



WORKING AND HEALTH

LECTURE FOR MEDICAL
STUDENTS

<https://is.muni.cz/www/2422/um>



WORK IS ENNOBLIG

- TO BE EMPLOYED HELPS TO FIND THE CREDIT WITHIN THE SOCIETY
- UNEMPLOYMENT IS ASSOCIATED WITH:
 - POVERTY,
 - DEPRIVATION, PASSIVITY
 - BARRENNESS



HEALTH CONSEQUENCES

- WORSE LIFESTYLE (MALNUTRITION, ALCOHOLISM, SMOKING, DRUGS ABUSE, POOR HYGIENE)
- PSYCHOSOMATIC DISEASES
- PSYCHIATRIC MORBIDITY



SOCIAL CONSEQUENCES

- MISSING OF WORK HABITS
- INTOLERANCE TO FOREIGNS
- DISCRIMINATION OF OLDER PEOPLE
- SOCIAL FRUSTRATIONS
- DEMONSTRATIONS
- ARM CONFLICTS,
- WARS



HISTORICAL CHANGES OF WORK

- EVERYBODY MADE EVERYTHING
- HAND-MADE SPECIALIZATIONS
- FIRST MACHINES
- MECHANIZATION
- AUTOMATIZATION
- ROBOTIZATION



CHANGES IN WORKERS' CONDITIONS

- DYNAMIC/ENERGETIC LOAD DECREASED
- STATIC LOAD INCREASED
- SEDENTARY POSITIONS
- MONOTONY WITH NARROW MUSCULOSCELETAL PARTS OVERLOAD



Changes - continue

- GROWING DEMAND FOR:
- SENSES ABILITIES (espec. Vision)
- MENTAL ACTIVITY (qualification, attention, responsibility)



RISK OF THE LOST OF CONTROL

- **ERGONOMIC APPROACH:**
- **DETAIL KNOWLEDGE ABOUT HUMAN ANATOMY, PHYSIOLOGY, PSYCHOLOGY**
- **ADAPTATION OF WORKING ENVIRONMENT TO HUMAN CAPABILITY**



EXAMPLES:

- **ERGONOMIC CHAIRS**
- **HANDLE HAFT**
- **CONTROL EQUIPMENTS**
- **INFORMATIVE EQUIPMENTS**
- **WORKING ENVIRONMENT**
(microclimate, lighting)
- **ARRANGEMENT OF WORKPLACE**



IN DENTAL OFFICES:

- POSITION „FACE-TO-FACE“ resp. BEHIND THE PATIENT’S HEAD
- UNIT FOR „RIGHT-HAND“ and „LEFT-HAND“ PREFERENCE (mirror construction)



ENVIFORM

- **ERGONOMIC SIMULATING SYSTEM = METHOD FOR THE ASSESSMENT OF POOR ERGONOMY:**
 - **VIRTUAL WORKING PLACES**
 - **ANALYSIS OF WORK PROCESSES**
 - **ANALYSIS OF AVAILABILITY, VISIBILITY, BODY LOAD, ENERGY LOST**



WORK AS A HEALTH RISK

- OCCUPATIONAL D.:
 - MAINLY AMONG WORKERS
 - CAUSE SPECIFIC
 - OCCUPATIONAL EXPOSURE IS ESSENTIAL
- WORK-RELATED D.:
 - LARGELY IN THE POPULATION
 - MULTIFACTORIAL
 - OCCUPATIONAL EXPOSURE MAY BE A FACTOR



THE SOCIAL APPROACH

- OCCUPATIONAL D.:
 - NOTIFABLE
 - COMPENSABLE
- WORK-RELATED D.:
 - MAY BE NOTIFABLE
 - MAY BE COMPENSABLE



OCCUPATIONAL HAZARDS

- FACTORS:

- MECHANICAL
- HEAVY PHYSICAL LOAD

- OUTCOMES:

- ACCIDENTS, INJURIES
- MUSCULOSKELETAL DISORDERS, INJURIES, LOW BACK PAIN



OCCUPATIONAL HAZARDS

- **ERGONOMIC**
- Non-physiologic position
- **MONOTONY**
- Quick rate of movement
- **MUSCULOSCELETAL DISORDERS (D. FROM REPEATED OVERLOAD)**
- **MENTAL STRESS, LOWERED QUALITY AND PRODUCTIVITY**
- **D.FROM REPEATED OVERLOAD**



PHYSICAL HAZARDS

- NOISE
- VIBRATION
- RADIATION
- EXTREME MICROCLIMATE
- HEARING LOSS
- PSYCHOSOMATIC D.
- TR.VASONEUROSIS
- CANCER, RADIAT.D.
- CATARACT
- CVD,HYPERTHERM.
- CHILBLAINS



CHEMICAL HAZARDS

- DUSTS
- Different compounds
- PNEUMOCONIOSIS
- SILICOSIS
- ASBESTOSIS
- BERYLLIOSIS
- SIDEROSIS

CHEMICAL HAZARDS



- WIDE SPECTRUM
OF HUNDREDS
COMPOUNDS
- INJURIES,
IRRITATION
- TOXICANTS
- CARCINOGENS
- ALERGENS
- TERRATOGENS



BIOLOGIC HAZARDS

- ANIMALS
- MICROBIAL AND VIRAL FACTORS
- PLANT ALLERGENS
- INJURIES,
- ANTROPOZOONOS.
- INFECTIONS
- ALLERGIES
- ALLERGIES



PSYCHOLOGICAL STRAIN

- DIFFERENT STRESS FACTORS
- NEUROSIS
- DEPRESSION
- DISSATISFACTION
- CONFLICTS
- PSYCHOSOMATIC D.



WORK FACTORS AND WORK-RELATED D.

- BEHAVIORAL AND PSYCHOSOMATIC D.
- HYPERTENSION
- WORK OVERLOAD
- WORK UNDERLOAD
- SHIFT WORK
- CAREER DEVELOP.
- MIGRATION
- INTERPERSONAL CONFLICTS
- RESPONSIBILITY



OCCUPATIONAL DISEASES

- ARE CHARACTERIZED BY SOME SPECIFIC MARKERS
- AND NEED SOME SPECIFIC DIAGNOSTIC METHODS



WHAT CAN DISCOVER THE DENTIST?

- TEETH ABBRASSION: MOLARS (dust).
INCISIVES (musical wind instruments)
- MORE FREQUENT CARRIES (org.dust)
- GREY GUM 's MARGIN (Pb)
- SLAVER (Hg, organophosphates)
- BLEEDING (benzene)



OCCUPATIONAL HAZARDS

- IN HEALTH PROFESSIONAL PRACTICE
ARE WIDE AND COMMON



OCCUPATIONAL HAZARDS

- INFECTIOUS AGENTS
- X-RAY
- INJURY
- POSTURAL STRESS
- NOISE, VIBRATION



OCCUPATIONAL HAZARDS

- CHEMICALS:
- ORGANIC SOLVENTS
- CHEMICAL CARCINOGENS AND TERRATOGENS (CHEMOTHERAPY, ANESTESIOLOGY)
- ANORGANIC MERCURY



OCCUPATIONAL HAZARDS

- ALLERGENS:
- PROCAIN, MESOCAIN
- IODINE, FAMOSEPT, FORMALDEHYDE
- SULFONAMIDES
- ANTIBIOTICS
- ACRYLATES, LATEX/RUBBER



OCCUPATIONAL STRESS

- sy. OF OVERFILL WAITING-ROOM
- LACK OF DRUGS
- LACK OF DIAGNOSTIC METHODS
- ADMINISTRATIVE OVERLOAD
- PATIENT'S MOOD
- PATIENT'S RELATIVES
- INTERPERSONAL RELATIONSHIPS
- SHIFT-WORK



OUTCOMES OF STRESS

- „BURN OUT“ sy.
- PSYCHOSOMATIC DISEASES
- ALCOHOLISM, SMOKING, DRUGS
- PSYCHIATRIC DISORDERS – SUICIDES
RR 2,0 (Finland, UK) – 4,0 (USA)



NANO-PARTICLES – A NEW HAZARDS?

- COMPOUNDS OF DIFFERENT CHEMICALS
- AT LEAST ONE DIAMETER IS UP TO 100 nm
- DIFFERENT PHYSICAL and CHEMICAL PROPERTIES



NANO-TECHNOLOGY IN HEALTH CARE

- SILVER-NANOPARTICLES=> BACTERIOSTATIC PROPERTIES (surgery)
- NANO-ROBOTS: CARRIERS OF DRUGS (chemotherapy)
- IN TOOTH PASTE => QUICK REPLACEMENT OF MICROSCOPIC DAMAGES OF TOOTH ENAMEL => PREVENTION OF CARRIES



WHAT WE KNOW?

- HIGH ABILITY TO MAKE CLUSTERS WITH DIAMETERS OF RESPIRABLE DUST (1 – 5 μm)
- INCREASED TRENDS TO WIDE USING
- NANO-SILVER: ANTIBACTERIAL PROPERTIES => DRESSING
- TARGET TRANSPORT OF DRUGS



WHAT WE DO NOT KNOW?

- TO MEASURE THE LEVEL OF EXPOSURE
- THE INFLUENCE OF NANOPARTICLES ON HUMAN HEALTH
- EVEN THE EXPERIMENTAL STUDIES GIVE INADEQUATE INFORMATIONS



WORLD CENTERS OF RESEARCH

- USA
 - South Korea
 - EU
-
- SYSTEM OF PRELIMINARY CAUTION



CARE ABOUT WORKERS

- AT RISK WORKPLACES:
 - 1) PRIMARY PREVENTION
 - 2) SECONDARY PREVENTION
 - 3) DUTIES FOR EMPLOYERS, PHYSICIANS, WORKERS



PRIMARY PREVENTION

- CONTROL OF NEW HAZARDS
- CONTROL OF KNOWN HAZARDS
- SUBSTITUTION OF RISK FACTORS
- TECHNICAL CONTROLS TO MINIMASE EXPOSURE
- ADMINISTRATIVE CONTROLS



PRIMARY PREVENTION

- ENVIRONMENTAL MONITORING
- BIOLOGICAL MONITORING OF EXPOSURE
- IDENTIFICATION OF VULNERABLE PERSONS (pre-employed examination)
- PERSONAL PROTECTIVE DEVICES



PRIMARY PREVENTION

- SMOKING REDUCTION/CESSATION
- ALCOHOL – APPROPRIATE AMOUNT,
ONLY IN THE PRIVACY
- EXERCISE AND FITNESS
- NUTRITION IN WORKPLACE
CANTEENS, IN VENDING MACHINES



SECONDARY PREVENTION

- SCREENING = EARLY DETECTION OF DELETERIOUS EFFECTS
- PERIODIC MEDICAL EXAMINATIONS
- TESTs OF CHEMICAL EXPOSURE:
 - measurement of chemical/metabolite
 - measurement of conjugates
 - measurement of body reactions



RESPONSIBILITY IN PREVENTION

- EMPLOYERs: (masters, bosses)
 - INFORMATION ABOUT RISKS
 - CONTROL FOR REDUCTION OF EXPOSURE
 - CONTRACT WITH PHYSICIANS
 - PROTECTIVE DEVICES



RESPONSIBILITY IN PREVENTION

- PHYSICIANS:
 - INFORMATION ABOUT HEALTH RISKS OF OCCUPATIONAL HAZARDS
 - EXCLUDING THE VULNERABLE PERSONS
 - PERIODIC MEDICAL EXAMINATIONS + COLLABORATION WITH SPECIALISTS
 - PROPOSALS FOR WORKERS PROTECTION



RESPONSIBILITY IN PREVENTION

- WORKERS:
 - ACCEPT THE INFORMATION AND ADVICES FOR SAFETY WORK
 - USE THE PROTECTIVE DEVICES
 - ABSOLVE PREVENTIVE MEDICAL EXAMINATIONS



RULES IN CZECH REPUBLIC

- HAZARDOUS WORKPLACES ARE STATUTED BY REGIONAL HYGIENIST
- LIMITS/NORMS ARE STATUTED BY GENERAL HYGIENIST
- OCCUPATIONAL DISEASES ARE DIAGNOSED BY SPECIALISTS IN REGIONAL OFFICES



MERCURY

- ELEMENTARY FORM (termometers, instruments)
- SUBLIMATION UNDER THE ROOM TEMPERATURE => LUNG DAMAGES (even lethal)
- SPECIAL RULES FOR CLEANING
- CHANGES BY ANOTHER SYSTEM



MERCURY ORGANIC

- NATURAL CONTAMINATION of FOOD CHAINS (Minamata D.)
- POISONING BY GRAIN (seed for sowing) covered by Hg INSECTICIDES => contamination of FOOD CHAINS (Iraqe)
- BAN of use ORGANIC Hg as PESTICIDE



MERCURY

- ANORGANIC – AMALGAM
- RISK FOR DENTISTS (drilling, brushing)
- RISK FOR PATIENTS (inspiration of aerosol => enhanced blood levels)



AMALGAM

- Cca 90 TONNES IS USED ANNUALLY WITHIN EU
- DENTAL USING REPRESENTS ABOUT 50 % OF DAILY INTAKE (ADI = 20 ug, + 22 ug from amalgam)
- RISK FOR ENVIRONMENT (cremation)
- CONTINUAL DECREASING



HEALTH OUCOMES

- INTERSTITIAL PNEUMONIA
- PSYCHIATRIC DISORDERS (mad hatter)
- TREMOR, MOOVING DISORDERS
- PERIPHERAL NEUROPATHY
- RENAL INSUFICIENCY
- PARALYSIS OF LIFE CENTERS



TERRATOGENIC EFFECTS

- MENTAL / NEUROLOGICAL DISTURBANCES
- DAMAGES of RENAL FUNCTIONS
- HOW TO TREAT CARRIES DURING PREGNANCY?



CONCLUSSION:

- ALL FORMS OF MERCURY ARE HARMFUL
- POOR ELIMINATION FROM THE EXPOSED BODY
- THE RISK IS BIG
- STRONG CONTROL IS A PRIORITY