

Silicosis and Silica Exposure in Dental Technicians

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Dental Lab Technology



BEFORE



AFTER

- **Permanent and Removable Dental Restorations**
 - ✓ **Crowns**
 - ✓ **Bridges**
 - ✓ **Implants**
 - ✓ **Dentures**
 - ✓ **Partials**
 - ✓ **Veneers**
- **Orthodontic Appliances**

Sentinel Cases

New Jersey

- Male
 - Smoker
 - 1946-1992 (46 yrs.)
 - 3 Facilities
 - Died of lymphoma
(Age: 65)
- Male
 - Smoker
 - White
 - 1947-1976 (29 yrs.)
 - 2 Facilities
 - Died of acute renal
failure (Age: 67)

Sentinel Cases

Michigan

- White
- Male
- Smoker
- Other
- 1964-1984 (20 yrs.)
- 1 Facility
- Died of chronic renal failure (Age: 77)
- Male
- Non-Smoker
- White
- 1977-1983 (6 yrs.)
- 1 Facility
- Diagnosed with nodular pneumoconiosis in 1997 (Age: 38)

Sentinel Cases

Ohio

	Case 1	Case 2	Case 3	Case 4	Case 5
Sex	M	M	M	M	M
Race	W	W	W	W	W
DOB	8/29/94	11/09/50	01/18/47	08/06/25	03/27/34
Age at Diagnosis	32	Unk	49	60	42
Years exposed at dental mfr/lab	14	Unk	14	13	Unk
Year first exposed at dental mfr/lab ¹	1943	Unk	1965	1943	Unk
Literal job title	Laborer	Unk	Dental lab Technician	Mixed Compounds	Compounder-Filler
COC	889	999	678	756	756
Literal industry title ²	Binding Powders Mfr	Dental Products	Dental Eqpt & Supplies	Dental Mold Mixtures	Dental Supply
SIC	3297	3297	3843	3297	3297

1 – for each of these cases, when start date was known, this date was the date of first occupational exposure to silica.

2- Cases 1,2,4 & 5 worked at same company.

Dental Laboratories

- Dental Laboratories: SIC 8072
- Dental Technicians: COC 678
 - ~14,000 dental labs in US
 - 454 listings in 1997 D & B database for NJ
 - No registration
 - No licensing
 - Certification
 - laboratories (CDL) & technicians (CDT)
 - voluntary
 - CDT: practical exam/continuing ed/disciplinary policies
 - CDL: employ CDT/OHS compliance/infection control

Dental Lab Associations

- NJ Dental Laboratory Association
- National Association of Dental Laboratories:
 - Founded National Board for Certification
 - Funds lobby effort
 - wants regulation of dental labs
 - Offers training packages
 - Infection Control
 - Hazard Communication

Dental Lab Hazards

- Bloodborne Pathogens
- Methyl Methacrylate
- Cyanoacrylates
- Acids (HF, HCL)
- Solvents
- Electroplating
- Soldering
- Metals (Ni, Cr, Co, Be)
- Glutaraldehyde
- Quarternary Ammonium Compounds
- Latex
- Noise
- Vibration
- Ergonomic
- Dusts

Silica Sources in Dental Labs

- Casting investment mixing/breaking
 - Quartz: 10-55%
 - Cristobalite: 20-70%
- Sandblasting
 - silica sand
- Porcelain grinding/polishing
- Clean-up
- Dust collector maintenance



divesting casting



sandblasting castings

glovebox sandblasting unit





work station local exhaust ventilation



local exhaust ventilation hood

hand-grinding enclosure

LEV



Hazard Surveillance Project

- Perform initial site visits
- Identify NJ dental labs
 - develop & maintain database
- Develop educational literature and survey form
- Mail survey and literature
 - develop & update database
- Conduct air sampling
- Analyze data
- Disseminate/publish findings & recommendations

Air Sampling Results

LAB	TASK	RESPIRABLE DUST (mg/m ³) Raw/TWA	FREE SILICA (mg/m ³) TWA	PERCENTAGE OF NIOSH REL
1	casting, sandblasting (SiO ₂)	0.59/0.51	0.021	0.42
	grinding/polishing porcelain	0.39/0.13	ND	NA
2	divesting (LEV), sandblasting	0.17/0.12	>LOD<LOQ	NA
	divesting (LEV), sandblasting	0.13/0.12	>LOD<LOQ	NA
	clean crowns	0.07/0.04	ND	NA
3	divesting, sandblasting (Al ₂ O ₃)	0.15/0.13	ND	NA
	divesting, sandblasting (Al ₂ O ₃)	0.40/0.38	0.055	1.1
	investing, clean-up	0.11/0.10	ND	NA
4	divesting	<0.01/<0.009	ND	NA
	investing	0.13/0.12	ND	NA
	grinding/polishing porcelain, abrasive blasting(Al ₂ O ₃)	0.05/0.04	ND	NA
	grinding/polishing porcelain	<0.01/<0.008	ND	NA
5	casting			
	grinding/polishing porcelain			
	divesting, sandblasting(Al ₂ O ₃)			