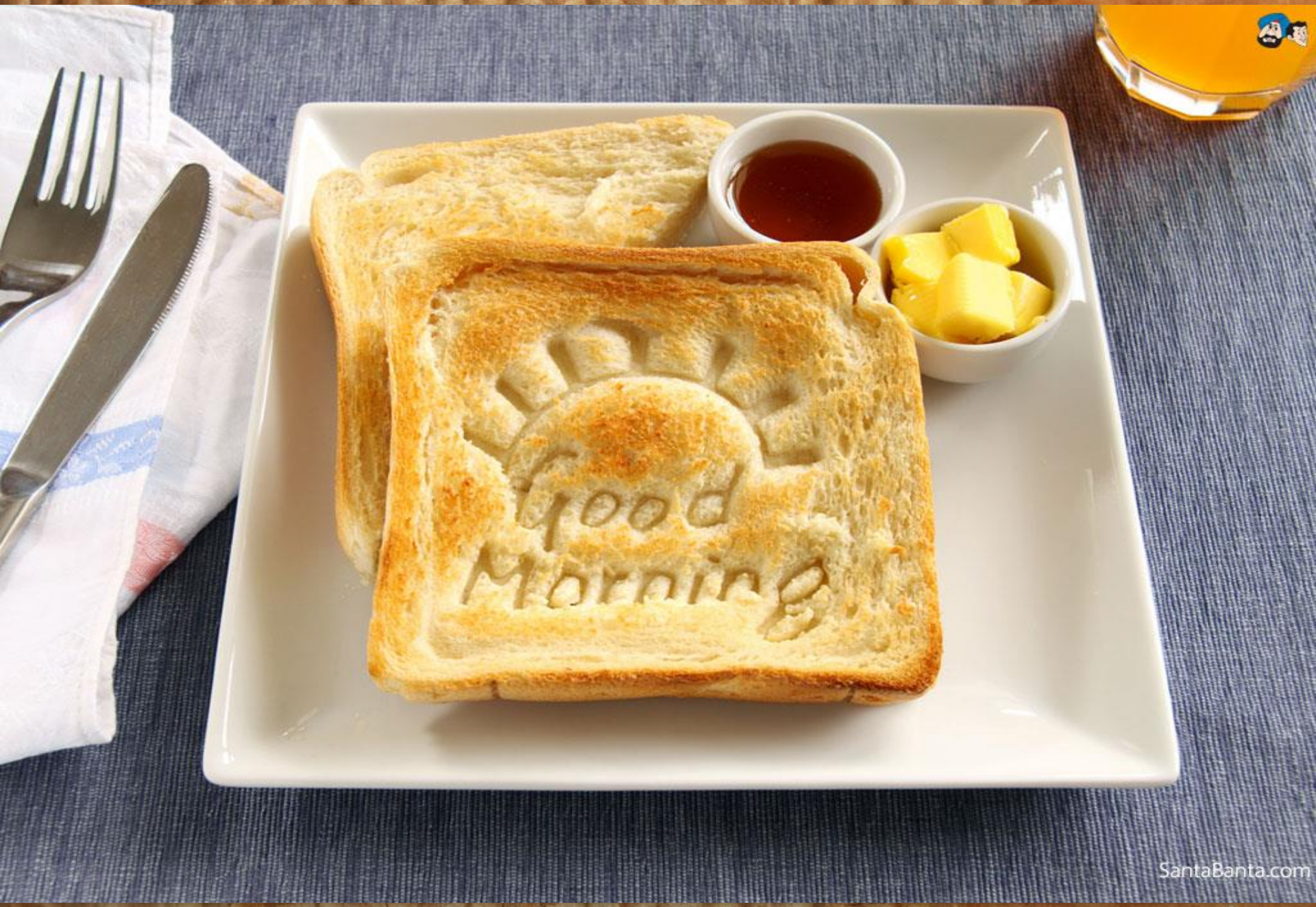

D Y PATIL DENTAL SCHOOL

DEPARTMENT OF

PUBLIC HEALTH DENTISTRY

OCCUPATIONAL HAZARDS IN DENTISTRY

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MDS in Public Health Dentistry

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Occupation and Profession

Occupation

- An activity that serves as one’s regular sources of livelihood.
- An occupation is something that we spend time doing, either for pleasure or because it need to be done.

Profession

- A calling requiring specialized knowledge and often long and intensive academic preparation.

Dentistry Becomes a Profession

- With the founding in 1840 of the world's first dental school, the Baltimore College of Dental Surgery, dentistry became a separate profession from medicine.

- Dramatic improvements in oral health occurred once dentistry became a profession in 1839.

Introduction

- Dentists belong to a professional group potentially exposed to harmful biological factors which most often are infectious microorganisms.

- The fundamental routes of spreading harmful microorganisms in a dental surgery are

  Blood borne,

  Saliva droplet,

  Direct contact

  Infected equipment

  Water droplet infections.

- In carrying out professional work, dentists are exposed to a number of occupational hazards.
- These cause the appearance of various ailments, specific to the profession, which develop and intensify with years.
- In many cases they result in diseases and disease complexes, some of which are regarded as occupational illness.

- Close contact with the patients, with their saliva and blood exposes the dentist to occupational biohazards, mainly of the contagious kind.

- Strained posture at work destabilizes the osteoarticular system and causes overburdening of the spine. The overburdening also affects certain groups of muscles and joints. This brings about the diseases of the musculoskeletal system and of the peripheral nervous system.

- The noise of suctions, saliva ejectors, turbines, engines, amalgamators, compressors, etc., causes impaired hearing.

- A limited surgical area and its artificial lighting results in eye strain, conjunctivitis, blurred vision or shortsightedness.

- Dental medicaments and materials as well as disinfectants used in dental surgeries cause allergies and skin diseases.

Definitions

- Occupational hazard can be defined as a risk to a person usually arising out of employment.

- It can also refer to a work, material, substance, process, or situation that predisposes, or itself causes accidents or disease, at a work place.

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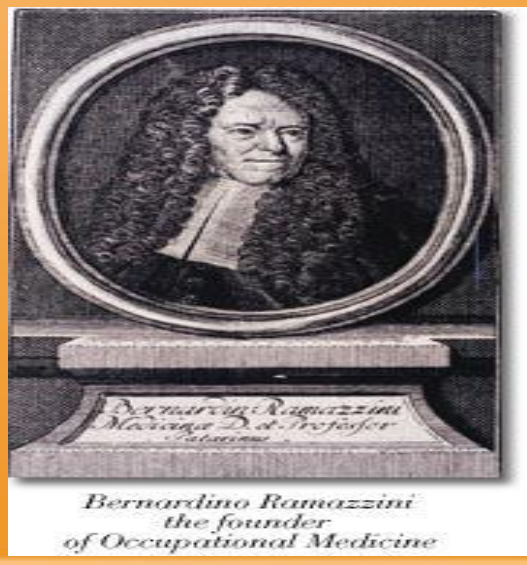
History of Occupational Hazards

- The history of occupational hazard awareness can be traced back to the 18th century.

- Bernadino Ramazzini,(3 Nov1633 –5 Nov1714),

an Italian physician, referred to as the Father of Occupational medicine, recognized the role of occupation

in the dynamics of health and diseases.



Bernardino Ramazzini
the founder
of Occupational Medicine

- He published his systematic study of occupational disease in a book in 1713 entitled “DeMorbis Artificum Diatriba” (Diseases of Workers) in which he recognized three principal causes of Occupational hazards.

1) A fixed working posture
2) A continuous repetitive motion
3) Psychological stress

These would now be referred to as repetitive “Strain injuries”.

Classification

- Based on the source, hazards in the work environment classified as

1) Physical hazards
2)Chemical hazards
3) Biological hazards
4) Legal hazards

Dental Ergonomics

- Ergonomics is the study or science of workers and their adjustment or adaptation to their working environment or working conditions.

- The objective of science of ergonomics is to seek means by which an equal or greater work out put can be achieved with less mental or physical fatigue experienced by the dentist, the assistant or the patient.

Mechanisms Leading to MSD

- Dental professionals commonly experience musculoskeletal pain during the course of their careers.
- The musculoskeletal health of dental professionals has been the subject of numerous studies worldwide

- A number of studies have found that the mechanisms leading to work related muskuloskeletal pain are multifactorial.

- This pain can be attributed to numerous risk factors, including

  Prolonged static postures or PSP's,
  Repetitive movements,
  Suboptimal lighting,
  Poor positioning
  Genetic predisposition
  Mental stress
  Physical conditioning
  Age

Prolonged Static postures (PSPs)

- The human body was designed for movement.
- More recently with the advent of computers and as the number of sedentary jobs have increased, the no of MSDs has risen dramatically.

- Dentists frequently assume static postures, which requires more than 50% of the body's muscles to contract to hold the body motinless while resisting gravity.

- The static forces resulting from those postures have been shown to be much more taxing than dynamic forces.

- When the human body is subjected repeatedly to PSPs, it can initiate series of events that may result in pain, injury, or a career-ending MSD

- The most common MSD's that result from PSPs in dentistry include the following:

- Chronic low back pain:- pain in the low back, often referring into hip, buttock, or one leg.

- Tension neck syndrome:- Stiffness, pain and muscle spasms in cervical musculature, often referring pain between shoulder blades or sometimes occiput.

- Trapezius myalzia:- pain, tenderness and muscle spasms in the upper trapezius muscle.

Preventing MSDs in Dentistry

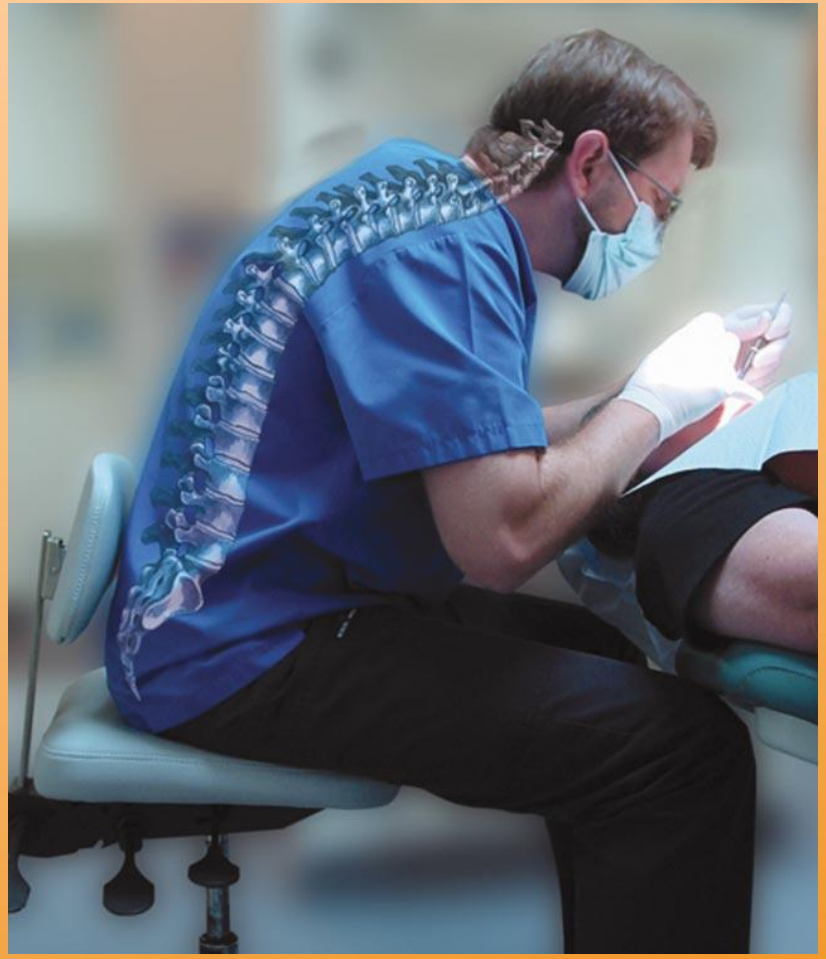
- Dental operators often cannot avoid prolonged static postures, or PSPs.

- Even in optimal seated postures, more than one-half of the body's muscles are contracted statically, and there is little movement of the vertebral joints.

- This may result in damaging physiological changes (microchanges) that can lead to back, neck or shoulder pain or musculoskeletal disorders, or MSDs(macrochanges).

- When sitting unsupported, a frequent posture in dentistry, the lumbar lordosis flattens.
- The bony infrastructure provides little support to the spine, which now is hanging on the muscles, ligaments and connective tissue at the back of the spine, causing tension in these structures.
- This flattening of the lumbar curve also causes the nucleus in the spinal disk to migrate posteriorly toward the spinal cord.

The effects of poor posture on the curves of the spine: Flattened lumbar lordosis and a flattened head position.



- Over time, the posterior wall of the disk becomes weak, and disk herniation can occur.
- Therefore, operators need to know about strategies they can use to maintain the essential lumbar lordosis whenever possible.
- Maintaining the cervical lordosis in the proper position is equally important.
- Forward-head postures are common among dentists, due to years of poor posture involving holding the neck and head in an unbalanced forward position to gain better visibility during treatment.

- In this posture, the vertebrae no longer can support the spine properly, and the muscles of the cervical and upper thoracic spine must contract constantly to support the weight of the head in the forward posture.

- This can result in a pain pattern, which often is referred to as tension neck syndrome.
- To effectively prevent injuries in dentistry, prevention strategies and ergonomic techniques must address these postural and positioning difficulties, as well as subsequent detrimental physiological changes

- Postural awareness techniques

  1) Maintain the low back curve

  2) Use Magnification

  3) Adjust operator chair properly

- Positioning Strategies

  1) Avoid static postures

  2) Alternate between standing and sitting

  3) Reposition the feet

  4) Position patients at proper height

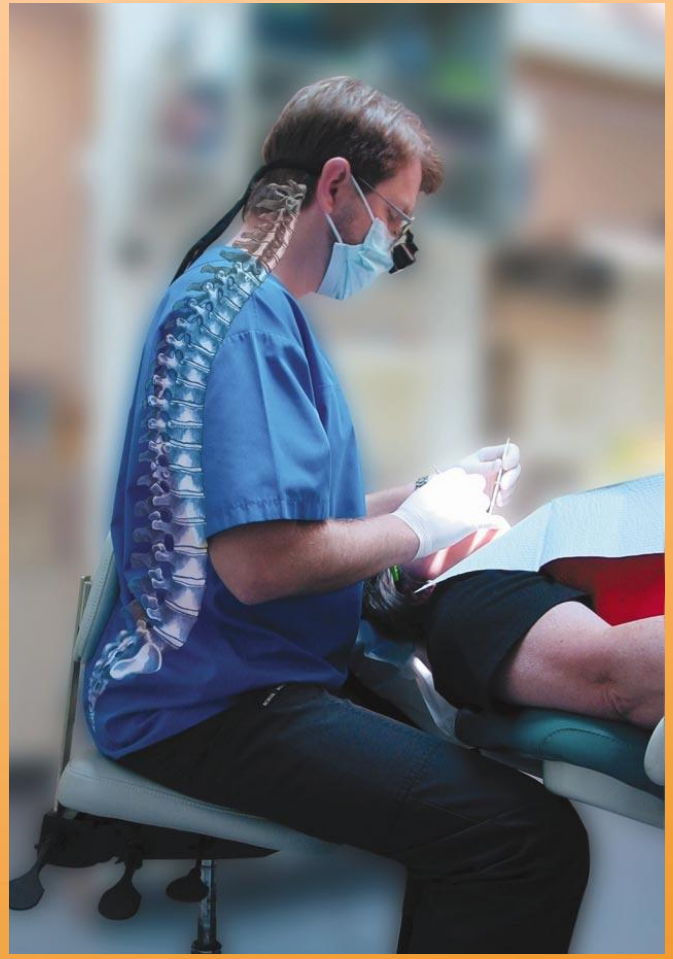
  5) Avoid twisting

- Periodic breaks and stretching

1) Chair side directional stretching

2) Stretching during micro breaks

Maintaining low back curve facilitates proper posture and reduces pressure on muscles and disks.



- Position the buttocks snugly against the back of the chair. The edge of the seat should not contact the backs of the knees.
- Place feet flat on the floor and adjust the seat height up until thighs gently slope downward while the feet remain flat on floor.
- This helps maintain the low back curve and enables you to position your knees under the patient more easily.

Positioning Strategies

Avoid Static Postures

- According to Lehto and colleagues, the concept of a single correct work posture may be physiologically invalid, as the human body may be made for movement and ever-changing postures.

- Spending long periods in static positions increases a worker's susceptibility to injury

Alternate between standing and sitting

- Standing uses different muscle groups than does sitting.
- Therefore, alternating between the two positions lets one group of muscles rest, while the workload is shifted to another group of muscles.
- Alternating between standing and sitting also can be an effective tool in preventing injuries

Chairside stretching can be performed during breaks such as while waiting for anesthetic to take effect in the patient

Hearing Problems

- Noise is an acoustic phenomenon which mainly arises in a gas, solid or, on occasion, liquid environment.
- Noise is always present during the work of dental staff.
- It can be roughly divided into distracting noise and destructive noise.
- There are three properties of noise that can be examined to determine the level of risk

  Intensity

  Duration

  Spectrum of sound

Noise in the Dental Office

- The sources of dental sounds that can be treated as potentially damaging to the hearing are

High-speed turbine handpieces,
Low-speed handpieces,
High-velocity suction,
Ultrasonic instruments
Vibrators and other mixing devices,
Model trimmers.

- Kilpatrick has listed the decibel ratings for various office instruments and equipment, which amount to

  70–92 dB for high-speed turbine handpieces,

  86 dB for ultrasonic scalers,

  84 dB for stone mixers and

  74 dB for low-speed handpieces

- Several studies and surveys have been completed to determine the effects of noise in the workplace for dentists.
- Many of these studies have examined whether the noise found in a dental practice exceeds the Occupational Safety and Health Act (OSHA) standards.
- OSHA regulations for industry limit a worker's exposure to steady state noise levels of 90 dB in an eight-hour time period.
- The National Institute for Safety and Health (NIOSH) recommends that the time spent exposed to noise should be reduced by half as the sound level doubles.

Prevalence of Hearing Problems

- Khalid A et al (2005) conducted study in 204 dental personnel (91 dentists, 72 dental assistants, 29 dental technicians, 12 dental hygienists).The data showed that 34 candidates had tinnitus, 30 had difficulty in speech discrimination, 63 had difficulty in speech discrimination in back ground noise. Dental technicians were most affected.

Methods to Prevent Hearing Loss

- Since noise-induced hearing loss is not medically treatable, preventing the effects of noise is important.

- Methods to reduce noise exposure in the dental office, and to protect hearing, can be implemented to prevent noise induced hearing loss.

- The work environment can be modified to decrease the effects of noise.

Maintain good posture

Keep an appropriate distance from patients

Maintain dental equipment

Use hearing protection devices

Optical Hazards

- Dental routine requires the use of normal-speed and high-speed drills for purposes like

  Removing old fillings,

  Preparing carious defects,

  Removing the excess of filling materials,

  Polishing fillings,

  Orthodontic and prosthetic operations

  Performing surgery on bone tissue.

- Drilling seriously increases the possibility of injuring the eyes of the operator with materials or fragments of tissue.

- In most cases, the foreign body locates itself in the conjunctival sac or the cornea, causing acute pain, lacrimation and reddening of the eyeball.

- Deeper penetration of the body may result in a perforation of the cornea and a consequent injury to the lens.

- Majority of doctors use glasses of a classical design in the belief that they give sufficient protection.

- According to Burton et al, effective protective glasses ought to have hard plastic lenses and be designed like goggles or glasses with edges fitting against the skin. Only glasses of that type offer complete security from sprays, droplets and solid bodies.

Fatigue

- Natural and artificial lighting is one of the basic factors determining the safety, efficiency and quality of dental practice .
- Long, debilitating work, which is the norm among dental operators, leads to the exhaustion of the individuals and the foremost symptom is eye fatigue.
- It reveals itself as the sensation of heavy eyelids, burning and stinging under the eyelids and deteriorated vision.

- This is usually accompanied by bloodshot eyes, blinking, lacrimation and increased sensitivity of the eyeball to touch.

- Eye fatigue causes a decrease in critical fusion frequency, a delayed accomodative reflex, a reduced accommodation width and a shift of refraction towards myopia or hypermetropia.

Lasers

- General stomatology makes frequent use of laser radiation of low and medium intensity.
- The light of typical biostimulating lasers has the strength ranging from 1–500mW. But, the mean strength of dental equipment does not exceed 50 mW.
- In clinical practice good results are obtained by using the biostimulating laser to treat diseases of the tooth pulp, hypersensitivity of the dentin, diseases of periapical tissues, gingivitis, peridontitis and diseases of oral mucosa.

- However, laser radiation can be a hazard to health. The eye and the skin are the organs most exposed to the light.

- This refers both to the patient and to doctor, as well as to the assistant personnel who are using laser apparatus

- Especially hazardous is the intensity of radiation (W/cm2) of a particular colour which falls on the skin or on a particular type of eye tissue.

- While using lasers not only the light beam emerging from the source of light and hitting, the patient’s eye is dangerous but also any reflected and diffused light.

- The lens concentrates the beams entering the eye and in this way optical density increases many times, raising the possibility of eye injury.

- UV radiation causes in the eye lens a number of biochemical and morphological changes, thus leading to the degeneration of its function and a destruction of the cytoskeletal apparatus of the lens cells.

Light Curing Units

- Among the most common materials in use today which are alternative to amalgam, we find composite resins and glass ionomers.

- Dental materials cured with visible light in order to polymerize need a blue light spectrum in the range of 400–500 nm, emitted by special lamps.

- Even though polymerization units for light-curing restorations are equipped with filters reducing ultraviolet, infrared radiation care should be taken to protect the operator’s eyes from direct or indirect light issuing from the unit.

- The operator should avoid looking directly into the light probe or do so from a necessary distance, otherwise serious damage to the eyesight may follow.

- The correct intensity of the light emitted by curing lamps is over 300 mW/cm2.

- The intensity between 200–300 mW/cm2 involves a prolonged time of curing, while the intensity below 200 mW/cm2 is incorrect and because emission of infrared and ultraviolet radiation may occur.

Psychological Disorders

Stress

- Stress situations form an inherent part of a dentist's everyday work.
- Although seldom discussed, they should be considered in view of the hazards connected with this profession, a profession which requires that a dentist should act in two roles: as a psychotherapist and a manually skilled operator.
- The psychological aspects of dentist–patient cooperation are very important.

- Premature retirement from the dental workforce may result from musculoskeletal disorders, stress and cardiovascular diseases.

- Stress among dentists is thought to result from many sources, including job satisfaction, business income, working hours, as well as staff and patient interactions.

- A study of Californian dentists suggested that, while dentists were satisfied, levels of satisfaction varied considerably.

- Regarding substance use, the most commonly reported cause of impairment amongst dentists is chemical dependence.

- Cigarette smoking has dropped dramatically among health professionals, including dentists in recent decades, smoking in dentists in some countries still remains high.

- Alcohol is the most widely abused drug reported among dentist and rates of alcoholism in profession estimated about 8%, increasing abuse of other drugs of dependence is becoming a growing concern in dentists.

Burn Out

- It is a syndrome of emotional exhaustion, depersonalization and reduced personal accomplishment, a particular type of job-related stress reaction .

- It is a response to the chronic emotional strain of dealing extensively with other human beings, particularly when they are troubled or having problems.

- The values of burnout and it's constituents among dental workers are amazingly high.

- Dentists are prone to burnout due to the nature of their work but may be able to prevent it if they can recognize the burnout process and take regular holiday breaks.

- Burnout is assumed to have an adverse influence on patient care, although no dental studies, as yet, have tackled the issue

- Varela-Centelles et al(2005) conducted study in the Spanish dentists were questioned, high values were detected in emotional exhaustion – 54.3 percent, depersonalization – 55.6 percent; personal achievements 6.9 percent .

- Gender differences in burnout among dentists do exist. Male dentists reported a higher score of depersonalization than did female dentists .

Radiation Exposure

- Exposure to both ionizing and nonionizing radiation may occur in dental practice.
- Non-ionizing radiation has become an increasing concern among dentists with the use of UV and blue light to cure or polymerize various dental materials, especially resin, bonding agents, and sealants.
- Exposure to these wave lengths can cause damage to various structures of the eyes, including the cornea, lens and the retina.
- Dental staff should take steps to protect themselves during exposures by standing behind protective barriers, use of radiation monitoring badges and regular equipment checks.

Dental Biomaterials

Aside from having adequate clinical properties, it is essential that used in dentistry be biocompatible and safe for both dentists and staff.

Some dental materials are aerosolized during high speed cutting and finishing and may there by inhaled by staff.

Other dental materials are volatile and may give rise to dermatological and respiratory effects.

Some of dental restorative materials can be potentially harmful to dental personnel and patients and can cause allergic contact dermatitis, asthma, and conjunctival symptoms.

- At some time in the past, allergic contact dermatitis was generally addressed to reaction to oral hygiene products (e.g.mouthwash, dental floss and toothpaste), metals, disinfectant and glutaraldehide.

- A vast range of new materials deployed in dental practice in recent years has altered the reported frequencies of reactions and types of allergens that cause allergic contact dermatitis

- WHO lists five categories of reactions caused by dental materials:

  1) irritation contact dermatitis,

  2) allergic dermatitis,

  3) contact urticaria,

  4) hyperreactivity,(Type1 and Type 4)

  5) light-dependent reactions.

Mercury Toxicity

The twentieth century saw great interest in the use of dental amalgam including the very well known ‘amalgam war’.

The development of an allergic reaction has often been traced to sensitisation to a mercury containing preparation such as a thermometer, dental amalgam, tattoos, mercurochrome, weed killers etc.

Mercurial stomatitis represents the earliest allergic observation, reported as early as 1935 by McGeorge and in 1936 by Akers after ingestion of mercury and bismuth for the treatment of syphilis.

- Eczematous eruptions may be produced by topical contact with mercury and by systemic absorption in mercury sensitive individuals.

- Oral lichenoid reactions adjacent to amalgam fillings have also been reported to occur.

- Although the incidence of mercury allergy is rare, members of the dental profession are in a high risk group.

- White R.R et al(2008) conducted study on dental students showed a statistically significant increase in the rate of mercury hypersensitivity from before the students began their studies to the final years of their courses.

- Eley et al showed that there is a reduction in the production of IL-2 and TNF-α in a group sensitive to mercury.

- Various sources of Hg-vapour production in dental surgeries or departments include

  Trituration,

  Condensation,

  Burnishing and polishing silver amalgam,

  Cutting hardened amalgam,

  Use of ultrasonics on amalgam restorations,

  Mercury spillage,

  Uncovered amalgam scrap and

  Cleaning the floor and the operating room.

Care and Prevention of Mercury Toxicity

- Various barrier techniques like using a mask, gloves, hair caps and eye-shields are advised while working.
- Careful handling of silver amalgam waste should be encouraged as well.
- The greatest hazard to the dentist and patients is from exposure to mercury metal, particularly its vapour, so it is beneficial to reduce mercury vapour production as much as possible.

- Air conditioners and proper ventilation of the operating room, high vacuum suction, proper cleaning and proper handling of amalgam scraps in a covered container or under sulphide solution is advocated to avoid vapour production.

- Dermashield (dimethisone) is a silicone polymer. Pharmologically inert, it has water repellant and surface tension properties.

- It is applied to skin adheres to it and protects it; It can be used to avoid contact with mercury vapour on the skin. This helps in reducing the lesion’s development or its intensity.

- Clonate lotion contains 0.05% clobetasol propionate which is a glucocorticoid used topically for a large variety of dermatological conditions due to their anti-infl ammatory, immunosuppressive, vasoconstrictor and antiproliferative (for scaling lesions).

- Antihistamines, though used to reduce allergic effects by many, are not of much use.

Latex Allergy

The most frequent allergy complained in dental practices is probably sensitivity to latex.

Powdered latex gloves were mentioned to cause allergic reaction, although dentists with an allergic profile complained that all latex gloves cause irritation.

The powder in latex gloves itself is not the allergen. It only provides binding sites for latex protein, and aids in carrying the protein into the skin.

- Dental personnel should also note that latex is present in other personnel protective equipment, e.g. masks, eyewear, and clinical gowns. These items have been linked to adverse skin and mucous membrane reactions.

- There are three basic categories of adverse latex gloves associated conditions: irritant, allergic and immediate, or type I hypersensitivity allergy.

- The first two types irritant and allergic contact dermatitis are painful and temporarily debilitating, but without potential for serious reactions.

- The third type (immediate or type I hypersensitivity) is the least common but the worst type of reaction, sometimes leading to anaphylaxis.

- Sufferers from latex allergy should rather use vinyl or nitril gloves, while it is advisable for severe sufferers to work in latex-free environment.

Safety Measures

- The reality of public health will always involve balancing maximum benefit and minimum harm to the public health and well-being.

- Because allergy is a reality dentists have to deal with, the following guidelines are proposed:

➢ Dental personnel should be familiar with the major signs and symptoms of allergic reactions, including anaphylaxis.

➢ Previous allergic status of patients and personnel should be noted.

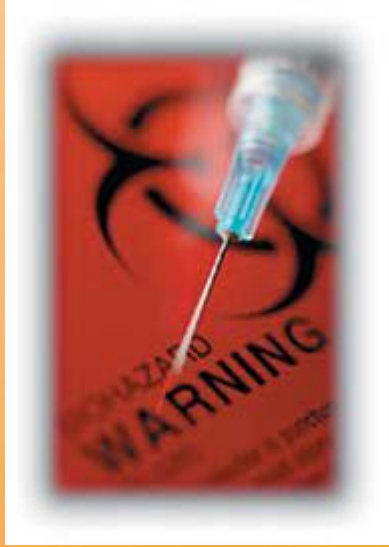
➢ Dental personnel should always keep records of dental materials used.

- If allergic reaction occurs, backtracking is necessary in order to identify the specific allergen.
- Nitrile or vinyl gloves should be used by the dental practitioner if acrylate or latex sensitivity is suspected
- If sensitivity is suspected in form the patient about possible clinical tests to determine origin of allergy, e.g. acrylate patch testing.
- Be aware of cross-sensitivity towards coloring agents of dentures.
- Create a latex-free environment for personnel and patients with latex sensitivity

Biological Hazards

Dentistry is unique in that clinical staff are in direct or indirect contact with traumatized tissues, saliva, and blood on a daily basis.

In the first case, microorganisms can pass into organism, through a cut on the skin of hand while performing a medical examination, as a result of an accidental bite by the patient during a dental procedure, or through a needle wound during an anaesthetic procedure.



- An indirect infection occurs when an infectious agent is transmitted into organism through the so-called carrier.

- The following are the main sources of indirect infection: aerosols of saliva, gingival fluid, natural organic dust particles (dental caries tissue) mixed with air and water, and breaking free from dental instruments and devices.

- Main entry points of infection for a dentist: epidermis of hands, oral epithelium, nasal epithelium, epithelium of upper airways, epithelium of bronchial tubes, epithelium of alveoli, and conjunctival epithelium.

- The source of harmful factors in most cases is the patient, but it may also be the water used in a dental unit.

- There are 4 basic routes of spreading harmful microorganisms in a dental surgery:

➢ **Blood-borne route** - through the blood of an infected patient;

➢ **Saliva-droplet route** - through a droplet aerosol, emitted by an infected patient and containing particles of saliva, secretions from the gum, periodontium and teeth;

➢ **Direct contact** with a patient and contaminated equipment;

➢ **Water-droplet route** - through a water droplet aerosol emitted from a handpieces of a dental unit

- Various infectious diseases, including viruses, such as hepatitis b virus, hepatitis c virus and more recently HIV, bacteria, fungi and prions may potentially be transmitted during dental procedures.

- Several of the common viral agents that can cause hepatitis have been detected in body fluids including saliva and blood.

- The viruses most commonly implicated include hepatitis A virus (HAV), HBV, and hepatitis C.

Viral infections of concern in dental practice

Virus	Source of transmission	Major routes of transmission	Infection
Hepatitis A	Food / Water	Inhalation / Inoculation	Infectious hepatitis
Hepatitis B	Blood / Body fluids	Inoculation	Serum hepatitis
Hepatitis c	Blood	Inoculation	Post transfusion non-A non-B hepatitis
Hepatitis D	Blood	Inoculation	Delta hepatitis
Hepatitis E	Water		Enterically transmitted non-a non-B hepatitis
Hepatitis F	Blood	Inoculation	Hepatitis F

Virus	Source of transmission	Major routes of transmission	Infection
HIV	Blood / semen	Inoculation	AIDS
HSV 1	Oro-nasopharyngeal secretions	Inoculation	Oral herpes / Hepetic Whitlow / Herpetic Keraatitis
HSV 2	Vaginal/ Peneal secretions	Inoculation	Genital herpes
Cytomegalo virus	Saliva / Blood	Inoculation	Disease in fetus/ Immunocompromised patients
Epstein-Barr virus	Saliva/Blood	Inoculation	Infectious mononucleosis
Rubella virus	Oro-nasopharyngeal secretions	Inhalation	Fetal pathology/ Meningitis/ Parotitis
Rubeola virus	Oro-nasopharyngeal secretions	Inhaltion	Generalized vascular rash

Virus	Source of transmission	Major routes of transmission	Infection
Mumps virus	Oro-nasopharyngeal secretions	Inhalation	Parotitis / Meningitis
Influenza virus	Oro-nasopharyngeal secretions	Inhalation	Flu / Common cold
Para influenza virus	Oro-nasopharyngeal secretions	Inhalation	Non specific upper and lower respiratory tract infections
HZV	Lesion / Droplet spread	Inhalation/ Inoculation	Chicken pox
Papilloma virus	Lesion	Inoculation	Mucosal / Skin papillomas
Coksackie virus	Oro pharyngeal secretions	Inhalation / Inoculation	Hand foot mouth disease

Bacterial infections of concern in dentistry

Bacteria	Source of transmission	Major routes of transmission	Infection
Mycobacterium tuberculosis	Oropharyngeal secretions	Inoculation/ Inhalation	Tuberculosis
T. pallidum	Oropharyngeal secretions	Inoculation	Syphilis
N.gonorrhoeae	Oropharyngeal secretions	Inoculation	Gonorrhoea
Pseudomonas	Oropharyngeal secretions	Inoculation/inhalation	Pneumonia
Staphylococcus aureus	Oropharyngeal secretions	Inoculation/inhalation	Suppurative lesions
Streptococcus pyogenes	Nasopharyngeal secretions	inhalation	Sore throat/rheumatic fever

Bacterial infections of concern in dentistry

Bacteria	Source of transmission	Major routes of transmission	Infection
Helicobacter pylori	Nasopharyngeal secretions	inhalation	Duodenal ulcers
Corynaebacterium dipthriae	Nasopharyngeal secretions	Inhalation	Diphtheria
Clostridium tetani	Nasopharyngeal secretions	Inhalation	Tetanus
Meningitidis	Oro-nasopharyngeal secretions	inhalation	meningitis

Prevalence of Microbial infections

- The dentist may become infected with HBV from a patient both through needlesticks or other accidental percutaneous injuries with sharp instruments, and through an aerosol of blood, saliva or gingival secretion.

- It is estimated that in the case of an injury with a HBV contaminated needle, the probability of infection is 6-30% (Beltrami EM et al).
- Vaccination of health care personnel and introduction of disposable syringes and needles reduced the number of occupational infections with hepatitis B in this professional group, both in Poland and worldwide

- A very low infectivity of the HIV virus explains the small number of registered occupational cases of AIDS in health care workers, including dentists, despite the high exposure connected with an increase of the disease incidence in many countries.

- Nevertheless, dentists should adopt extensive safety measures when treating suspected AIDS patients or people from at-risk groups.

Percutaneous Exposure Incidents

- Percutaneous exposure incident(PEI) is a broad descriptive term that includes needlestick and sharp injuries, as well cutaneous and mucous exposure to blood and serum.
- PEI represents most efficient method for transmitting blood borne infections between patients and health care workers.
- It may be a particularly common problem in dental personnel.

- Only 14% of the dentists reported needlestick injuries in the previous six months in South African survey.(Yengopal v et al, 2001)

- Dental students and dental assistants were found to have the highest rates of exposure in a US study, mainly due to syringe needle injuries.

- The most common ‘sharps’ injuries among dentists continue to arise from needles and drilling instruments, such as burs.

- Therefore, strict infection control guidelines are adhered to, following any ‘sharps’ injury during dental practice.

- Nevertheless, it is important that dentists continue to follow strict infection control guidelines for glove tears, and ensure that skin cuts are covered by water proof dressings in the event of bodily fluid penetrating the gloves.

Preventive Measures

- Preventive measures reducing the risk from microbiological factors transmitted from a patient include

  Personal protective means,

  Disinfecting patients oral cavity,

  Sterilization of dental instruments,

  Use of rubber dam

  Sterilization of work place with UV radiation

  Protective vaccination of dentists

- Recently, Palenik and Govoni(2004) have strongly recommended immunization of dental personnel against Hepatitis B, Influenza, Measles, Parotitis, Rubella, Chicken pox and Tubrculosis.

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