Perspective/Point of View

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Exploring the Interplay Between Lifestyle Medicine and Oral Health: A Bidirectional Relationship

Abstract: *Lifestyle medicine, characterized by its evidence-based approach, recognizes the profound impact of lifestyle choices on overall health. The six pillars of lifestyle medicine encompass nutrition, physical activity, stress management, sleep, avoidance of risky substances, and social connections. While their significance in promoting general health is well-established, their specific influence on oral health is an area of growing interest. A balanced and nutritious diet contributes to strong teeth and healthy gums, while regular physical activity enhances blood circulation and salivary flow, which is vital for maintaining optimal oral health. Effective stress management techniques can mitigate oral health issues related to anxiety and bruxism. Quality sleep supports oral health, allowing for tissue repair and immune system rejuvenation. Avoiding risky substances like tobacco and excessive alcohol consumption reduces the risk of oral diseases such as periodontitis and oral cancer. Lastly, social connections and supportive networks positively influence oral health by promoting positive oral hygiene behaviors and providing access to dental care resources. Understanding the impact of lifestyle medicine's six pillars on oral health offers valuable insights for healthcare professionals and individuals seeking to improve their oral well-being.*

Keywords: oral health; lifestyle medicine; prevention; quality; nutrition

Introduction

Lifestyle medicine has emerged as a compelling and widely discussed subject in our contemporary society. What makes it particularly captivating is the robust scientific foundation highlighting the direct correlation between a healthy lifestyle and a longer life and, perhaps more significantly, an enhanced quality of life.[1] The compelling evidence points to a profound connection between adopting a healthy lifestyle and many positive outcomes. Research consistently demonstrates that individuals who embrace a healthy lifestyle tend to prioritize essential elements such as balanced nutrition, restorative sleep, nurturing relationships, resilience in the face of stress, consistent physical activity, tobacco avoidance, and moderation in alcohol consumption.[2] In essence, the outcome of a life well lived in

> "Positive relationships improve our immunity and increase our resistance to diseases."

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adherence to these principles improves the likelihood of achieving holistic health and well-being.[1,2]

When we explore the realm of a healthy lifestyle, we often overlook a crucial aspect – oral health. But how pivotal is oral health in the grand tapestry of a vibrant and well-balanced life? It extends beyond a bright smile; it encompasses communicating, savoring the world's flavors, expressing emotions through facial expressions, and performing essential functions like chewing and swallowing free from pain, discomfort, and craniofacial disorders.[3]

Oral health-related quality of life (OHRQoL) is a new concept based on the relationship between the impacts of the oral condition on daily activities and quality of life.[2] Recent research findings reinforce what many have intuited: individuals who lead a healthy lifestyle also enjoy the benefits of good oral health.[2,4] Thus, it's evident that Lifestyle Medicine extends its nurturing hand to enhance oral health. Reports on Oral Health in America underscore the inseparable link between oral health and overall well-being. Studies illuminate how positive health behaviors and regular dental check-ups contribute to preserving our quality of life.[4,5]

Before delving into Lifestyle Medicine as a catalyst for excellent oral health, let's turn the spotlight on dentistry. It's essential to recognize that oral health, in turn, can significantly impact the foundational pillars of lifestyle medicine in individuals. Studies have examined the multifaceted effects of oral health on various aspects of life, including self-esteem, social interactions, and performance in educational or professional spheres.[6] Remarkably, these investigations have concluded that oral health is pivotal in determining an individual's overall sense of well-being.[6,7]

A thorough study investigating oral health and longevity underscores the crucial link between oral function, a balanced diet, and overall health. Maintaining or enhancing oral function, along with a proper diet and nutritional status, significantly impacts overall well-being. Diminished oral function is identified as a significant risk factor for conditions such as malnutrition and sarcopenia.[8]

Dental health professionals possess a distinctive skill set refined through years of education, training, and clinical experience. Their unique vantage point within the realm of healthcare allows them to identify health issues before other healthcare professionals through regular check-ups and comprehensive examinations, advanced imaging, and screening for sleep disorders and oral cancers.[9] Their contributions underscore the importance of holistic healthcare, where dental and medical professionals collaborate to provide the best possible care for patients, ensuring early detection and timely intervention, ultimately leading to improved health outcomes.[10] Just as a healthy lifestyle bolsters oral health, oral health, in turn, becomes a cornerstone in the construction of a wholesome and fulfilling life.[9,10]

Oral Health and Nutrition

The American Dental Association (ADA) highlights the integral nature of nutrition concerning oral health. Scientific and epidemiological data suggest a lifelong synergy between the types of food consumed and the integrity of the oral cavity regarding health and disease. In addition, oral health is integral to holistic and nutritional health.[11]

Healthy teeth and gums are fundamental to a positive relationship with food and nutrition. Digestion begins in the mouth, and the teeth must initially break down food before it can continue the digestion journey to the stomach. The ability to chew one's food adequately is the first step towards healthy digestion and nutrition. The ability to execute proper chewing techniques allows food to arrive in the stomach in a form that facilitates the continuation of nutritional breakdown for maximal absorption by the body.[6]

There is a vast array of scientific evidence that supports the importance of oral health to general health. Furthermore, the role of oral health and nutrition are linked to achieving better outcomes concerning various acute and chronic diseases. According to the authors, improved oral health reduces the risk of chewing and swallowing difficulties and reduces nutritional deficiencies.[11] Poor chewing capability is related to tooth loss, lack of saliva, inadequate mastication strength, and malocclusion problems. Some studies indicate that individuals with difficulty chewing tend to avoid fresh fruits, vegetables, meat, and bread. The resulting preference for soft and easy-to-chew foods that are more processed often increases the consumption of sugar and fat to levels exceeding recommended values, thus increasing the risk of cardiovascular disease and metabolic syndrome.[6,11]

One study revealed that a high rate of tooth loss is associated with a 28% increase in the risk of Mild Cognitive Impairment. Cognitive impairment is characterized by the gradual loss of the ability to learn, remember, concentrate, and make decisions.[11,12] Mild cognitive impairment is the clinical stage between the cognitive decline expected from normal aging and dementia. Therefore, the study concludes that fewer teeth may be associated with cognitive decline in older adults. However, evidence has shown that this relationship disappears among individuals who use prostheses, most likely due to increased nutritional intake and increased social engagement. In addition, masticatory dysfunction

has been associated with morphological impairments of the hippocampus and cognitive decline in elderly adults.[12] These findings again highlight the importance of dentistry and oral health professionals on overall health.

Oral Health and Physical Activity

Sports dentistry illustrates how dental foci and malocclusion can negatively impact athletes' performance.[13] The performance of athletes can be improved by maintaining oral health and preventing and treating possible injuries.[14] One study reveals that the clear psychosocial impacts of oral health affect the training and performance of athletes with poor oral health. These negative impacts can arise from pain and impaired trust and socialization with teammates. According to the authors, poor oral health can affect sports performance directly, not only through pain from disease conditions but also more subtly from effects such as increased systemic inflammation.[14,15]

In another study by the same authors, several athletes described long periods of inability to train or perform at the desired level due to oral problems.[16] A study that evaluated the influence of oral health on the physical performance of soccer players concluded that oral issues could lead to deficiencies in the physical performance of the soccer players studied if not monitored or treated, mainly because of the impact of lifestyle on athletic performance.[13] According to the authors, it is essential to acknowledge the negative impact that poor oral health can have on the athlete's sports performance, directly or indirectly, through negatively impacting physical development, well-being, quality of life, recovery from injuries, muscles, general health, and several other factors.[13,16]

Current research concluded that oral diseases are frequently found in athletes and may be responsible for negatively impacting well-being, training, performance, and general health. Physical performance can be reduced by up to 21% in cases of any disturbance in the oral cavity.[17] Factors that compromise oral health, such as dental caries, lesions, gum disease, and tooth loss, influence the individual's health. Furthermore, poor oral health compromises the lifestyle medicine pillars of food, relationships, and physical activity. There is a need for multidisciplinary work in which healthcare professionals from multiple fields routinely request an "Oral Health Assessment" from the dentistry professional to integrate oral health into Lifestyle Medicine.[16,17]

Oral Health and Stress

The effects of stress are well-known and have been established. Therefore, it is no surprise that stress negatively affects oral health. Stress weakens the immune system, increasing the risk of developing any disease, including the mouth. Coping mechanisms for stress include using illicit substances, which, as previously explained, negatively impact oral health.[18] Most people under stress often have more difficulty eating healthy, sleeping well, exercising less, and may have less time for healthy interactions with others to foster relationships, all of which impact oral health.[18,19]

Studies have shown that chronic stress leads to increased levels of catecholamines and glucocorticoids, playing a role in cancer progression.[18] More specifically, another study showed that chronic stress promoted oral cancer growth and angiogenesis with increased circulating catecholamine and glucocorticoid levels in a mouse model.[19]

People with a strong sense of coherence (SOC) are better at dealing with stressful situations, leading to better general health. 2020, a systematic review revealed that SOC was significantly associated with the rate of caries and tooth brushing frequency.[20] Another systematic review affirmed a positive qualitative correlation between stress-related biomarkers and the severity of periodontal disease and thus suggested that clinicians assess for stress-related disease as it can change the biochemistry of the mouth.[21] A third systematic review showed that stress-related biomarkers in saliva and gingival crevicular fluid were associated with chronic periodontitis.[22] Research has also linked chronic stress with promoting oral cancer growth and angiogenesis with increased circulating catecholamine and glucocorticoid levels in mouse models.[19] Though research on stress and oral cancers is lacking in humans, it has been shown that stress may promote cancer progression.[18]

Oral Health and Sleep

Quality sleep is an essential component of maintaining a healthy lifestyle. Poor sleep can have detrimental effects, some strongly correlated with overall health issues such as obesity, hypertension, type II diabetes, and cardiovascular disease.[23] Oral health professionals are uniquely positioned to be the first to detect evidence of poor sleep in a patient's oral presentation. It makes them valuable in referring patients to appropriate health professionals for suspected sleep issues. Oral health assessments identifying poor sleep quality encompass extraoral and intraoral manifestations.

Extraoral signs that may raise concerns about sleep quality include physical facial features such as "flaccid skin tone, recessed chin, short upper lip, open lip posture, open bite, chronic dry lips."[23,24] The early identification of poor sleep quality can facilitate corrective actions and appropriate treatment. Additional studies have indicated

that "short or long sleep duration is associated with poor oral health status. There are several possible explanations for the detrimental effects of short or long sleep duration on oral health status."[24] It includes immune system impairment, which can increase susceptibility to periodontal disease, and the release of stress hormones like cortisol, which suppress the immune system and promote bacterial growth in the mouth, leading to poor oral health.

An intraoral examination by an oral health professional can provide clues regarding structural features that might impact an individual's sleep quality. For instance, the tongue may obstruct the airway during sleep "due to the lack of teeth to keep the tongue in proper position if a prosthetic is not worn…lack of dentition also causes changes in the vertical dimension of the face, thereby affecting the upper airway and retropharyngeal space."[23,24] Oral health professionals are trained to initially detect components of oral health that coincidentally have a broader impact on a patient's sleep quality, "training received by oral health professionals includes obtaining medical and dental histories, identifying abnormal oral structures, detecting oral disease, identifying oral/comprehensive health links and, more specifically, identifying signs and symptoms of sleep-related bruxism, primary snoring, and obstructive sleep apnea."[23] Because sleep is a crucial component of health, oral health professionals could significantly impact an individual's overall well-being through early detection and referral.

Oral Health and Substance Abuse

Substance abuse also takes a toll on oral health in various ways. Smoking introduces compounds in the mouth that mix with the saliva and cause hyposalivation, which then induces halitosis.[25] Furthermore, smoking and tobacco use promote unaesthetic tooth staining, halitosis, periodontal diseases, impaired healing of wounds, increased risk of dental implant failure, precancerous conditions, and oral cancer.[26]

Globally, oral cancer is the sixth most common cancer and is often not caught until the later stages, significantly increasing mortality rates. Alcohol alone increases the risk and works synergistically with tobacco to promote carcinogenesis. Signs of oral cancer include a sore on the lip or mouth that does not heal, a mass or growth anywhere in the mouth, or bleeding from the mouth.[26,27] In the United States, if oral or oropharyngeal cancer is diagnosed early, the 5-year relative survival rate for all people is 86%, but only 28% are detected this early. Once spread to surrounding tissues or lymph nodes, the 5-year relative survival rate drops to 69%. Of importance, detection of 50% of all the cases in the United States was from clinician evaluation of the tongue and tonsils.[27]

The effects of other drugs on oral health are well-supported. To review, "meth mouth" is characterized by tooth decay and painful inflammation that can progress to complete tooth loss by causing hyposalivation, thereby promoting bacterial growth, tooth decay, and oral tissue damage.[28] Cocaine and ecstasy likewise cause hyposalivation but can also increase tooth grinding.

Oral Health and Healthy Relationships

Human beings have the inherent capacity to build relationships. In the book "Love and Survival," Dr. Dean Ornish cites research that describes how love and relationships are protective. Positive relationships improve our immunity and increase our resistance to diseases. Unsurprisingly, lonely and isolated people are up to four times more likely to become ill and die prematurely from virtually any cause when compared with those who experience stronger feelings of love, connection, and community.[29]

Smiling is an integral aspect of building connections and relating to others. According to a study, laughing decreases pain in children and older adults and reduces cardiovascular risk and anxiety. This mechanism occurs due to the production of catecholamines – responsible for the brain production of endorphins – increasing the level of adrenaline and noradrenaline, slower breathing, and reduced blood pressure and muscle tension.[30] A smile lights up the moment like sunlight. It would be remiss to underestimate the importance of the teeth. They are to a smile what the eyes are to sight, and the ears are to hearing. Seeing a person smiling intensely, securely, and comfortably is beautiful. When you receive a smile, the world lights up, and you wrap yourself in the smile of the other and connect with the other through the smile.[30,31]

Laughter promotes social bonding in a group and can do so even among strangers. Similarly, when we see someone smiling with a tight-lipped expression, without intensity, in a way that uncomfortably prevents their teeth from being seen, it could create feelings of distrust, and the potential for forming a relationship could be damaged.[31] Studies show that an open smile, showing the teeth, is interpreted as a sign of confidence, whereas smiling with the mouth closed or without lifting the cheeks when smiling can give the impression that something is being hidden.[32]

Behind a beautiful smile are good teeth, healthy gums, and healthy breath. Authors concluded that many people are ashamed to smile because they are not satisfied with their teeth, gums, and even the odor of their breath, which may have several social and psychological consequences, leading to

a reduction in the individual's quality of life.[33]

Halitosis is an unpleasant odor emitted from the mouth. Some oral conditions, including poor oral hygiene, periodontal disease, or systemic factors, can cause it. The offending odor appears to stem from volatile sulfur compounds, including hydrogen sulfide, methyl mercaptan, and dimethyl sulfide. An individual who finds himself with a condition of halitosis often experiences embarrassment and difficulty with social connection.[34] Therefore, dental professionals are crucial in improving patients' quality of life when seeking halitosis treatment.[35]

Discussion

Clinical guidelines recommend that regular dental follow-up should take place at intervals ranging from 3 to 24 months.[36] Moreover, studies indicate that most individuals visit dentists at least once a year. This frequent interaction with dental professionals provides a unique opportunity to identify habits and illnesses that could potentially impact a patient's quality of life. With their expertise and regular patient engagement, dentists are ideally positioned to recognize factors that may trigger diseases, including assessing suspected skin lesions during routine extraoral examinations.[37] Oral health professionals must refer patients to lifestyle medicine professionals when identifying such risk factors.

Behaviors related to oral health, such as practicing good oral hygiene, attending regular check-ups, and considering cosmetic dental care, often stem from concerns about OHRQOL. With this understanding, oral health professionals have a unique opportunity to educate their patients about their health. People are more inclined to adopt positive behaviors when comprehending how oral diseases can affect their overall health and quality of life rather than focusing solely on these diseases' impact on their oral structures.[38] Numerous experts concur on the need to stimulate scientific research in the interdisciplinary realm of dentistry. Such analysis can potentially yield valuable insights for preventing and resolving systemic diseases. This collaborative approach would enable physicians and dentists to jointly interpret and address health issues.[8,38]

Conclusion

For the present moment, it is evident that dentists, due to their frequent and consistent patient interactions, possess a heightened ability to detect risk factors that may jeopardize their patients' quality of life, as mentioned above. Simultaneously, lifestyle medicine practitioners should advocate for regular dental visits among their patients, recognizing the reciprocal nature of this partnership in promoting holistic health and well-being.

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