Effects of Moisture Content and Endodontic Treatment on Some Mechanical Properties of Human Dentin

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**Aim**
- To determine whether significant differences exist between the mechanical properties of human dentin from treated pulpless teeth and dentin from normal vital teeth.

**Materials & Methods**
- 2 groups of freshly extracted permanent teeth were collected.
  - **Group 1:** Teeth with minimal caries that were vital at the time of extraction (54 teeth)
  - **Group 2:** Teeth that had been RCT at least 1 yr. before extraction (24 teeth)
- Dentin was cut out of teeth to form cylindrical specimens.
- The mechanical properties of those specimens were measured using:
  - a- Compression test
  - b- Indirect tensile test
  - c- Impact tests
- Specimens for compression and indirect tensile tests were divided into subgroups and received different treatments:
  - a- Remained wet
  - b- Air dried at room temperature for 3 days
  - c- Desiccated over CaSO4 for 2 days at room temperature
  - d- Rehydrated previously air-dried specimens in the storage solution for approximately 2 hrs.
- Specimens for impact tests were studied only wet and desiccated.

**Results**
- No significant difference in the compressive and tensile strengths of dentin between treated pulpless teeth and normal dentin in the average values.
- The mean values of Young's modulus and proportional limit in compression tests appear to be lower in pulpless teeth.
- 50% of the dentin specimens from treated pulpless teeth exhibit greater plastic deformation than normal dentin in compression.
- Dehydration increases the stiffness and decreases the flexibility of dentin. This applies both to normal vital tooth samples and to treated pulpless tooth samples.

**Conclusion**
- Results of this study do not support the theory that dehydration after RCT weakens dentin structure in terms of compressive and tensile strengths.
- Other mechanical properties of treated pulpless teeth may not be the same as those of normal vital teeth.

**Authors**
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