



Bernardino Ramazzini *De Morbis Artificum Diatriba*

Diseases of Workers. The Latin text of 1713 revised with translation and notes by Wilmer Cave Wright. Chicago: The University of Chicago Press, 1940 - New York: The Classics Medicine Library, Division of Gryphon Editions, 1983

Bernardino Ramazzini (1633-1714)

De Morbis Artificum Diatriba

First book on occupational diseases – 1700 in Italy



Bernardino Ramazzini

**The Father
of Occupational Medicine**

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OCCUPATIONAL HEALTH

- The modern definition of Occupational Health (ILO and WHO) is:



“The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations – total health of all at work”



OCCUPATIONAL HAZARD:

``Source or situation with a potential for harm in terms of injury or ill health, damage to property, damage to the workplace environment, or a combination of these``

Safety and Health Legislations :

THE FACTORIES ACT, 1948



11 Chapters

120 Sections

3 Schedules

Chapter- III - Covers Health

Chapter- IV - Covers Safety

Chapter- Iva - Provision-related-to
Hazardous Processes

Chapter- V - Welfare

Chapter- VI - Working hrs-adults

Chapter- IX - Special provisions
-Dangerous operations
-Notifications





Safety and Health Legislations : THE FACTORIES ACT, 1948

SCHEDULES

First schedule- List of Factories
Hazardous processes (29)



Second schedule- Permissible levels of
certain chemical substances in work
environment.

Third schedule- List of notifiable diseases.
(29 categories)



OCCUPATIONAL HEALTH HAZARDS

TYPES OF OCCUPATIONAL HEALTH HAZARDS

- A. **Physical**
- B. **Chemical**
- C. **Biological**
- D. **Mechanical**
- E. **Psychosocial**



PHYSICAL HAZARDS

- ★ *Temperature - Heat / Cold*
- ★ *Illumination*
- ★ *Noise*
- ★ *Vibration*
- ★ *Radiation*
- ★ *Atmospheric pressure*

DISEASES DUE TO PHYSICAL AGENTS

Heat - Heat hyperpyrexia, Heat Exhaustion
Heat Syncope, Heat Cramps, burns,
Prickly heat

Cold - Frost bite,

Light – Occupational Cataract,

Atmospheric-pressure-Caisson disease, air
embolism, explosion.

Noise - Occupational deafness,

Radiation -Cancer, Leukemia, aplastic
anemia, Pancytopenia

Electricity - Burns, Shocks,



Human Heat Balance Equation

$$M+R+-C+-CV-E=+-S$$

Basic equation can be used for any adjustment in relation to existing Environmental condition to keep body in thermo neutral in that particular environment

HEAT= Evaporative cooling will be more

COLD= Process of conserving heat from conductive, radiative & convective heat will be more so that the body will remain in thermo-neutral e.g. it will neither gain or loss heat irrespective of environment heat or cold change.



Heat Illness

- Predisposing Factors
 - Physical activity
 - Extremes of age, poor physical condition, fatigue
 - Excessive clothing
 - Dehydration
 - Cardiovascular disease
 - Skin disorders
 - Obesity
 - Drugs
 - Phenothiazines, anticholinergics, B and Ca channel blockers, diuretics, amphetamines, LSD, cocaine, MAOIs



Heat Stroke

SYMPTOMS

- True emergency
- Altered LOC
- Any neurological finding
- **And** elevated temperature
- May still be sweating initially
- Syncope
- History is critical

PREVENTION

- ★ Awareness
- ★ Adaptation of behavioral and physical activity
 - Clothing
 - Activity
- Appropriate hydration
- ★ Education



Frost Bite

SYMPTOMS

Caused by freezing conditions which cut off circulation, usually in extremities (hands, feet, ears, nose), which may be permanently affected. Frost-bitten areas are cold, pale or marbled-looking, solid to the touch, and painless (until circulation is restored).

TREATMENT

Giving warm drinks, and covering with blankets. Warm the injured part with body heat only-put a hand under an armpit, for example. Do not rub the skin or apply direct heat to the injured area.

CHEMICAL HAZARDS



- Routes of entry - Inhalation, Ingestion, skin absorption. (inhalation is the main route of entry)
- Chemical agents can be **classified** into-
 - 1) **Metals** - Lead, TEL, As, Hg, Cd, Ni , Co etc.
 - 2) **Aromatic Hydrocarbons** - Benzene, Toluene, phenol etc.
 - 3) **Aliphatic Hydrocarbons** - Methyl alcohol
 - 4) **Gases** - ***Simple asphyxiants** : N₂, CH₄, CO₂
* **Chemical asphyxiants** : CO, H₂S, HCN
* **Irritant gases** : Ammonia, SO₂, Cl₂,
* **Systemic poison** : CS₂



TLV CONCEPT

The Threshold Limit Value - Time Weighted Average (TLV-TWA) : ``Time-weighted average concentration for a normal 8-hour working day and a 40-hour working week, to which nearly all workers may be repeatedly exposed day after day, without adverse effect``

The Threshold Limit Value - Short Term Exposure Limit (TLV-STEL) is defined as a 15-minute, time-weighted average which should not be exceeded at any time During a working day, even if the 8-hour time-weighted average is within the TLV``



DUSTS (Pneumoconiosis)

Inorganic Dust

- **Coal Dust** -Anthracosis
- “ **Silica** -Silicosis
- “ **Asbestos** -Asbestosis

Organic Dusts

- “ **Cane Fiber** -Bagassosis (Bronchi gets affected)
- **Cotton dust** -Byssinosis (In Textile industries)
- “ **Tobacco** - Tobaccosis, Lung Cancer
- “ **Grain Dust** -Farmer's Lungs

Biological Hazards



Bacteria-Tetanus, Tuberculosis, Anthrax, Brucellosis (Milkmen), Gonorrhoea (Sex-workers-Genital organs get affected).

Virus - Hepatitis, AIDS

Protozoal & Parasitic-Malaria, Hydatid (Dog handlers), Hookworms, tapeworms (Agri-workers), etc.

Fungi-(Agri-workers)-Tinea-infections, Coccidiomycosis, Psittacosis, ornithosis, etc.



MECHANICAL HAZARDS

Injuries-

Falls, cuts, abrasions, concussions, contusions, etc.

Ergonomic Disorders-

Musculo-skeletal disorders (MSDs), Cumulative-trauma-Disorders (CTDs) etc.

Ergonomics: ``Adjustment of Man & Machine``/

Application of human biological sciences with engineering science to achieve optimum mutual adjustment of man & his work, the benefit being measured in terms of human efficiency and well being

Tool / machine design to fit to work. Ergo tools/ ergofriendly tools : Tools which reduce the stresses or problems resulting in CTD's / MSD's.)



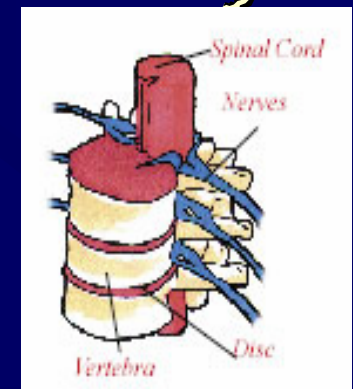
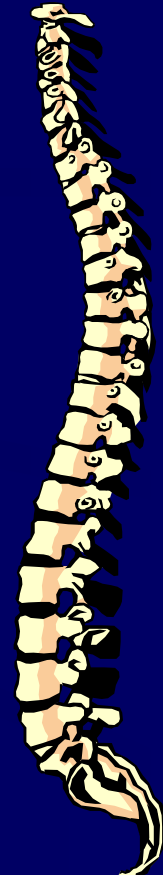
Manual Handling - Back Injuries

All forces which come down the spine compresses discs and as a result of Continuous squeezing they can rupture and bulge causing severe pain.

Most back injuries are built over along period of time by repetitive pounding on discs caused by improper methods. After sometime some minor lift can produce such rupture

``Straight back rule``

‘Thinking before lifting’





Manual Handling - Back Injuries

*CONTROL any risk by **reducing necessity for manual handling** by using alternative means of handling

*consider the load; size, awkward shape, etc

*consider need for mechanical or manual assistance

*position legs apart - one foot level with the load

***keep back straight, look up**





Manual Handling - Back Injuries

- *bend from the hips, avoid 'twisting' the body
- *tighten the stomach muscles, but don't hold breath
- ***BEND THE KNEES**
- *keep the load close to the body
- *lift with the legs, not the back
- *keep carrying distance short
- *avoid changing grip or 'jerking' the load
- *deposit the load by bending the knees and keeping the back straight

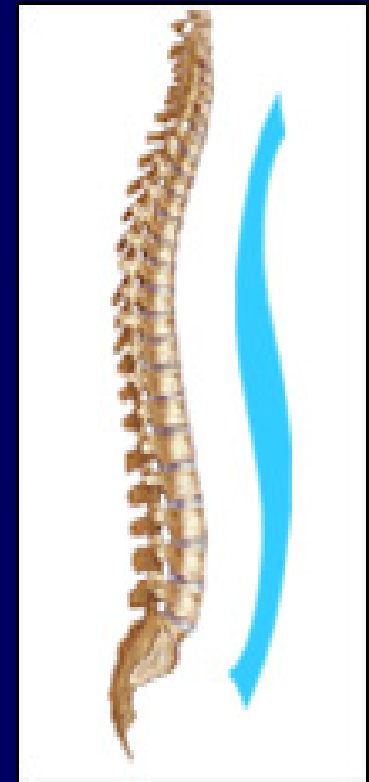


VDT USER'S-ERGONOMIC GUIDELINES



SEATING POSITION

- *Seat height to be adjusted so that thighs are horizontal & feet are resting flat on the floor
- *Thigh-torso angle is not less than 90 degrees, with 100 degrees as preferable
- *Chair should have ``Backrest`` with support for curvature in lumbar area



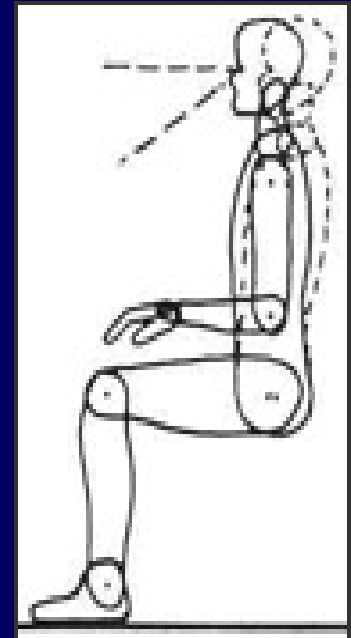
Natural S-curve of the spine



VDT USER'S-ERGONOMIC GUIDELINES

WORKING POSTURE

- *Wrist and forearm-held in straight line to reduce tendon & nerve stress
- *Upper & lower arm-at 90 degree angle
- *Elbows to be kept close to the sides
- *Head-Screen distance=25-48 inches(min 12 ``) from the VDT users eye
- *Optimal viewing angle is 20 degrees below the horizontal line from the eyes



VDT USER`S-ERGONOMIC GUIDELINES



VISION & LIGHTING

*NO GLAIR

*VDT to be placed 90 degrees to the light source, adjust screen angle

*Use screen filters to reduce glare

*Screen intensity needs to be adjusted

*Frequent breaks from the screen to reduce stress on eyes

*Optical illusion

VDT USER'S-ERGONOMIC GUIDELINES



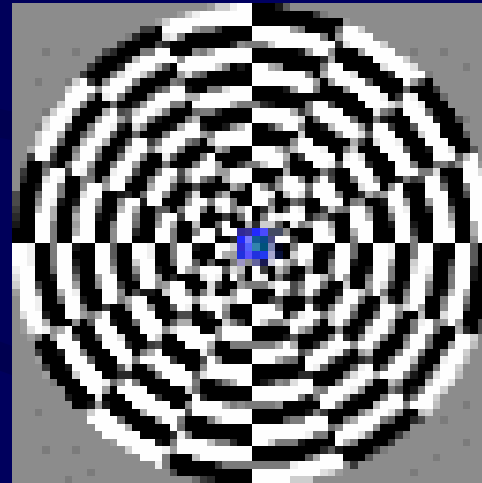
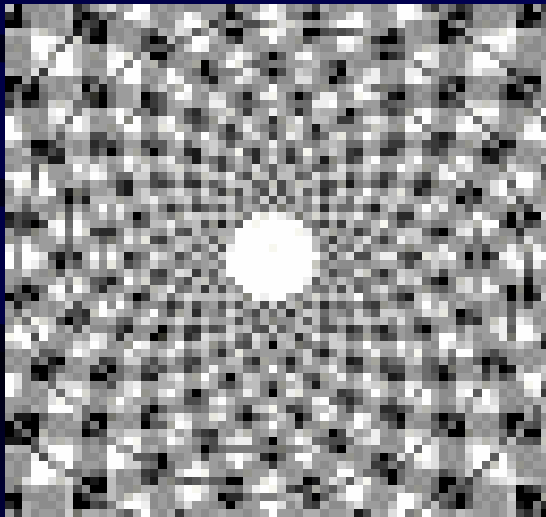
GENERAL GUIDELINES

- *Change positions, Stretch or walk around if feeling tiredness
- ***``LIGHT TOUCH``** on Keyboard to reduce hand stress or developing CTD`s
- ***Look at ``Optical Illusion``** for 1-2 minutes after every 20 minutes of work with vdt to reduce eye stress
- ***Rotate eye ball and also concentrate on a distant object & near object alternatively to reduce eye stress**
- ***Keep the vdt screen and eyeglasses clean**



VDT USER`S-ERGONOMIC GUIDELINES

OPTICAL ILLUSIONS





PSYCHOSOCIAL HAZARDS

- ⑩ ❖ Lack of job satisfaction, insecurity, poor interpersonal relations, work pressure, ambiguity, etc.
- ⑩ ❖ Psychological & behavioral changes – hostility, aggressiveness, anxiety, depression, alcoholism, drug addiction, sickness absenteeism.
- ⑩ ❖ Psychosomatic disorders- Hypertension, headache, body-ache, peptic ulcers, asthma, diabetes, heart disorders, etc.



TYPE OF CONTROL MEASURES

Medical (required to monitor effectiveness of Engg. Controls)

Engineering (Best Engg. Control is to reduce exposure)

Administrative / Legal. (Emphasis given to reduce the exposure)



ENGINEERING CONTROLS

- A Designing-building, Work station.
- B Good Housekeeping.
- C Ventilation
- D Mechanization
- E Substitution.
- F Enclosure
- G Isolation
- H Local Exhaust Ventilation.
- I Personal Protective Devices.
- J Work Environment Monitoring
- K Statistical Monitoring.



Thank You!



Carbon-Dioxide



- Has no odor.
- Heavier than air.
- TLV exposure limit is 5,000 ppm.
- IDLH 50,000 ppm
- Can cause death by asphyxiation

Ammonia



- **Odor detection limit 1-5 ppm**
- **Irritating 50 ppm (eyes), 100 ppm (respiratory tract)**
- **TLV 25 ppm**
- **IDLH 500 ppm**
- **Lethal 10,000 ppm**
- **Irritant in nature**