SDM
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"AN INVITRO STUDY TO EVALUATE THE MARGINAL FIT AND BACTERIAL LEAKAGE OF COMPLETE CAST CROWNS OBTAINED BY LASER SINTERING AND CONVENTIONAL CASTING TECHNIQUE."

By

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ABSTRACT

Introduction:

The prime goal of prosthodontic treatment is to provide the patient with precisely fitting restoration or prosthesis. . Inadequate marginal fit is an essential shortcoming that can cause the washing out of a luting agent resulting in bacterial penetration between the restoration and dentin. Hence it increases the risk of recurrent caries and pulp inflammation.

Conventionally casted metal crowns which are long known for their excellent mechanical properties and cost effectiveness make them the preferred choice for growing range of applications. Despite of all these advantages, the base metal crowns are difficult to cast and consists of certain inaccuracies because of the casting procedures. The potential distortions inherited in casting of metal crowns could be overcome through the use of direct metal laser sintering technology.

Laser sintered structures are built up in layers by means of a high energy focused laser beam that fuses metal alloy powder following a sliced 3D computer aided design (CAD) file obtained from the abutment digitization. As very few studies focus on the use of laser sintering in the field of dentistry, further research is required.

Objective:

To evaluate and compare the marginal fit and bacterioleakage of complete cast crown by conventional casting technique and DMLS technique.

Methodology:

A custom made stainless steel die assembly was used to fabricate standardized wax patterns. Group 1 consisted of sample size of 15, wherein the crowns were fabricated using conventional casting technique. Group 2 also consisted of sample size of 15, wherein the crowns were fabricated using laser sintering technique .They were checked for marginal fit with the help of stereomicroscope. Bacterial leakage was tested by placing the samples in plastic tubes containing culture broth in such a way that the margins of the crowns will be submerged in the broth of the tube. Samples from the chambers will be incubated to check bacterial viability.

Results:

Student T test was performed to check for marginal gap between conventionally casted metal crowns and direct metal laser sintered crowns. According to this study, the mean marginal gap of 50.73, 50.61, 45.12, 49.65 μm in lingual, buccal, distal and mesial side respectively was found for conventionally casted metal crowns. Whereas in DMLS group, the mean marginal gap in lingual, buccal, distal and mesial side was 38.41, 38.99, 40.31, 38.22 μm .

Bacterial leakage experiment proved that marginal gap was present in both crowns fabricated by conventionally casted technique and DMLS technique.