CHEMICAL GERMICIDES IN PERSONAL SERVICES: HOW EFFECTIVE, RELEVANT AND SAFE ARE THEY?

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WHY THE CONCERN?

- BODY PIERCING/TATTOOING ARE HIGH-RISK ACTIVITIES
- INCREASING NUMBERS OF PRACTITIONERS & CLIENTS AS SUCH PRACTICES HAVE GONE MAINSTREAM
- WIDE VARIATIONS IN QUALITY OF SERVICE
- CLIENTELE IS VARIED & MAY VISIT ONLY ONCE

CONCERN (CONT’D.)

- TYPE & DURATION OF PROCEDURE VARY WIDELY
- CLIENTS NOT OBLIGED TO REVEAL HEALTH STATUS
- RISK OF INFECTIONS TO CLIENT AS WELL AS PRACTITIONER
- DISEASE MAY APPEAR LONG AFTER PROCEDURE
- INFECTION OF SITE(S) AFTER THE PROCEDURE
CONCERN (CONT’D.)

- STUDIOS VARIED IN LAYOUT & OFTEN CROWDED
- INFECTION CONTROL PRACTICES VARIED & OFTEN INADEQUATE
- INADEQUATE NATIONAL DATA ON SUCH SERVICES
- PUBLIC HEALTH INSPECTORS NEED GUIDANCE IN ENSURING PROPER INFECTION CONTROL

IS THERE RISK OF INFECTION IN PERSONAL SERVICES?

- YES, BECAUSE OF DAMAGE TO INTACT SKIN AND/OR MUCOUS MEMBRANES
- WIDE VARIATIONS IN LEVEL OF EDUCATION & EXPERIENCE IN PRACTITIONERS
- KNOWLEDGE OF BASIC INFECTION CONTROL OFTEN INADEQUATE
- REPORTS OF VIRAL & BACTERIAL INFECTIONS

WHAT IS THE EVIDENCE?

- A RECENT SURVEY (JOHNSON ET AL. 2001) OF MANICURE & PEDICURE ESTABLISHMENTS IN TORONTO POINTS TO:
  - POOR VACCINATION RATES
  - SPORADIC BARRIER PROTECTION
  - SERIOUS GAPS IN KNOWLEDGE OF INFECTION CONTROL & BLOODBORNE PATHOGENS
  - DECONTAMINATION PRACTICES FLAWED
**BODY PIERCING/TATTOOING & INFECTIONS**

*Mayers et al., Mayo Clinic Proc. 77: 29-34, 2002*

- A Survey of Undergrads in New York State
- 51% Had Body Pierced & 23% Had Tattoos
- 9% (21/229) of Complications from Piercing Due to Bacterial Infections
- Pierced Navel More Prone to Infections
- No Complications from Tattooing (?)
- No Cases of Viral Infections (?)

**WHAT PATHOGENS ARE IMPORTANT?**

- **Viruses**
  - HIV, HBV, HCV, Herpes, Pox (M. Contagiosum), Papilloma, Etc.
- **Bacteria**
  - Pseudomonas, Staphylococcus, Streptococcus, Clostridium Tetani, Etc.
- **Mycobacteria**
  - Mycobacterium Tuberculosis, M. Leprae, Non-Tuberculous Mycobacteria (E.G., M. Abscessus), Etc.
- **Protozoa**
  - Malarial Parasites (?), Etc.

**EXAMPLES OF INFECTIONS DUE TO PERSONAL SERVICES**

<table>
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<tr>
<th>Infection</th>
<th>Procedure</th>
<th>Reference</th>
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A RECENT REPORT OF MYCOBACTERIOSIS
(50th Ann. Meeting of Epidemic Intelligence Service, April, 2001)

- IN WATSONVILLE (CALIF.) >110 CASES OF ANTIBIOTIC-RESISTANT BOILS DETECTED
- ALL PATIENTS CUSTOMERS OF SAME PEDICURE SALON
- BOILS SEEN 10 DAYS TO 4 MONTHS AFTER PROCEDURE
- RAZOR-SHAVING OF LEGS INCREASED RISK OF INFECTION
- MYCOBACTERIUM FORTUITUM CAUSATIVE AGENT, WITH THE FOOTBATH AS SOURCE
- THE BACTERIA GREW ON A SUCTION SCREEN PLUGGED WITH HAIR, GREASE & CLIPPED NAILS
- EQUIPMENT WAS NEVER CLEANED OR DISINFECTED

Infection Practitioner (Blood, Hands)

Sources of Infection in Personal Services

Interruption Disease Spread Via Vehicles

Cleaning Disinfection Sterilization
WHERE ARE CHEMICAL GERMICIDES USED IN PERSONAL SERVICES?

- Skin or mucous membrane of client
- Hands of practitioner
- Environmental surfaces
- Instruments

MAJOR TYPES OF DISINFECTANTS

A) HALOGENS

1) Chlorine: gas, liquid or powder
- Used at 100-10,000 ppm free chlorine
- Broad-spectrum, cheap, multi-purpose
- Instable, corrosive, pH dependent
- Toxic and hazardous to environment
- Neutralized by organic matter
- Demand-release chlorine compounds
- Chlorine dioxide - on-site generation

2) Iodine: free or combined
- 30 to 1000 ppm free iodine
- Many uses; stains treated objects
- Neutralized by organics
- Solution in alcohols (tincture)
- Toxic and corrosive
- Use on skin & mucous membranes
- Bacterial growth in organic iodine
DISINFECTANT TYPES (cont’d.)

B) ALCOHOLS: ETHYL (40-90%), ISOPROPYL (60-95%)
- Fixative action
- Multiple uses including antisepsis
- No residue, non-corrosive
- Flammable and potential for abuse
- Non-sporicidal; viricide at high conc.
- May affect air quality
- Damage to parts of medical instruments

DISINFECTANT TYPES (cont’d.)

C) PHENOLICS: 400-2,500 PPM
- Generally used with detergents
- Pungent, unpleasant smell
- Limited activity against viruses
- Toxic in some forms
- Not recommended in child-care and food preparation areas
- May be absorbed by rubber

DISINFECTANT TYPES (cont’d.)

D) QUATERNARY AMMONIUMS
- 500-2,500 PPM; built-in detergent action
- Generally pleasant and relatively mild
- Commonly used in North America
- Often used with other types of actives
- Good bactericides; poor viricides, mycobactericides and sporicides
- Environmental concerns
DISINFECTANT TYPES (cont’d.)

F) HYDROGEN PEROXIDE
- 3 TO 30% SOLUTION IN WATER; STRONG OXIDANT
- NO RESIDUE; ENVIRONMENTALLY SAFE
- SPORICIDAL AT HIGHER CONC.
- EXPLOSIVE AT HIGH CONC.; MAY BE CORROSIVE
- STABILIZED SOLUTIONS WITH ORGANIC ACIDS
- ACCELERATED ACTION
- INCREASING USE
- PERACETIC ACID

COMMON ANTISEPTICS
- ALCOHOLS
- IODINE
- HYDROGEN PEROXIDE
- TRICLOSAN
- TRICLOCARBAN
- CHLORHEXIDINE GLUCONATE
- BENZALKONIUM CHLORIDE
- PARACHLOROMETAXYLENOL (PCMX)

HAZARDS IN GERMICIDE USE
- CHLORINE IS TOXIC TO HUMANS & ENVIRONMENT
- PHENOLICS CAN CAUSE LIVER DAMAGE, SKIN DEPIGMENTATION & SKIN BURNS
- ETHANOL IS FLAMMABLE & CAN BE ABUSED
- HYDROGEN PEROXIDE CAN CAUSE BLEACHING & SKIN BURNS
- VOLATILE ORGANICS & SMOG
HAZARDS IN GERMICIDE USE (cont’d.)
- VOLATILE ORGANICS & INDOOR AIR QUALITY
- HORMONE DISRUPTERS
- ACCIDENTAL INGESTION AND POISONING
- UNDESIRABLE MICROBES IN GERMICIDES
- ARE GERMICIDE & ANTIBIOTIC RESISTANCE LINKED?

DESIRED TRAITS IN A GERMICIDE
- GOVERNMENT REGISTERED
- NON-TOXIC TO HUMANS & ANIMALS
- NON-ALLERGENIC & NON-SENSITIZING
- NON-HORMONE DISRUPTING
- ENVIRONMENTALLY FRIENDLY
- BROAD-SPECTRUM GERMICIDAL ACTIVITY
- FAST-ACTING
- NON-STAINING & FREE OF ANY PUNGENT SMELL

DESIRED TRAITS (cont’d.)
- FREE FROM VOLATILE ORGANIC CHEMICALS (VOC’S)
- SHELF-LIFE OF ONE YEAR OR LONGER
- SAFE TO TRANSPORT, & SAFE/EASY TO STORE
- NO RESIDUAL ACTIVITY(?)
- NOT READILY NEUTRALIZED BY SOIL LOAD
- NON-CORROSIVE & MATERIALS COMPATIBLE
- COST-EFFECTIVE
- EASY TO USE WITH CLEAR LABEL DIRECTIONS
CHECKLIST FOR INFECTION CONTROL

- IS SERVICE PROVIDER AWARE OF RISKS OF SPREAD OF INFECTIONS?
- HOW & HOW OFTEN ARE ENVIRONMENTAL SURFACES BEING CLEANED?
- ARE REQUIRED STERILIZERS AVAILABLE?
  - ARE THEY INSTALLED PROPERLY?
  - ARE THEY BEING USED PROPERLY?
- WHAT CHEMICAL GERMICIDES ARE AVAILABLE?
  - ARE THEY BEING DILUTED, STORED & USED PROPERLY?
- ARE REUSABLE DEVICES BEING CLEANED WELL BEFORE DISINFECTION OR STERILIZATION?

CHECKLIST FOR INFECTION CONTROL (CONT'D.)

- ARE HANDS BEING WASHED FREQUENTLY & PROPERLY?
- IS FACILITY USING ALCOHOL-BASED HAND ANTISEPTICS?
  - IF SO, WHAT IS THE TYPE & LEVEL OF ALCOHOL IN THEM?
- ARE THEY STORED PROPERLY TO PREVENT EVAPORATION OF ALCOHOL?
- HOW IS CLIENT'S SKIN OR MUCOUS SURFACE BEING DISINFECTED BEFORE PROCEDURE?
- HOW ARE HEAT-SENSITIVE INSTRUMENTS BEING DECONTAMINATED BETWEEN PATIENTS?
- VACCINATION STATUS OF SERVICE PROVIDER?

CHECKLIST FOR PHYSICAL FEATURES

- GENERAL CLEANLINESS
- EASILY CLEANABLE ENVIRONMENTAL SURFACES
- GOOD LIGHTING & VENTILATION
- PROPER HANDWASHING FACILITIES (PREFERABLY WITH WRIST OR FOOT-OPERATED FAUCETS), WITH WELL STOCKED DISPENSERS FOR SOAP & PAPER TOWELS
- WELL-SEPARATED CLEAN & DIRTY WORKING AREAS
- INSTRUMENTS THAT CAN BE READILY CLEANED & DISINFECTED/STERILIZED
CHECKLIST FOR PHYSICAL FEATURES (CONT’D.)

- Adequate supply & proper storage of sterile sharps for single use
- Discard bins for proper disposal of sharps
- Stock of gloves
- Proper sterilizers with related supplies
- Chemical germicides in appropriate containers

CONCLUDING REMARKS

- Canadian guidelines published in 1999
- American Body Art Model Code and Guideline
  - Provides assistance to regulatory agencies wishing to regulate piercing
  - Currently, 42% of states involved in regulating body piercing
  - Regulations for tattooing also under consideration
  - ‘Artistic freedom’ & patient/practitioner safety

CONCLUSIONS (CONT’D.)

- Informed consent from client
- Self-regulation by industry (Alliance of Professional Tattooists (ART))
- Registration of studios/parlors
- In-home procedures will remain hard to monitor
RECOMMENDATIONS

- Develop a national inventory of studios/parlors
- Develop standardized checklists for health inspectors
- Educate practitioners on:
  - Importance of personal & client safety
  - Basics of infection control
  - Preventive vaccination

RECOMMENDATIONS (CONT’D.)

- Inform clients of risks through brochures
- Consider piercing/tattooing in cases of unexplained infections
- Urge practitioners to consult health authorities prior to building or renovating studios

FURTHER READING

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THIS PRESENTATION AND ADDITIONAL INFORMATION AVAILABLE AT CREM WEBSITE
ENVIRONMENTAL-MICROBIOLOGY.CA