

Occupational Hazards of Dentistry

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Abstract: Dental professionals are susceptible to a number of occupational hazards. These include exposure to infections (including Human Immunodeficiency Virus and viral hepatitis, , hazardous dental materials, radiation, and noise; musculoskeletal disorders; psychological problems and dermatitis; respiratory disorders; and eye insults. Minimizing percutaneous exposure incidents and their consequences should continue to be considered, including sound infection control practices, continuing education, and hepatitis B vaccination. Basically, for any infection control strategies, dentists should be aware of individual protective measures and appropriate sterilization or other high-level disinfection utilities. Strained posture at work disturbs the musculoskeletal alignment and leads to stooped spine. The stooped posture also involved certain groups of muscles and joints. This may lead to diseases of the musculoskeletal system. Continuous educating and appropriate intervention studies are needed to reduce the complication of these hazards. So, it is important for dentists to remain constantly up-to-date about measures on how to deal with newer strategies and dental materials, and implicates the need for special medical care for this professional group. This article discusses selected occupational hazards. Once identified and recognized as a risk, new guidelines, precautions and protocols are rapidly instituted to greatly reduce or even eliminate the occupational hazard.

Keywords: Dental staff, Dentist, Occupational disease, hazards.

1. INTRODUCTION

Infection control is a concern in all health sector services. Confronted with a high biological risk both for patients and professionals in dental care and due to the constant development of new technologies, information, equipment, material and behavioral attitudes in this area, Health Organizations such as the Center for Disease Control (CDC), the American Dental Association (ADA), the National Sanitary Department (ANVISA) and the Ministry of Health (MOH) among others, have developed guidelines to prevent, minimize or eliminate any threat to life or health during treatment. These guidelines, given the peculiarities of dentistry activity, should be followed by the professional and his team before, during, and after care for all patients and for all types of treatment. This includes all instruments and equipment used, regardless of the confirmed or presumed diagnosis, being infectious or not.

The environment in dentistry practices and clinics is far from ideal. However, the adoption of infection control measures is an effective way to reduce occupational risk. Dentists face many hazards such as the biological, chemicals and physical ones.

Some written reports have shown that the most common safety problem is not related to available technology to eliminate or minimize risks, but rather the behavior of dentists.

A well-informed and alert dentist is capable of performing his job without putting himself at risk or the health of his patients. Consequently, the goal of this study was to show the hazards facing dentists during their job practice and assess current infection control measures adopted by dental surgeons during their practice.

2. BIOLOGICAL HAZARDS

A range of diseases can be transmitted through contact with oral fluids or within the dental office environment from dental unit water microorganisms. These infectious agents may gain access to the human host through a wide variety of exposure events, as summarized in the following table:[1]

TABLE 1. shows the biological hazards dentists may expose to during their job practice and how to avoid these risks.

Area of exposure	Risks	Protection
Head	Inhalation, ingestion, irritation, needle stick, absorption through cuts, open sores, skin sores	Masks, shields, protective head coverings
Eyes	Splashes, squirts, imitation	Protective eye wear
Hands	Absorption, imitation, needle stick, absorption through cuts, open sores, skin sores	Protective gloves, protective barrier substance(cream, lotion)
Feet	irritation, needle stick, absorption	Protective footwear
Whole body	Inhalation, ingestion, irritation, needle stick, absorption through cuts, open sores, skin sores	Protective clothing, aprons, gaiters

3. CHEMICALS (HAZARDOUS SUBSTANCES)

Dentists are exposed to various types of chemicals that are hazardous while providing care. They include mercury, beryllium, silica and powdered natural rubber latex (NRL). Most dangerous of these agents is mercury. These chemicals act by local action, inhalation and ingestion. Mercury use in dental amalgam has potential occupational exposure to dentists. The maximum level of exposure considered to be safe is 50 µg/ cc of air[2],[3] Occupational Safety measures should be followed to minimize the side effects due to chemical agents. There are many potentially toxic materials that are used in dentistry that may pose a health hazard in the absence of appropriate precautionary measures. Most of the dental materials undergo an extensive range of tests both before and after use. Even so, some dental materials are aerosolized during high speed cutting and finishing and may thereby be inhaled by dental staff. Other dental materials are volatile and may give rise to dermatological and respiratory effects[4].

4. PHYSICAL HAZARDS

There are many potential physical hazards to which dental personnel may be exposed. The nature of the work may pose ergonomic hazards, the potential for slips, trips and falls, exposure to environmental conditions, hazards related to the storage and use of compressed gas cylinders, cuts, and electrical hazards[5].

A. EYE:

In the modern dental practice, safety concerns must be paramount to avoid injury and litigation. The principle of “do no harm” must also apply to patient for injury prevention. Similarly, dentists must be vigilant in wearing personal protective equipment to ensure their own personal safety and thus remain healthy and active in their profession. Because the majority of dental procedures are accomplished with instruments being passed over or near the patient's face and with aerosols and chemicals frequently in close proximity, both patients and dentists should wear eye protection. Curing lights are also a potential hazard to those who place restorative resins due to phototoxic and photo allergic reactions originating from absorbed radiation[6]. Visual field constriction related to mercury exposure is reported[7]. Color vision examination has been shown as a sensitive indicator of subtle neurotoxic effects from exposure to solvents and heavy metals[8],[9]. In 1991, the U.S. OSHA mandated protective eyewear use reducing the risk from blood-borne pathogens during procedures in which splatter or the use of aerosols might occur[10]. The CDC's latest update simply states “Protective eyewear for patients can shield their eyes from splatter and debris during dental procedures.” Infrequently, the dental literature supports the use of safety eyewear during restorative procedures to reduce the risk of ocular injuries[11].

B. EAR:

The sources of dental sounds inducing hearing loss that can be diminished are high-speed turbine hand pieces, low-speed hand pieces, high-velocity suction, ultrasonic instruments and cleaners, vibrators and other mixing devices, and model trimmers[12]. Although hearing loss may not be symptomatic, the first complication and the reason for seeking a hearing evaluation may be tinnitus¹⁹. Wear hearing protectors like earplugs and earmuffs to protect ears from noise[13].

C. Musculoskeletal disorders:

Musculoskeletal disorders are common health problems reported among dentists. Its prevalence reported to be between 38-82%. Musculoskeletal disorders are a group of conditions that involves: Nerves, Tendons , Muscles and supporting

structures such as intervertebral discs[14]. Following are the classifications of some of the musculoskeletal disorders seen commonly among dental practitioners [15],[16].

Table2. Shows the classifications of musculoskeletal disorders and their symptoms

No	Type of musculoskeletal disorders	Symptoms
1.	Neck and shoulder disorders	
a.	Myofascial pain disorder	Pain and tenderness in the neck, shoulder and arm muscles.
b.	Cervical spondylosis	Painful trigger points upon touch.
c.	Thoracic outlet syndrome	Intermittent / chronic neck and shoulder pain or stiffness, headache, hand and arm pain, numbness, tingling and clumsiness.
d.	Rotary cuff tendinitis/tears	Pain in the shoulder, arm or hand, numbness, tingling of fingers, muscle weakness/ fatigue, cold arm or hand.
		Pain and stiffness in the shoulder associated with backward and upward arm movements. Weakness of rotator cuff muscles.
2.	Hand and wrist disorders	
a.	Dequervain's Disease	Pain in thumb and wrist area when grasping, pinching and twisting.
b.	Carpel Tunnel Syndrome	Hand or finger numbness, pain, tingling, burning, clumsiness. Eventually, muscle weakness and atrophy. Symptoms often worse with increased activity.
c.	Guyon's Syndrome	Feeling of pins and needles in the ring and little.

5. PSYCHOLOGICAL HAZARDS

a. STRESS:

Dentists encounter numerous sources of professional stress, beginning in the dental clinic. Stress can be defined as the biological reaction to any adverse internal or external stimulus physical, mental or emotional that tends to disturb the organism's homeostasis. Dentists perceive dentistry as being more stressful than other occupations. Coping with difficult or uncooperative patients, over workload, constant drive for technical perfection, underuse of skills, low self-esteem and challenging environment are important factors contributing to stress among dentists[17],[18]. A large number of factors are responsible for stress situations including low autonomy, work overload, and inappropriate relation between power and responsibility. Teaching role in addition to clinical role may increase the levels of stress, but there is also evidence that this dual role may decline job-related stress[19].

6. ROUTINE PRECAUTIONS

Transmission of infection within the setting of dentistry may occur from the dental health care worker to the patient, from the patient to the health care worker or from patient to patient. Cases have been documented in which human immunodeficiency virus(HIV) or hepatitis B virus (HBV) was transmitted from dental health care workers to their patients and vice versa[20].

Immunization Program:

Immunization is an essential part of prevention and infection-control programs for DHCP, and a comprehensive immunization policy should be implemented for all dental health-care facilities [21].

Hand Hygiene:

Hand hygiene (e.g., hand washing, hand antiseptis, or surgical hand antiseptis) substantially reduces potential pathogens on the hands and is considered the single most critical measure for reducing the risk of transmitting organisms to patients and HCP[22].

PPE:

A. Masks, Protective Eyewear, and Face Shields

Dentists should wear a surgical mask and eye protection with solid side shields or a face shield to protect mucous membranes of the eyes, nose, and mouth during procedures likely to generate splashing or spattering of blood or other body fluids[23] .

B. Protective Clothing

Dentists should wear protective clothing (e.g., reusable or disposable gown, laboratory coat, or uniform) that covers personal clothing and skin (e.g., forearms) likely to be soiled with blood saliva[24].

C. Gloves

Dentists should wear medical gloves when a potential exists for contacting blood, saliva, OPIM, or mucous membranes. They should wear a new pair of medical gloves for each patient, remove them promptly after use, and wash hands immediately to avoid transfer of microorganisms to other patients or environments[25],[26],[27]. They should remove gloves that are torn, cut, or punctured as soon as feasible and wash hands before regloving [28],[29],[30].

7. CONCLUSION

Dentists are prone to many hazards during performing their job responsibilities. They should be alert and cautious so as not to catch disease. They face many kinds of hazards such as biological, chemical, physiological and psychological hazards. The biological hazards include exposing the head, eyes, hands, feet and all the body to danger through Inhalation, ingestion, irritation, needle stick, absorption through cuts, open sores, skin sores, Splashes, squirts, imitation. Dentists can protect themselves from these biological hazards by using Masks, shields, protective head coverings, Protective clothing, aprons, gaiters. Chemicals also represent a threat of infection to dentistry staff especially the dentists. Chemical hazards include mercury, beryllium, silica and powdered natural rubber latex (NRL). Most dangerous of these agents is mercury. Psychological hazards include stress and fear of being infected in their practice environment. Precautions that must be taken involve immunization programs to help them avoid being infected. They must wear masks, Protective Eyewear, Face Shields, gloves and protective clothing. This paper showed the infection potential to happen in dentistry environment and how dentists could overcome to keep safe and healthy. The researcher recommend adhering to the rules of hand hygiene and other precautions mentioned.

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