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Influence Of Preparation Parameters And Cement Space Width On The Marginal And Internal Fit of A Machinable All Ceramic Crown System

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By

Sarah Ahmed El-Hussieny Ali

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Cairo University,

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SUPERVISORS

Dr. Eman M. Anwar

Professor of Fixed Prosthodontics

Faculty of Oral and Dental Medicine

Cairo University

Dr. Rasha Nabil Sami

Lecturer of Fixed Prosthodontics

Faculty of Oral and Dental Medicine

Cairo University

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INTRODUCTION

All ceramic restorations have replaced other fixed prosthodontic restorations because of their superior esthetics and biocompatibility, which made them first choice for the patient and also for the dentist.

Ceramic is basically a brittle material, so its wide use has been limited at a time, as they were always prone to fracture.

Recently, the continuous researching and development of ceramic materials and fabrication techniques has allowed for the introduction of several all ceramic systems, which can be used in the posterior as well as the anterior regions.

Successful all ceramic restorations must satisfy clinical requirements of strength, precision of fit and esthetics.

Excellent adaptation is essential for successful all ceramic restorations in terms of longevity as increased marginal discrepancy of all ceramic crowns may favor the increases rate of cement dissolution and micro leakage affecting the longevity of the restoration. Moreover, the preparation parameters and cement space are important factors affecting the marginal and internal fit of the restoration predicting the success and performance of the restoration.

Machined milling (Cerec In lab) ceramics are among the well known techniques used to produce esthetic ceramic restorations. The Cerec CAD/CAM system was designed to produce ceramic restoration at chair side. The principle advantage of this system is its ability to provide long

lasting, tooth colored restorations in one appointment without need to provisional restorations.

It would be worthy to investigate throughout this study the effect of preparation parameters and cement space on the marginal and internal fit of all ceramic crown system.

REVIEW OF LITERATURE

Esthetics is a matter of individual interpretation and preference, that extend to individual perceptions of autos, clothes and facial beauty[(1)]. In 1969 a study[(2)] indicated that most dentists interpret esthetic attitudes based on their own esthetic concepts rather than those of the patient and this seems untrue and the opposite should occur. **Rosenthal et al.,** in (1964)[(3)] discovered that the greatest degree of satisfaction occurred when the dentist considered the patient's feelings as the most important guide in denture esthetics. A survey of patient's attitudes toward current esthetic procedure, causes of selecting dental procedures and patient's satisfaction with the appearance of the smile was conducted by **Goldestein., and Lancaster.,** in (1984)[(4)] and they found that patient dissatisfaction would be a simulating factor for the need for esthetic dentistry.

Different factors were reported by **Tjan and Miller** in (1984) [(5)] that affect the esthetic behaviour of restoration such as the outline form, translucency and color of the restoration and they concluded that a defective smile might be considered as a physical handicap. Nowadays, esthetic restorations became a need and no other option is accepted by the patient and the dentist and this is achieved by the great evolution in both the dental materials, the techniques and the machines.

History of Esthetic Restorations Development:

The development of metal ceramic restorations and high strength dental ceramics dominated the later part of the 20th century, first

Weinstein et al., in (1962)[6] introduced vaccum fired porcelains where bonding of porcelain to gold alloys by aluminous porcelain that were finally veneered with conventional feldspathic porcelain to reproduce contour and shade of natural tooth.

In 1970s the collarless metal ceramic crowns was introduced by **Sozi**[7] **and Toogood**[8] that was known as commercial shoulder porcelains.

Finally **Mclean and Seed**[9] developed the first commercially viable foil-reinforced crown system (Foil- reinforced porcelain crowns).

In the quest for the ultimate esthetic restorative material new materials and techniques continued to develope till the all ceramic systems were developed . The reason for the increase in use of these systems is the ease with which a ceramist can mimic the optical properties of natural teeth, the biocompatibility of the used dental alloys and the perception that improved the esthetics obtained by removing the dark and opaque metallic substructure. An ideal all-ceramic restoration should be able to be used in a multiple of clinical situations, withstand the mechanical and chemical attacks perpetuated on it in the oral environment for an extended period of time and not be limited to the incisor region[10].

The currently available all ceramic systems are either in the form of powder to be mixed with water and then built up in layers on a die such as conventional powder slurry ceramics and Infiltrated ceramics , or the other technique based on lost wax technique leaving mold into which the ingots were pressed as the pressable ceramics and castable