

**ACCURACY OF CASTING:
SINGLE CAST THREE-UNIT FIXED
PARTIAL DENTURE *VERSUS*
SINGLE CROWN**

THESIS

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ABSTRACT

Several independent studies have shown that the casting procedure introduced by Taggart (1907) was not able to produce a single cast restoration that will fit its recipient site without seating discrepancies. Consequently, the longevity of the restoration in the mouth is questionable. Casting discrepancy is a consequence of several factors that are incorporated in the casting procedure.

The replacement of the missing tooth with fixed partial denture had passed through different stages; it started by casting the retainers individually and joining it later to the pontic. In 1959 Fusayama, advocated to cast a three-unit fixed partial denture as a one-piece.

Casting the three-unit fixed partial denture as one-piece still is not free of discrepancies, however whether these discrepancies are greater or lesser than those in a single crown, is not yet investigated.

The purpose of this *in vitro* study was to compare the casting accuracy of the single crown castings and the single cast three-unit fixed partial denture.

A modified stainless steel metal mold was utilized to produce a standardized 21 castings divided into three equal groups.

The casting accuracy have been investigated from two aspects and comparisons between the different experimental groups were attempted. The vertical marginal discrepancies at different sites of the casts were measured with the help of a traveling microscope. In addition, the internal fit discrepancies of each castings at specific sites were measured. Three, two and one way analysis of variance were used to find the effect of the marginal discrepancy and the internal fit discrepancy for the measurement sites, the retainer and the post casting sectioning.

The results suggest the following conclusions: (1) the single crown casting has less vertical marginal and internal fit discrepancies than the single cast three-unit fixed partial denture ($P < .0001$), (2) the fit of a one-piece cast three-unit fixed partial denture improved nearly 50% after sectioning which indicate that the fixed partial denture castings were distorted, (3) the greater the vertical marginal discrepancies of three-unit fixed partial denture castings were found to be in the mesial of the anterior abutment and the distal of the posterior abutment as a result of warpage across the span, (4) when sectioned from the fixed partial denture, the retainers of the single-cast three-unit fixed partial denture fit their dies in a manner almost similar to that of the single cast crown.