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Mechanical Properties of Laser welded Co-Cr removable partial denture alloy

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In recent years, the use of laser welding in dentistry is increasing. This study was performed to evaluate the mechanical properties of laser welded cobalt-chromium removable partial denture alloy. This investgation compared the tensile strengths, 0.2% yield strengths, and % elongation of laser-welded joints and as-cast metal for a cobalt-chromium removable partial denture alloy.

Twenty cobalt-chromium standard tensile testing rod were prepared and divided into two group of ten. All speciman in the control group were left in the as-cast condition. The test specimans were sectioned at the center of rod and joined by using laser welding. After joining, then tested to tensile failure on an Instron universal testing machine. Tensile strengths, 0.2% yield strengths, and % elongation were recorded.

The results were as follows:

1. There was a stastiscally significant difference in tensile strength between laser welded and as-cast speciman. ($p<0.05$)
2. The tensile strength of laser-welded joints was 75% of tensile strength of as-cast specimans.
3. laser-welded joints exhibited lower % elongation than as-cast speciman.
4. failure of laser-welded joints occurred in welded zone and void was found at fractured surface.