

Occupational Hazards in the Dental office – An overview

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A B S T R A C T

Occupational health hazard is an unavoidable circumstance for the dentist and his team. Despite improvement in technology and numerous advancements, occupational risk prevails in the dentist profession. The dental personnel should be aware of all signs of symptoms of hazards and the strategies to prevent and control them. Continuing dental education programs in this regard needs to be organized to help dentists.

Key words: Dental Personnel, Hazard, Risk, Stress, Allergy, Infection

INTRODUCTION

Bernadino Ramazzini, is termed as the ‘Father of Occupational Medicine’, who played a key role in recognising the role of occupation in the dynamics of health and disease, way back in 18th century. Occupational hazard is defined as the risk to the health of a person usually arising out of employment. It can also refer to work, material, substance, process or situation that predisposes or itself causes accidents or disease at work place.¹

Dental professional is also susceptible to a number of occupational hazards. Various conditions and diseases develop and intensify over the years. Dental personnel in the course of performing their functions are exposed to a variety of hazards. The type and degree of exposure depends on certain factors like the type of services, the type of patients or clients, and the specific task or function performed.² In fact the risk posed to dental professionals are more frequent and worse than any other high risk medical professionals.³ This could possibly be because of greater exposure to irritants like stress, allergic reactions, higher noise levels, percutaneous exposure incidents, radiation, musculoskeletal disorders and even legal hazards. The dental office environment projects a significant risk to exposure of various micro-organisms. As the dentist has to constantly deal with blood or saliva, which is a source of these infectious agents, either as a result of bacteremia or viremia associated with the systemic infections.

Types of Hazards

A variety of hazard exists in dental profession at a global level. They are systematically summarized into:

Infectious hazards: Dentists are exposed to variety of

micro-organisms like cytomegalovirus, hepatitis B virus, hepatitis C virus, herpes simplex virus types 1 and 2, HIV, mycobacterium tuberculosis and other viruses and bacteria, especially those which infect the upper respiratory tract. Certain viral infections can be life threatening infections such as Acquired immunodeficiency syndrome and Hepatitis B. Syphilis and tuberculosis are bacterial infections posing a significant risk in dental practice.⁴⁻⁷ These are transmitted through needles and other sharp objects, spatter and aerosols. Microbes can enter through a cut on the skin of the dentist while performing a medical procedure or accidental biting by the patient, or through a needle wound while giving anesthesia. An infectious agent can indirectly infect through the so called carrier.

Psychological hazards: Stressful conditions are an intrinsic form of a dentist’s occupation. It is the main psychological hazard seen in the dental office.^{8,9} Situations like anaesthetization of patients, overcoming of pain and fear, unanticipated emergency situations which puts a patient’s life in danger or procedures with questionable prognosis are stressful to the dentist. Since anesthetic procedures are seldom discussed with the patients, it forms a prime source of stress in this profession. Failure associated with improper treatment planning and an inappropriate diagnosis can be stressful to both doctor and patient. As a consequence, the dentist is susceptible to develop increased tension, high blood pressure, fatigue, sleeplessness, touchiness and depression.¹⁰ Stressful situations can be resolved with thorough knowledge of psychology, good communication skills and by establishing proper relation between the dentist and the patient which also decides the outcome of the treatment.

Allergic reactions: Latex gloves is the main cause of allergic skin reaction in the dental office. To a minimal extent, other dental materials, detergents, lubricating oils, solvents and X ray processing chemicals can also result in allergic skin reaction.¹¹ Latex allergy symptoms manifest as urticaria, conjunctivitis associated with lacrimation and swelling of eyelids, mucous rhinitis, bronchial asthma and anaphylactic shock. The main culprit in latex allergy is the corn starch or absorbable dusting powder, a potential allergenic resulting in immediate allergic reactions.

Methacrylate found in dental polymer materials can even result in contact dermatitis. The free monomer during polymerisation can cause a wide range of adverse health effects like irritation to the skin, eyes or mucous membranes, allergic dermatitis, asthma and parasthesia in the fingers. Asthma due to acrylate compounds is also an important allergic occupational hazard. Certain central nervous system disturbances may also be noted like headache, pain in the extremities, nausea, loss of appetite, fatigue, sleep disturbances, irritability, loss of memory and changes in blood parameters.^{12,13}

Physical hazards: Musculo skeletal complications begin with the dentist's professional studies and remains with them during their professional practice. It affects the spine, neck, shoulders and hands. Back pain is a major occupational health risk in dental professionals. Dentistry procedures incorporate such postural situations which increases the risk of twisting and contorting the body, varicose etc.¹⁴ Posture exerts higher pressure on intervertebral disk. Prolonged spinal hypomobility leads to degenerative changes in the lumbar spine and subsequently results in lower back pain. The postural stress affects the peripheral nerves of the upper limbs and the neck nerve roots.^{15,16} Along with posture, the mechanical vibrations produced by some dental equipment like ultrasonic scalers and handpieces result in chronic extrinsic compression of the nerves in the hand. A vast number of dental doctors show median nerve and cubital nerve defects exhibiting acroparasthesia. A consequence of the defected median nerve in the carpal nerve results in carpal tunnel syndrome. It is manifested by paroxysmal parasthesiae of the thumb and the index finger occurring throughout.¹⁷

Mercury health hazard: Literature evidence has proved that a high mercury vapour dose exposure can result in biological and neurological deficits.¹⁸ Exposure to mercury from dentists occur during handling amalgam and amalgam capsules used in restorations and during storage and disposal of amalgam.¹⁹ Over the years, the potential dangers of mercury has diminished with use of lower mercury level, water irrigation and high suction, good ventilation and proper collection, and proper discarding of amalgam. New filling materials like composite resins have decreased the dependence on mercury based substances.

Ionizing radiation: The frequent use of X-ray machines exposes dental workers to ionizing radiation. The occupational doses of ionizing radiation is markedly decreased since 1950s with use of protective barriers.²⁰

Non – ionizing radiation: The use of blue light and ultra violet light to cure various dental materials have raised concern of the non- ionizing radiations. These radiations damages various structures of the eye including the retina and the cornea.²¹

Hazards from anesthetic gases: The main agent of concern is extended use of Nitrous Oxide. Nitrous oxide commonly referred to as laughing gas, is an anesthetic agent used in operating rooms. The harmful effects of occupational exposure to Nitrous oxide includes reduced fertility, spontaneous abortions, and neurological, renal and liver diseases. Mental performance, audiovisual ability and mental dexterity is also affected in susceptible individuals.²²

Legal hazards: Dentistry is governed by regulatory bodies throughout the globe. Raising consumer awareness can warrant legal actions against the dental professional, particularly in developed countries. This makes the dentist to be aware of all regulations to save from any legal risks.¹

Prevention and control of occupational hazards:

As explained earlier, dental professionals are exposed to a wide variety of hazards in performing their functions. To prevent and control occupation induced hazards, the first step will be to employ a systematic approach for hazard assessment. It includes:

- Enlist all work related tasks and activities.
- Identify potential biological, chemical, physical and psychological hazards pertaining to each task.
- Assess the severity, consequence and the probability of the exposure of the hazard.
- Identify controls which will eliminate or reduce the risk.
- Personal protective barriers and appropriate engineering controls should be employed.
- Implement the controls for each hazard.
- Instruct and train each worker who performs the task.
- Periodic evaluation of the regulatory measure to be done to ensure effectiveness.

CONCLUSION

Dental professionals are exposed to various occupational hazards ranging from physical, chemical, infectious, mechanical and social hazards. Infection control procedures and following standard precautions minimizes the risk of infectious hazards. Practicing correct ergonomics at work keeps musculoskeletal hazards at check. Dental practitioners should update themselves regularly through scientific workshops and conferences regarding prevention of occupational hazards, which in turn will ensure positive occupational health.

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