Silicosis: From Gauley Bridge to Artificial Stone

Leonard Go, MD
MinER Center
University of Illinois at Chicago School of Public Health
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Silicosis

• A preventable lung disease caused by excessive silica exposure
• Disease may result in difficulty breathing, cough, infections, need for home oxygen, lung transplant, and death
Selected Sources of Silica Exposure

- Mining, Tunnelling and Excavating
- Foundries
- Abrasives
- Ceramics
- Construction
- Crafts
- Glass making
- Gemstone workers
- Agriculture
Silicosis

• Agricola, 16th century, of miners in the Carpathian mountains: “women are found to have married seven husbands, all of whom this terrible consumption has carried off to a premature death.”

• Silica medically recognised as cause of chronic lung disease in mid-19th century
Silicosis

• Hawks Nest Tunnel disaster, near Gauley Bridge, WV, USA

• Silicosis in the 21st century
Hawks Nest Tunnel
Hawks Nest Tunnel

• Parts of mountain was 99% sandstone
  • >90% silica
  • Mined for steel production
• Project completed in 18 months
• Dry drilling used mostly
• No dust measurements
• Respirators worn by engineering staff, but not workers
  • “Eye protection”
• Men began getting sick shortly after construction started

• Company doctors called the illness “tunnelitis”

• One Hawks Nest worker: “Each and every day I worked in that tunnel, I helped carry off 10 to 14 men who was overcome by the dust”
• Workers denied breaks to step out and breathe clean air
• Sick workers often forced from bed at gunpoint
• Average length of employment 15-16 weeks
Acute Silicosis
Hawks Nest Tunnel Disaster

- 3000 workers who worked in tunnel
- 109 admitted deaths by Union Carbide
- Estimated 500-1000 deaths in 1930-1935
Silicosis in the 21st Century
Sandblasted Denim
Artificial Stone
Artificial Stone Silicosis

E Matar et al, Med J Aust 2017
Silicosis

• Although very toxic, silica’s effects are often delayed
  • Importance of education and awareness
  • Need for protections to extend past time of employment
• Silica exposure can occur in many work settings
  • Poses challenges to spreading awareness and institute changes
• Chest imaging (x-rays, CT scans) may show abnormalities before a worker feels sick
  • Importance of screening
Silicosis

• Silicosis is preventable
  • Ideally avoid unnecessary silica exposure
    • Importance of adequate protection via regulations and laws
    • Adherence
  • Engineering controls to reduce exposure
    • Wet cutting
    • Ventilation
  • Personal protective equipment as a last line of prevention