Wood as a Restorative Material in Healthcare Environments

How wood and natural materials affect physical and mental health indoors

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The average North American spends close to 90 percent of his or her time indoors. This not only makes the design of building interiors ever more important, but calls for the buildings themselves to provide a connection to nature. This presentation will examine a growing body of research suggesting that the human relationship with wood is similar to positive responses of our species to other natural cues such as nature, natural sunlight, and plants. Biophilia, the affinity of humans for life and life-like processes, will be discussed in the context of visual wood used in healthcare facilities and subsequent effects on patients and staff.
Learning Objectives

1. Define biophilia and consider wood’s role in biophilically-designed healthcare structures.

2. Describe the responses of patients and caregivers to the use of natural materials in healthcare environments.

3. Review the building designer’s role in specifying exposed wood structure and finishes in order to leverage the link between wood use and pro-health outcomes.

4. Highlight research results supporting wood’s impact as a stress-defusing building element.
Agenda

• Humans and Nature
• Biophilia
• Views
• Light
• Plants
• Wood
• Stress Reduction
• Specifying Exposed Wood
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February 2015

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Humans’ Home Sweet Home: Nature
Nature and Psychological Restoration: Why, When, and How
Nature and Health
Mood and Nature
Biophilic Design Elements
Architectural Psychology / Biophilic Design Toolkit

- Views
- Light
  - Natural
  - Planned
- Water
- Plants
- Fabrics
- Wood
- Biomimicry

Photo: Mount Pleasant Community Centre
Nature Views
Healthcare Results: Views


Natural Light
Healthcare Results: Light

1. Better cardiac intensive care results - less time in hospital and lower mortality (Beauchemin and Hays, 1998)
4. Relieve of symptoms of depression (Benedetti, Colombo, Barbini, Campori, and Smeraldi, 2001)
6. Caretaker satisfaction and lower stress (Alimoglu and Donmez, 2005)
Water
Natural Sounds
Indoor Plants
Healthcare Results: Plants

- Lower intake of postoperative analgesics (Park and Mattson, 2008)
- Lower heart rate (Park and Mattson, 2008)
- Lower anxiety (Park and Mattson, 2008)
- Better pulmonary patient results (Raanaas, Patil, and Hartig, 2010)
- Enhanced patient well-being in healthcare waiting rooms (Arnell and Devlin, 2002)
Wood
Healthcare Results: Wood

1. Lower cortisol levels (Ohta, Marutama, Tanabe, Hara, Nishino, Tsujino, Morita, Kobayashi, and Shido, 2008)

2. Increased perception of well-being (Weenig and Staats, 2010)

Other Wood and Health Results

1. Lower stress indications in autonomic nervous system
   - Lower stress indicated by higher heart rate variability (Kelz et al., 2011)
   - Lower stress indicated by lower skin conductance reactivity (Fell, 2010)

2. Lower blood pressure (Tsunetsugu et al. 2007. Sakurgawa, 2005)
Skin Conductance Level – stress indicator

![Graph showing skin conductance levels across baseline, test, and recovery epochs for wood and non-wood conditions.](image)
SCR per minute – Stress Responses

Baseline

Recovery

Test

Error Bars: 95% CI
Skin Conductance Level (Stress)

Trending lower but not statistically significant
Understanding – Color in Wood

Mean = 67.3
Range = 26.7
Low = 57.0
High = 83.7

Mean = 11.6
Range = 16.4
Low = 2.9
High = 19.3
Applying wood in public buildings
3 Durability strategies

1. Durability by nature
2. Durability by treatment
3. Durability by design
Durability by nature
Durability by treatment
Durability by design

Use wood wisely depending on traffic

Photo: UBC Computer Engineering
Durability by Design

Cleanability
Durability by Design

• Design for the occupants

Faculty of Forestry, UBC.
Durability by Design

Design for Longevity

• Create and emotional connection
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Questions?

This concludes The American Institute of Architects Continuing Education Systems Course

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