need for clarity in where the dental industry stands in terms of tobacco use. Both the patients' and providers' responsibilities should be clearly understood to maximize healing after dental surgery. Quality of care is the duty of both the provider and the patient, and both should be held accountable. Furthermore, motivation for

this topic comes from the family members who use tobacco and don't understand the risks. As an oral health professional, witnessing loved ones take complete disregard for their oral health on the daily basis by not seeking medical attention yet use tobacco regularly is extremely difficult. This issue hits home for dental professionals who repeatedly witness oral surgery patients hinder the jaw healing process or implant performance due to tobacco use immediately after surgery. It is interesting that tobacco can lead to a bone-integrated surgery to fail. Even for periodontal professionals, there is room for improvement in terms of education and understanding of how harmful substance specifically attacks the surgical wound and cause extreme side effects that could have been either minimized or prevented. This topic touches many people on the personal basis because many Americans know a loved one or have family members using tobacco. When the providers know more, they can help the patients and the youth take better care of themselves after they go home from a surgical procedure.

Resource Search and Selection

A careful review of the significant literature related to the importance of dental implants pertaining to the use of tobacco. The search was narrowed to patients with dental implants who used tobacco as well as those who had implants and didn't use tobacco. Additionally, a literature search regarding communication issues between providers and patients was pursued. The search was limited to 262 articles. Review of the abstracts were accomplished and 6 databases were selected for incorporation into this project.

Libraries/search engines and data bases used. Several databases were used to search for the sources for this project. The databases were (a) Cochrane Database of Systematic Reviews, (b) eBook Subscription Collection (EBSCOhost), (c) Citations and Abstracts for Literature of Nursing and Allied Health (CINHAL), and (d) ProQuest.

Search terms. Several search terms were used to identify sources for this project. The search terms included (a) dental implants, (b) effects of smoking on dental implants; (c) dental implant failure, (d) risk indicator on implants, (e) information on maintaining dental implants, (f) communication failures. This search resulted in 2,718 articles. Filters were used to narrow down the search. The filters applied were; date of publication, full text availability, peer reviewed, English as the language and published in the US.

Boolean String. Two Boolean strings were used: tobacco use AND dental implants, communication barriers AND providers.

Age of the Sources. The significant literature will be reviewed. Only sources from the last 5 years were considered for inclusion in the review of literature. Government sources, including the CDC, were used to provide statistics in the introduction review and discussion.

Discussion

Research has led to significant developments in understanding how to best facilitate patents' dental health. Recent evidence suggests that smoking duration, intensity and history are important considerations. For example, the risks a social smoker assumes is less than the risks of chain smoker. Before dangers can be conquered, they first must be understood. The risk factors are not black and white but have many grey areas. Modern research sheds new light on how many variables come into play when determining the true suspects of dental failure. Risk factors sprout from several angles. The patient's health, genetics, oral hygiene and daily habits must be considered. The quality of the implant (such as name brand versus generic, material, design, condition) are variables in this complex equation. Not all locations in the jaw provide the same

level of bone density and surgical ease. Lastly, the expertise, dexterity and quality of surgical precision and technique of the provider. Several attempts have been made to quantify these variables and to what extent they play a role. Tobacco is not a sole reason for dental problems. The other contributing factors that play a role for a dental implant failure include person's age and medical and dental health conditions that both contribute to the success of dental implants.

In addition to finding answers, research has also stirred up controversy. Possible areas of controversy lie also in where should doctors draw the line when it comes to informing the patient about the risks without infringing on the patient's personal life. Doctors make a living by the satisfaction of their patients and shaming patients is a conflict of interest. Therefore, doctors may hesitate to mention the risks. Even so, clients deserve a detailed explanation of all the risks factors of how the drug may hinder bone health, gum health and implant performance. The message that smoking is harmful is already well understood, but possibly not in the way that affects oral surgery or implant performance. It is common knowledge for most Americans that tobacco is harmful to the lungs and throat, but it should not be presumed that dentals patients know that the risks also transfer to their bone health, healing quality and life of the implant. Oral surgery makes the jawbone especially vulnerable to chemicals, such as tobacco. The standard tobacco warnings do not specifically outline the dangers to surgical wounds. A detailed explanation of the risk is best for both the client and dentist.

Latest research reveals that there are still no methods to determine with certainty the level of impact of the various factors. When a patient with weak bone has a dental failure and smokes occasionally, to what extent is the failure based on genetics, health, age, hygiene, smoking duration, intensity and frequency? Little research, if any, exists what truly narrows

down one variable at time. For example, many studies researched a population with a large age variation, health levels, smoking intensity/frequency/duration levels. If one truly wants to understand specifically how smoking intensity alone impacts dental implants, then the subjects should be in similar health, age, genetic propensities. Scientists still need to find how to compare patients with similar tobacco habits and health to truly understand how duration impacts the prosthetics.

The standard for executing a scientific experiment is to have one variable and hold all other values constant. When studying tobacco, some variables that can affect the success or failure of a prosthetic include patient health, doctor skill, implant location, implant quality, implant size, genetics, patient age, and in terms of drug use: length of use, amount of use and frequency of use, etc. The challenge is how to isolate a single variable while holding the others constant. At the very least, how does one quantify the level of impact of each variable; it cannot be assumed that each variable is equally potent in its ability to cause harm.

Though the studies under consideration were performed at prestigious universities or laboratories, one should not presume that the experiments were without their weaknesses. For example, Shabena studied the effects of tobacco using a population sample of 2,610 men and 650 women. Men and women have different hormonal levels and on average, men have a greater bone density than women. Since the stability of a dental implant relies in part on the quality and density of the jaw bone, this study could have eliminated some uncertainty by either studying only men or only women or treating the sexes independently all together. In addition, the age range (26-58) is quite large. One cannot presume that subjects 50-58 possess the same level of resiliency of those 26-34. The large age range provides a large amount of uncertainty and does not hold age constant by selecting a small age window.

This research is concerned with the American population and the problem that patients think they know the risks of tobacco when receiving surgery when they should be asking more questions. Dentists make a living with content patients and are often rushed for time. If dentists see that patients get annoyed with the repetitious tobacco lecture, they may discontinue or water down their responsibility as health advisors. The patient could develop bone recovery issues and not be aware that it due to tobacco. Communication barriers arise because providers do not want to lecture or shame their patients, patients may not be completely honest with their providers regarding their tobacco use. Some insurance companies may charge more for patients who smoke and therefore encourage dishonesty.

For an intervention to this issue, a standard protocol is recommended. Since dentists and oral surgeons have earned a reputation for lacking in social skills or "bedside manner". Even with some training in school, these professionals still may not overcome their communication barriers. A standard question and answer, test schedule (create tests on how one responds to tobacco – healing designed by PhDs in their fields) and educational program could make up for the lack of communication between the provider and patient. By standardizing the question and answer section, this would allow proven experts in the tobacco-versus-periodontal disease field to make sure all the pertinent questions are asked since not all dentists will know specifically what or how to ask information to obtain the highest quality of understanding.

There are several desired outcomes from this research. More effective communication between patient and provider, higher quality data collection to ensure provider is informed in order to provide necessary counsel and discharge instructions, provide a level of clarity of what is the provider's responsibility in terms of care and advisement and the patient's responsibility in terms of providing oneself with the necessary environment, knowledge, rest and self-care to

maximize recovery, break down barriers that the patient may have built regarding tobacco, providing an effective, non-shaming, non-intimidating method for providers to probe and provide tobacco side-effects information that the provider is comfortable giving and also comfortable for the patient so that thorough and honest information is collected.

Instead of over-burdened dentists trying to figure out what questions to ask and what tests to run, there should a standard created by the most respected experts in their field. These experts create the question-and-answer data collection packet for all potential surgery patients. Experts will know what questions need to be asked (and to what extent). Additionally, experts specializing in the effects of tobacco on oral surgical wounds would know the exact schedule of tests that should be part of the pre-screening process. Dentists and oral surgeons may not know all the specific cases that warrant a test, especially for those who show either unusual or minimal symptoms. Furthermore, there patients will receive educational packets, DVDs and consultations that will remind them the importance of not using the drug while healing and will receive the motivation to abstain from the drug, at least for the short term if not for the long term. This standardized yet thorough educational program will overcome calloused eardrums and allow a more comfortable method of communication between the doctor and the patient – it allows solid communication even for medical professionals who do not have strong social or communication skills. This program by-passes communication barriers caused by poor social skills or fear the doctors may have of shaming the patient.

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