



Role of Digital Dentistry in Reducing Dental Phobia in Adolescence

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Abstract

This literature review summarizes the importance of oral health in adolescents and interventions for overcoming dental phobia using digital dentistry. It is known that the early age is a period of learning through different means, such as observing, hearing, and grasping. We also say that health is the first wealth. Oral health is an essential component in determining the complete well-being of health. It is the mouth mirror to detect any systemic alignments in the body. Adolescence is a phase in life where an individual experiences physical, mental, cognitive, and psychosocial growth. This affects how they feel, think, make decisions, and interact with the world around them, and the child tries to learn from different backgrounds and adapt to them negatively and positively. One of the common negative thoughts about oral health leads to dental phobia. It is where the child doesn't want to visit a dentist and eventually falls into bad oral health. Digital dentistry is playing a role in reducing dental phobia using minimally invasive techniques.

Problem:

Dental phobia in children can lead to delayed visits even in pain, leading to dental problems and symptom-driven treatment. As the child will be in a mixed dentition period (mixture of both baby teeth and permanent teeth), this will affect the child's overall well-being in the future. It is essential for the dentist and the caregiver to ensure that the child overcomes dental fears.

Introduction

Adolescence is the phase of life between childhood and adulthood, from ages 10 to 19. It is a unique stage of human development and an important time for laying the foundations of good health. (Adolescent Health, n.d.) It is a dynamic maturational period during which young lives can pivot rapidly—in both negative and positive directions. (Dahl et al., 2018) and is also a critically crucial developmental stage and a time of vulnerability for acquiring dental fear and anxiety. (Themes, 2022) Children tend to develop a lot of dental diseases during that phase. Dental caries and dental phobia are the two most common problems they encounter. As the child undergoes rapid growth, learning, and development, Investing in teaching the child during this period will help them positively impact developmental trajectories relating to health, education, and social and economic success. (Dahl et al., 2018)

Dental Phobia is a severe concern for many children. It refers to the fear of and anxiety about going to the dentist. It exists in many children and adolescents and is a significant dilemma in pediatric dental practice. (Gao et al., 2013) Dental anxiety is a state of nervousness, anxiety, or fear produced by the thought of an impending dental appointment. Some also call this condition “dental fear” or “dental phobia.” Odontophobia is literally “fear of the dentist” and is recognized by the World Health Organization (WHO). They estimate that fifteen to twenty percent of the population suffers from dental phobia or anxiety. In children, symptoms of dental anxiety can be noticed as young as five and vary widely. Studies have shown 10% of children and young people have experienced severe dental phobia. (Dental Anxiety in Children | Pediatric Dental Care of Yukon, n.d.). According to the recent 2023 report on oral health from the California Department of public health (CDPH), children miss 874,000 school days yearly. It is due to dental problems, and estimated that it would be increased to 70 percent if left untreated; the tooth problem will affect children’s academic performance, social-emotional development, sleep, and nutrition.

(Kindergarten Oral Health Assessment Requirement - Letters (CA Dept of Education), n.d.)

Dental phobia can affect anyone, but children are more susceptible. Most adults with high-anxiety symptoms can trace the origin from a young age, and parents who suffer from dental anxiety are very likely to pass this feeling of unease on to their children.

A few situations that can lead to developing dental phobia include bad experiences in which a negative experience with one dentist can often influence their view of every dentist, assuming all future encounters will be similar, or in cases of young patients who have struggled with proper brushing techniques may feel self-conscious before a dental check-up. A poor report from the dentist, especially compared to a sibling, can cause embarrassment or fear of punishment, and lack of understanding can also lead to dental fear in children. (Dental Anxiety in Children | Pediatric Dental Care of Yukon, n.d.)

In recent years digital technologies have significantly changed the clinical approach to medicine and dentistry. Innovative operative techniques and restorative materials have paved the way for a significant active boost toward complete digital workflows. The digital workflow came into dentistry in different fields of application, from treatment planning and designing to prototyping steps, from implant surgery procedures to the fabrication of customized prostheses and devices produced by computer-aided design/computer-aided manufacturing (CAD/CAM) additive and subtractive technologies. (Spagnuolo & Sorrentino, 2020). Dental practices regularly using digital tools and advances offer patients better services through reduced pain, treatment periods, and ultimately fewer appointments. (Ways Digital Dentistry Reduces Dental Phobia | Angel Smile, n.d.)

Public Health Significance

According to Centers for disease control and Prevention, more than half of those aged 12 to 19 years have dental caries (57%); however, the prevalence increases substantially from the ages of 12 to 15 years to the ages of 16 to 19 (48% to 66%, respectively) as the adolescent population experiences different transition phases during that period. (“Oral Health Across the Lifespan,” 2021)

Teeth transition phase: Adolescence is a period in life when the child undergoes the teeth transition. Permanent teeth start to erupt when children are about six years of age. Baby teeth will gradually wobble and fall out as the child grows and develops. Permanent teeth will replace all baby (deciduous) teeth of the child by 12 or 13 years old and can take till 21 years old in few children. This transition period is called the "Mixed Dentition Stage." (Mixed Dentition / Eruption Guide :: Great Outdoors Pediatric Dentistry, n.d.) As the permanent teeth will last a lifetime, developing good oral health will lead to good overall health in children.

Social learning: Fear and anxiety can be caused by communication or observational learning. In these cases, someone may hear about an aversive dental experience from a parent, friend, or another source (e.g., mass entertainment or media outlets) or may witness someone else's pain or fear reaction to dental stimuli, generalized or specific worries about dental treatment–related impulses or fear reactions in the dental setting can follow. So, Children have more chances of developing dental fears. Communicating with them in their early life stages will help them understand the importance of oral health.

Cognitive factors: For children, adolescents, and adults, mental factors can play a role in the development and maintenance of dental care–related fear and anxiety. Several cognitive factors influence fear, anxiety, behavior, and symptom perception in the context of dentistry, such as misperceptions and misappraisal of threat/risk (e.g., cognitive distortions including catastrophizing), rumination about an overestimation of pain, worries about lack of control, beliefs about dentistry and dentists, and trust. Creating a good rapport between the dentist and the child can build trust and confidence that helps the child to maintain good health.

Conditioned fear: Conditioned fear or anxiety accounts for a potentially significant proportion of the dental care–related fear and anxiety experience. Patients can experience distress when they encounter those same stimuli, even without pain or discomfort, and they may show behavior management problems or avoid dental care to avoid distress. So, the dentist and the caregiver must help the child overcome fear by building a good relationship.

Role of Digital Technology in Dentistry

Digital solutions allow dentists to take impressions quicker and enable patients to get treatment in a single visit, with less chair time for the patient. As for the labs, digital dental technologies speed up processes, letting them handle more orders simultaneously.

Novel dental materials offer undeniable advantages such as optimal mechanical resistance, excellent esthetic and optical properties, and reliable accuracy and precision, widening the clinical scenario and allowing for innovative and less invasive therapeutic solutions. (Spagnuolo & Sorrentino, 2020)

Dental digital X-rays are popular in modern dental practice. The X-ray image features many benefits for the patient and dentist. These include low radiation levels, instant viewing, and image enhancement.

Laser Dentistry has revolutionized dental care. Because lasers do not cut through tissue like traditional dental instruments, they cause less swelling, tenderness, and bleeding. This less invasive method is ideal for people with dental anxiety.

One of the significant fears around going to the dentist is the drill because the loud, unpleasant sound and vibrations it makes can be triggering. The lasers are much quieter during laser dentistry, emitting a low pulsing sound that many people find relaxing. (Dental, 2021)

Another major cause of dental anxiety/phobia is the administration of an anesthetic via a needle. It's estimated that at least 10% of Americans fear needles, impacting their dental experiences.

The wand is an entirely different way of administering anesthetic. This computerized device gradually pushes the anesthetic gently into the gum. This method is relatively painless, and the fact that the wand looks like a pen rather than a needle makes it much less threatening. (Dental, 2021)

With guided surgery, the dentist uses the (CBCT) scanner to obtain a scan of a patient's entire mouth. So, it allows the patient to see their future teeth first in virtual animation, and the guided surgery software decides where to position the implants. This makes the patients feel reassured, safe, and better prepared for the surgery.

The 3D printers print a perfect 3D physical representation of an image. This reduces wait times as it doesn't have to be produced in a lab but is instantly created at the clinic. For anxious patients, it's a great solution as no impressions have to be taken.

Patients, nowadays, demand easy and transparent access to their medical data and records. This is mainly agreeable as it's one of the ways to reduce dental anxiety. Through the digital dentistry revolution, there are cloud-based platforms and networks where patients can view their dental records or invoices and send questions or notes to the dental staff.

Teledentistry is the delivery of dental consulting or essential examinations using digital tools such as synchronous or asynchronous video offers a way to help bridge the gap. It is expanding access to care.

Virtual or augmented reality (AR) could be headsets patients wear to provide digital distractions in a dental practice. It's an extension of the function currently filled by ceiling-mounted televisions in dental offices that give patients something else to focus on.

AI tools are now more consistent than dentists in diagnosing tooth decay from bitewing and peripheral radiographs, which makes sense. AI algorithms are trained using billions of data points to make decisions based on available evidence, giving them an edge over humans when identifying specific conditions (9 Technologies That Will Shape The Future Of Dentistry, 2022).

Conclusion

Oral health is a crucial indicator of overall health, well-being, and quality of life. It is defined as being free from mouth and facial pain, oral diseases, and disorders that limit an individual's capacity for biting, chewing, smiling, and psychosocial well-being. (WHO/Europe Home, n.d.) A healthy and pain-free mouth supports good alimentation and the ability to sleep and focus at school or work. (Lee & Somerman, 2018) The combination of medical and dental care is essential for individuals, irrespective of their age. There is abundant evidence that oral health is strongly linked to general health. Oral diseases are linked to systemic diseases; likewise, systemic diseases impact oral health. Over the decades of research, it has been found that hundreds of systemic diseases show oral manifestations, and they are the primary and crucial signs in diagnosing the condition. This is a bidirectional relationship linked to inflammation. Oral health problems can have a negative impact on the quality of life and are more dominant in immunocompromised individuals, older adults, psychiatric patients, and children. (Haumschild & Haumschild, 2009) Early detection of dental diseases through a complete but brief examination of the oral cavity can lead to the timely management of systemic diseases and improved quality of life.

Providers' ability to effectively communicate information is vital to a successful patient-provider relationship. The healthcare setting places increased importance on clinical productivity and less interaction with patients. (Effective Patient-Physician Communication, n.d.)

Patient education is a relatively new science within the field of health care. As health care has moved from a traditional paternalistic approach of 'doctor knows best' to a patient-centered care approach, patient education must be tailored to meet a person's needs. Health literacy is linked to general literacy and entails people's knowledge, motivation, and competencies to access, understand, appraise, and apply health information to make judgments and take decisions in everyday life concerning health care, disease prevention, and health promotion to maintain or improve quality of life during the life course. (Wittink & Oosterhaven, 2018).

Modern dental technologies can make a difference to patients by providing more precise diagnostics, shorter and more accurate treatments, and less invasive and painful surgeries; all help reduce dental phobia. Explaining every dental procedure to patients can offer a more transparent dental treatment that reassures patients with anxiety. Every child has a right to live with good health and well-being. So, fear cannot stop them from achieving their best life.

Taking good care of young, developing teeth will reduce plaque, prevent gum disease and tooth decay, and improve the child's overall health. This will mean fewer sick days and time off from school, less time dealing with discomfort from cavities, and more days doing what they do best: being a growing child.

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