EFFECT OF AIR ABRASION ON MARGINAL ACCURACY OF TITANIUM CROWNS AFTER CASTING

By

Dr. BHUPENDER YADAV

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Dr. ROSELINE MESHRAMKAR
Professor

DEPARTMENT OF PROSTHODONTICS
S.D.M. COLLEGE OF DENTAL SCIENCES & HOSPITAL,
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ABSTRACT

Background and objectives: A study was carried out to evaluate and compare the effect of air abrasion on marginal accuracy of titanium crowns after casting. The purpose of the study was to evaluate and compare the marginal discrepancy of cast titanium structure having different marginal configurations, caused due to sand blasting with two different particle sizes of Aluminum oxide and after removal of alpha case layer by abrading with metal trimmer.

Methodology: A total of 90 hard/rigid casting wax patterns for the test specimens plates (2omm length: 8mm in width: 1mm thick) were prepared using an index made in rubber base putty material. There were 3 groups of 30 specimens each of shoulder, chamfer and knife edge marginal configurations respectively. Reference horizontal marking on wax pattern were made just below sprue attachment. After investing and casting specimens in titanium, control group having 30 specimens (i.e 10 of each marginal configuration) will be immersed in acid solution to remove the investment material. Out of 60 remaining specimens 30 will be air abraded using 120 μm particle size of aluminum oxide particle and remaining 30 specimens by 250 μm particle size respectively. The length from the reference line and tip of the cast specimens before and after sand blasting was measured with the help of travelling microscope. This raw data was used for calculating the marginal discrepancy. Same specimens were subjected to trimming for removal of alpha case layer for a standardized time, speed and pressure. Again from the reference marking upto the tip of the margin will be measured and resultant marginal discrepancy will be recorded.

The basic data of marginal discrepancy due to sand blasting and alpha case removal for each marginal configuration were evaluated and compared with data for the control group using student't' test and ANOVA.

Results: Statistical comparison of the mean and the standard deviation of the marginal loss due to air abrasion, in *Group* IA (56 $\pm$ 38.1000), Group IB (81.3333$\pm$ 48.1902), Group II (2.6667$\pm$ 4.4978) was carried out by one way ANOVA test. The results showed significant difference in the marginal loss of the three test groups with F-value (38.3232) and p-value (0.0000) at 5% level of significance.

Interpretation and conclusion: The smaller the margin angle, the greater was the loss of alloy after air abrasion (feather edge > chamfer > shoulder). Particle size of the abrasive also influenced the vertical marginal loss, as the particle size increased from 120 to 250 μm, marginal loss also increased. Finishing of casting margins after sandblasting also induced vertical marginal loss.

Key words: CP Grade II Titanium; air abrasion; Aluminum oxide.