



**OCCUPATIONAL SKIN  
DISEASES  
DR.SARAEI**

# **EPIDEMIOLOGY**

- **ACCOUNTS FOR >30% OF OCCUPATIONAL ILLNESSES**
- **ACCOUNTS FOR 3% OF SICK DAYS FOR OCCUPATIONAL ILLNESS**
- **4 MILLION WORKING DAYS ARE LOST DUE TO OCCUPATIONAL SKIN DISEASE**
- **ASSOCIATED COST TO INDUSTRY OF £100 MILLION PER YEAR**

# INTRODUCTION

- A SKIN DISEASE THAT IS CAUSED BY PHYSICAL, BIOLOGICAL OR CHEMICAL FACTOR IN WORK
- ALSO A WORSENING OF PRE-EXISTING SKIN DISEASE CAN BE TERMED AS OCCUPATIONAL SKIN DISEASE (PSORIASIS , ACNE)

# WORK PLACE AGENTS THAT INDUCED SKIN DISORDER

- **CHEMICALS**

ACIDS

ALKALIS

SOLVENTS

OILS

DETERGENTS

RESINS

PLASTICS

METALS

PETROLEUM PRODUCT

PLANT & WOOD

- **PHYSICALS**

TEMPERATURE

IONIZING RADIATION

NON IONIZING RADIATION

- **BIOLOGIC**

VIRUSES (ORF-WART-HERPES)

BACTERIA(ANTHRAX-ERISIOPELOID)

FUNGI(CANDIDA-DERMATOPHYTE)

PARASITES(SCABIES-(SCHISTOSOMIASIS)

- **MECHANICALS**

PRESSURE

FRICTION

VIBRATION

# IMPORTANT CAUSAL AGENTS OF OCCUPATIONAL SKIN DISEASE BY SELECTED **INDUSTRY CLASSIFICATIONS**

- **ELECTRONIC:** SOLVENTS ,RESINS ,ACIDS ,FIBERGLASS ,METALS
- **MACHINERY:** CUTTING OILS ,SOLVENTS , RESINS , FIBERGLASS
- **RUBBER & PLASTIC PRODUCTS :**FIBERGLASS ,RESINS , SOLVENTS
- **STONE ,CLAY ,GLASS:** CEMENT
- **FOOD PRODUCT:** FRUITS ,VEGETABLES ,MEATS
- **AGRICULTURE:** PLANT & ANIMAL PRODUCTS

# DIAGNOSIS

## History

Description of the job:

- Duties performed
- Substance encountered
- Protective and cleaning equipment used
- Temporal relationship between dermatitis and work(during vacation and at work)
- Whether other co-workers are affected

# HISTORY

- **PAST MEDICAL HISTORY**

  - HISTORY OF ATOPY

  - HISTORY OF DERMATITIS IN PREVIOUS JOB

- **RECREATIONAL HISTORY**

  - EXPOSURE TO IRRITANTS DURING LEISURETIME ACTIVITY

- **SECOND JOB**

# CLINICAL EXAMINATION

- **GENERAL EXAMINATION**

- **SKIN EXAMINATION**

PATTERN

MORPHOLOGY

SYMMETRY

- **ICD** IS USUALLY LOCATED TO THE AREA IN CONTACT

WITH THE CHEMICALS

- **ACD** MAY BE MORE WIDESPREAD



# **WORKPLACE ASSESSMENT**

- **IDENTIFICATION OF FURTHER SUBSTANCE**
- **EVALUATION OF DEGREE OF EXPOSURE**
- **WHICH SUBSTANCE COME INTO DIRECT CONTACT WITH SKIN**
- **DEGREE OF FREQUENCY OF SUCH CONTACT AND SITE OF CONTACT**
- **LOOK IN DETAIL AT THE WORKPLACE PROCESS**
- **CHECK ENVIRONMENTAL FACTORS:**  
**(HUMIDITY/VENTILATION/GENERAL HYGIENE)**

# SPECIAL INVESTIGATION

- **BIOPSY**
- **FUNGAL SCRAPING**
- **PATCH TEST**



# CLASSIFICATION OF SKIN DISEASE

- OCCUPATIONAL DERMATITIS
- OCCUPATIONAL PHOTSENSITIVITY REACTIONS
- OCCUPATIONAL PHOTOTOXICITY REACTION
- OCCUPATIONAL SKIN CANCERS
- OCCUPATIONAL CONTACT URTICARIA
- OCCUPATIONAL ACNE
- OCCUPATIONAL SKIN INFECTIONS
- OCCUPATIONAL PIGMENTARY DISORDERS
- MISCELLANEOUS

# CONTACT DERMATITIS

- **OCCUPATIONAL DERMATITIS IS AN INFLAMMATION OF THE SKIN CAUSING ITCHING, PAIN, REDNESS, SWELLING AND SMALL BLISTERS.**
- **CONTACT DERMATITIS IS AN ECZEMATOUS ERUPTION CAUSED BY EXTERNAL AGENTS, WHICH CAN BE BROADLY DIVIDED INTO:**
  - **IRRITANT SUBSTANCES THAT HAVE A DIRECT TOXIC EFFECT ON THE SKIN (IRRITANT CONTACT DERMATITIS, ICD)**
  - **ALLERGIC CHEMICALS WHERE IMMUNE DELAYED HYPERSENSITIVITY REACTIONS OCCUR (ALLERGIC CONTACT DERMATITIS, ACD).**

# Dermatitis

## OCCUPATIONS WITH THE HIGHEST RATE OF DERMATITIS

Occupation	Rate of dermatitis (cases per 100,000 workers per year) in 2015–2016
Florists	109
Hairdressers and barbers	81
Beauticians	73
Cooks	61
Metal working operatives	54

# PROGNOSIS OF OCCUPATIONAL DERMATITIS AFTER TREATMENT

- **25% COMPLETE RECOVERY**
- **25% REFRACTORY**
- **50% REMITTING / RELAPSING**

# Influencing factors

- Constitutional factors

- Atopic skin diathesis
- History of:
  - Flexural eczema
  - Hand dermatitis

- Wet work

- wet hands >2h/day
- Occlusion by gloves
- Frequent hand washing



Age, sex

High /low temperature

Chemical irritation

Mechanical irritation

# HOW EXPOSURE CAN OCCUR



Direct handling



Contaminated surfaces



Splashing



Immersion



Deposition



## CASE 1

**Erythema , dryness and itching on the right hand of a printer man**

*What is your diagnosis ?*



# CAUSATIVE AGENTS: IRRITANT O.C.D

- **CHEMICAL**

**ALCOHOLS**

**ACID**

**ALKALIN**

**CUTTING OILS**

**DEGREASERS**

**DISINFECTANTS**

**PETROLEUM PRODUCTS**

**SOAPS AND CLEANERS**

**WET WORK**

- **PHYSICAL (<1%)**

**FRICTION**

**LOW HUMIDITY**

**HOT AND DRY AIR**

# HIGH RISK OCCUPATION FOR ICD

- **CLEANER**
- **HOUSEKEEPING**
- **FOOD SERVICE**
- **MEDICAL/DENTAL**
- **ENGINEER**
- **HAIRDRESSER**
- **MECHANIC**
- **BUTCHER**
- **AGRICULTURE/GARDENING**
- **MACHINIST**

# CLINICAL FEATURES OF CONTACT DERMATITIS

- **LOCATION**

- SKIN DISEASE **STARTS** ON THE AREA OF CONTACT.
  - DORSAL ASPECTS OF HANDS AND FINGER
  - VOLAR ASPECTS OF ARMS
  - INTERDIGITAL WEBS
  - MEDIAL ASPECT OF THIGHS
  - DORSAL ASPECTS OF FEET
- MAY IN FACE (FOREHEAD, EYELIDS, EARS, NECK) AND ARMS DUE TO AIRBORNE IRRITANT DUSTS AND VOLATILE IRRITANT CHEMICALS

# ACUTE IRRITANT CONTACT DERMATITIS

- **COMMONLY SEEN IN OCCUPATIONAL ACCIDENTS**
- **IRRITANT REACTION REACHES ITS PEAK QUICKLY, WITHIN MINUTES TO HOURS AFTER EXPOSURE**
- **SYMPTOMS INCLUDE STINGING, BURNING, AND SORENESS**
- **PHYSICAL SIGNS INCLUDE ERYTHEMA, EDEMA, BULLAE, AND POSSIBLY NECROSIS**
- **LESIONS RESTRICTED TO THE AREA WHERE THE IRRITANT OR TOXICANT DAMAGED THE TISSUE**
- **SHARPLY DEMARCATED BORDERS AND ASYMMETRY POINTING TO AN EXOGENOUS CAUSE**
- **MOST FREQUENT IRRITANTS ARE ACIDS AND ALKALINE SOLUTIONS**



DOIA

(c) University Erlangen,  
Department of Dermatology



# CHRONIC (CUMULATIVE) ICD

- REPETITIVE EXPOSURE TO WEAKER IRRITANTS
  - WET : DETERGENTS, ORGANIC SOLVENTS, SOAPS, WEAK ACIDS, AND ALKALIS
  - DRY : LOW HUMIDITY AIR, HEAT ,DUSTS , AND POWDERS
- DISEASE OF THE *STRATUM CORNEUM*

# CLINICAL FEATURES OF CONTACT DERMATITIS

- **SIGN AND SYMPTOMS**
  - **CUMULATIVE (EXPOSURE TO WEAK IRRITANTS)**
    - **DELAYED PAIN AND BURNING**
    - **VESICLES AND LITTLE PRURITUS**
    - **LICHENIFICATIONS, FISSURES**





## CASE 2

**A builder man presented with erythema , scaling and pruritus on his hands**

*What is your diagnosis ?*



# CAUSATIVE AGENTS: ALLERGIC O.C.D

- COBALT /CHROMIUM/NICKEL
- FORMALDEHYDE
- RUBBER-PROCESSING CHEMICALS
- COSMETICS, FRAGRANCES
- EPOXY RESINS
- PLANTS/WOOD
- PRESERVATIVES
- ACRYLICS
- BIOCIDES



# HIGH RISK OCCUPATION FOR ACD

- **TEXTILE**
- **PAINTING**
- **PRINTING**
- **AGRICULTURE**
- **HAIRDRESSER**
- **METAL WORKER**
- **RUBBER MANUFACTURE**
- **LEATHER TANNING**
- **PLASTIC MANUFACTURE**

## CLINICAL FEATURES ( ACUTE FORM )

- RASH APPEARS IN AREAS EXPOSED TO THE SENSITIZING AGENT, USUALLY ASYMMETRIC OR UNILAT.
- SENSITIZING AGENT ON THE HANDS OR CLOTHES IS OFTEN TRANSFERRED TO OTHER BODY PARTS.
- THE RASH IS CHARACTERIZED BY ERYTHEMA, VESICLES AND SEVER EDEMA.
- PRURITUS IS THE OVERRIDING SYMP.

# CLINICAL FEATURES ( CHRONIC FORM )

- **THICKENED , FISSURED, LICHENIFIED SKIN WITH SCALING**
- **THE MOST COMMON SITES:**
  - **DORSAL ASPECT OF HANDS**
  - **EYELIDS**
  - **PERORBITAL**



**Figure 1.3 Allergic:** This is a classic example of allergic contact dermatitis, showing typical clinical lesions, with vesicles, blisters and exudation.



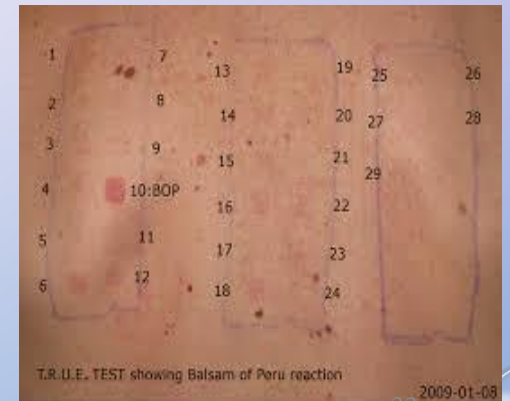
**Figure 4.99** The rubber insole of the black rubber boots worn by a construction worker was responsible for this plantar dermatitis. The allergens proved to be the antioxidants added to the insole: *N*-isopropyl-*N'*-phenyl-*p*-phenylenediamine (IPPD) and cyclohexyl-phenylparaphenylenediamine (CPPD).

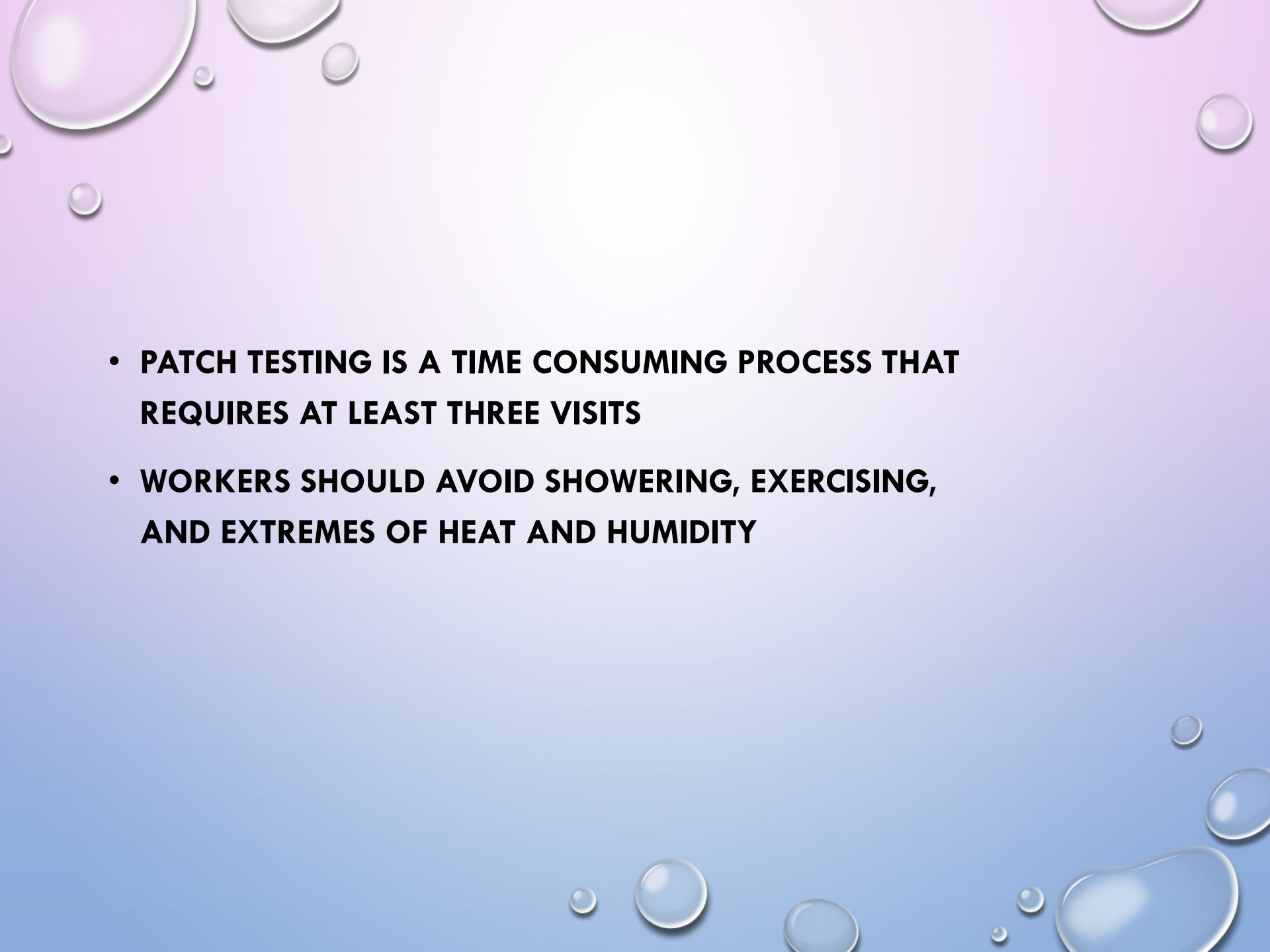


**Figure 4.100** This chronic dermatitis on the dorsum of the foot was caused by chromate contained in the leather of Spanish-manufactured footwear.



# Patch testing



- 
- The background features a light purple-to-blue gradient with several realistic water droplets of various sizes scattered across the top and bottom edges. The droplets have highlights and shadows, giving them a three-dimensional appearance.
- **PATCH TESTING IS A TIME CONSUMING PROCESS THAT REQUIRES AT LEAST THREE VISITS**
  - **WORKERS SHOULD AVOID SHOWERING, EXERCISING, AND EXTREMES OF HEAT AND HUMIDITY**

## Case 3

**A worker with  
itchy papules  
on his forearm**

**What is your  
diagnosis?**



# **DX : FIBER GLASS DERMATITIS ( KIND OF CD)**

- **MECHANISM OF SKIN INJURY IS VIA DIRECT PENETRATION**
- **PRURITUS AND TINGLING ARE THE USUAL INITIAL SYMPTOMS**
- **SUBSEQUENTLY **ERYTHEMATOUS PAPULES** DEVELOP (OFTEN WITH FOLLICULAR ACCENTUATION) ON EXPOSED AREAS WHEN THERE IS AIRBORNE EXPOSURE OR ON THE FOREARMS WHEN THERE IS CONTAMINATION OF A WORK SURFACE**
- ****PARONYCHIA** IS COMMON AND AIRBORNE EXPOSURE MAY ALSO CAUSE **BURNING EYES, SORE THROAT AND COUGH****

# OCCUPATIONAL SKIN CANCERS

- **THE SECOND FORM OF OCCUPATIONAL SKIN DISEASES**
- **ABOUT 17% OF ALL CASES OF OCCUPATIONAL SKIN DISEASES**

# OCCUPATIONAL SKIN CANCER

- **ULTRAVIOLET LIGHT**
- **POLY CYCLIC AROMATIC HYDROCARBONES**
- **ARSENIC**
- **IONIZING RADIATION**
- **TRAUMA**

**Table 1.** Occupations at risk for occupational skin cancer

Causative agent	Occupation
Arsenic	Manufacture of insecticide or herbicide Agricultural exposure to pesticide Smelting of copper, lead, zinc Mining of arsenic
Polycyclic hydrocarbons	Distillation of coal tar Manufacture of coal gas Working with shale oil, creosote, asphalt and chimney soot
Ultraviolet irradiation	Outdoor work, e.g. agriculture, driving, fishing and construction Welding Laser exposure Certain printing processes
Ionizing radiation	Nuclear plant operations Diagnostic X-ray work Uranium mining
Burn	Welding



264 Tar keratoses.



265 Tar keratoses.



259 Pigmented tar keratoses.



260 Squamous cell carcinoma on the back of the hand of a soldier who had observed nuclear weapons tests.



261 Multiple BCC following arsenic ingestion.



268 Pigmented BCC.



269 Ulcerating nodular cystic BCC.



270 Morpheaic BCC on the nose.



271 Superficial BCC on the shoulder of a professional yachtsman.

The background features a vertical gradient from light purple at the top to light blue at the bottom. Scattered throughout are several realistic water droplets of various sizes, each with a highlight and a shadow, giving them a three-dimensional appearance.

# OCCUPATIONAL ACNE

# ENVIRONMENTAL ACNEA

- **PREEXISTING ACNE VULGARIS MAY BE AGGRAVATED BY VARIOUS OCCUPATIONAL STRESS**

**1-TROPICAL ACNE: ACNE PRONE INDIVIDUALS EMPLOYED IN TROPICAL CLIMATES**

**2-ACNE MECHANICA: TIGHT FITTING WORK CLOTHING ,PRESSURE FROM SEAT BELT**



# OIL ACNE

## **OCCUPATION AT RISK**

- MACHINIST
- OIL FIELD WORKER
- OIL REFINER
- AUTO, TRUCK, AIR CRAFT, BOAT MECHANICS
- RUBBER WORKER
- ROOFERS
- ROAD MAINTENANCE WORKERS

239 Oil folliculitis with  
follicular plugging and  
inflammatory papules  
(courtesy of the National  
Institute for Occupational  
Safety and Health,  
Cincinnati, OH).



# COLORACNE

- **OCCUPATION AT RISK**

- WORKERS IN PRODUCTION OF PESTICIDES,  
HERBICIDES
- ELECTRICAL WORKERS EXPOSED TO PCB  
(TRANSFORMER OIL)





# AGE

## DIFFERENTIAL FEATURES OF ACNE

- OIL ACNE ANY AGE
- ACNE VULGARIS PEAK INCIDENCE,  
AGES 11-20
- CHLORACNE ANY AGE

# DISTRIBUTION

## DIFFERENTIAL FEATURES OF ACNE

- OIL ACNE EXPOSED AREA
- ACNE VULGARIS FACE ,NECK ,CHEST
- CHLORACNE FACE, ESPECIALLY MALAR CRESCENT & AURICULAR CREASES, AXILLAE, GROIN, NOSE SPARED

# ASSOCIATED CONDITIONS

## DIFFERENTIAL FEATURES OF ACNE

- OIL ACNE                      MELANOSIS/PHOTOSENSITIVITY
- ACNE VULGARIS                      NONE
- CHLORACNE                      XEROSIS,  
CONJUNCTIVITIS,  
ACTINIC ELASTOSIS,  
PHERIPHERAL NEURITIS,  
LIVER ABNORMALITIES

The background features a vertical gradient from light purple at the top to light blue at the bottom. Scattered throughout are several realistic water droplets of various sizes, each with a highlight and a shadow, giving them a three-dimensional appearance. The droplets are more densely packed in the top-left and bottom-right corners.

# PIGMENT DISORDERS

# **TOXIC VITILIGO**

- **DEPIGMENTATION CAN BE CAUSED BY INHIBITING OF MELANIN SYNTHESIS, KILLING THE MELANOCYTES.**

- **PHENOLIC OR CATHECOLIC DERIVATIVES:**

**RUBBER MFG, PHOTOGRAPHIC DEVELOPING AGENTS ,LUBRICATING OILS ,PLASTIC MFG ,DISINFECTANTS**



(a)



(b)

**Figure 4.101** (a) The cause of the loss of pigment on the dorsum of the foot was an adhesive that contained *p*-*tert*-butylphenol-formaldehyde resin. The depigmentation was not post-inflammatory. This type of depigmentation does not require antecedent dermatitis, and is seen in industrial exposures to this same class of compounds (Rietschel and Fowler, 1995, p.770). (b) An example of post-inflammatory depigmentation.

# DISCOLORATIONS AND STAINS

- **MECHANISM: DEPOSITION , STIMULATION OF MELANIN SYNTHESIS**

**- CHRONIC INTOXICATION FROM HEAVY METALS:**

**AG ,HG ,AS**

**- NITROSYLATED COMPOUNDS:**

**TNT ,DINITRO PHENOL ,...**



# SEQUELAE OF CONTACT DERMATITIS



**Figure 1.14** This 31-year-old woman with post-inflammatory hyperpigmentation had an antecedent nickel dermatitis due to a jeans button.



**Figure 1.15** Hyperpigmentation may be the sequela of many forms of dermatitis; in this example the initial eruption was stasis dermatitis.



**Figure 1.16** This is a 76-year-old man with post-inflammatory hyperpigmentation following mechanical dermatitis from his belt.

# CONTACT URTICARIA

- **ANIMAL HUSBANDRY, FARMERS, VETS**
  - **COW DANDER**
- **COOKS, FOOD PREPARATION WORKERS, KITCHEN WORKERS**
  - **FOOD, ANIMAL PRODUCTS**
- **KITCHEN WORKERS, BAKERS, MILLERS**
  - **FLOUR, GRAINS**
- **HEALTH CARE, ANIMAL HUSBANDRY, VETS, LABORATORY WORKERS**
  - **NATURAL RUBBER LATEX**

# PHYSICAL CAUSE OF OCCUPATIONAL SKIN DISORDERS

- **MECHANICAL TRAUMA: CALLUS ,CORN, LICHENIFICATION**
- **PERMANENT CALLUS LEADING TO EARLY RETIREMENT**
- **CALLUS WITH PAINFUL FISSURE BECOME INFECTED**
- **PREVENTION : NOT NECESSARILLY**

# HEAT

- **BURN ,MILIARIA, INTERTRIGO**
- **BURN: AFTER BURN HYPOPIGMENTATION SUSCEPTIBLE ACTINIC DAMAGE**
- **HYPERPIGMENTATION AND SCAR ARE DISFIGURING**
- **MILIRIA : SWEAT RETENTION**
  - M.CRYSTALINA : UPPER EPIDERM**
  - M.RUBRA: LOWER EPIDERM**
  - M.PERFOUNDA: UPPER DERMIS**

- **DX : CLINICAL PICTURE, HX OF EXCESSIVE HEAT EXPOSURE**
- **PREVENTION: AVOIDING OF EXPOSURE, HEXACHLOROPHEN SOAP, FREQUENT CLOTHING CHANGES**





heat rash

# CONTINUE

- **INTERTRIGO: MACERATED, ERYTHEMATOUS LESION IN BODY FOLD**
- **RESULT EXCESSIVE SWEATING IN OBESE WORKER**
- **COMMON SITE IS INTERDIGITAL SPACE BETWEEN THIRD AND FOURTH FINGER**
- **BACTERIAL AND FUNGAL INFECTION IS COMMON**





# COLD

- FROSBITE, CHILBLAIN
- FROSBITE: PROGRESSIVE VASOCONSTRICTION CAUSE IMPAIRMENT CIRCULATION
- CLINICAL SYMPTOM IN MILD FORM: REDNESS, TRANSIENT ANESTHESIA, SUPERFICIAL BULLAE  
→ INITIAL REDNESS REPLACE BY WHITE WAXY APPEARANCE → BLISTERING & LATER NECROSIS

- **LONG-TERM EFFECTS: RAYNAUD-LIKE CHANGE  
PARESTHESIA, HYPERHYDROSIS**
- **SCC DEVELOP IN OLD SCAR**
- **REWARMING, ANALGESIC, SURGICAL DEBRIDEMENT**
- **PREVENTION: PROTECTIVE CLOTHING, EDUCATING.**





# COLD

- **CHILBLAIN: MILD FORM OF COLD INJURY**
- **REDDISH, BLUE, SWOLLEN, BOGGY DISCOLORATION WITH BULLA AND ULCERATION**
- **FINGER, TOE, HEEL, NOSE, EAR ARE EFFECTED**
- **GENETIC IS IMPORTANT BACK GROUND**
- **TREATMENT : SYMPTOMATICALLY**



# VIBRATION SYNDROME

- **VIBRATION TOOL IN COLD WEATHER PRODUCE VASOCOSTRUCTION OF DIGITAL ARTERIES.(30-300)**
- **PALLOR, CYANOSIS, ERYTHEM OF FINGER NAMED RAYNAUD PHENOMEN**
- **PAPULAR NAME : DEAD OR WHITE FINGER.**



- **TINGLING, NUMBNESS, BLANCHING OF THE TIP OF FINGER OCCURRED**
- **ASYMMETRY IS DIAGNOSTIC**
- **PREVENTION: DESIGN OF TOOLS, INSULATION, PROTECTION OF HANDS FROM COLD WEATHER.**



*With thanks*

