بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

﴿ قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ﴾

صدق اللَّهُ العظيم

سورة البقرة، آية 32

Validity of Using Newly Introduced Thermoplastic Material in Fabrication of a Telescopic Denture: (Finite Element Stress Analysis)

A Thesis Submitted to Faculty of Oral and Dental Medicine,
Cairo University , In Partial Fulfillment of the Requirement of Master Degree
in Dental Material Science

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DEDICATION

To my Husband,

To my family,

To my friend **s.**

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List of Abbreviations

AR	Acrylic resin
^{0}C	Centigrade
cm	Centimeter
Co	Cobalt
Cr	Chromium
FEA	Finite element analysis
FEM	Finite element method
g	Gram
h	Hour
min	Minute
mm	Millimeter
mm/min	Millimeter/minute
MPa	Mega Pascal
N	Newton
PMMA	Poly methyl matehacrylate
RPDs	Removable partial dentures
RCDs	Removable complete dentures
s	Second
y	Year
2-D	Tow-Dimensional
3-D	Three-Dimensional

I. Introduction

Polymethyl methacrylate (PMMA) was introduced in 1937. Since then, it became the most popular polymer material used in dentistry. The low cost, good aesthetics, ease of fabrication, manipulation and polishing has made PMMA a preferred denture base material[(52)].

With increasing dental awareness and elderly population, it is reasonable to expect that more and more patients will require various dental prosthetic treatment options. Classic removable dentures are still an important treatment option for completely or partially edentulous patients. However, telescopic dentures with the aid of its retentive capacity provide a more acceptable prosthetic treatment. Conventionally, telescopic dentures are made of acrylic resin and metal framework to ensure good aesthetics and mechanical properties [(7)].

An optimum restoration is dependent on the clinicians' skills in the selection of material type and restoration design for each clinical situation. The fabrication of prosthesis for completely or partially edentulous arches encounters special challenges when soft tissue and bony undercuts interfere with various paths of placement. Tilted teeth and deranged occlusion are also present further complicating factors for treatment planning

Recent advancements in material science motivated by the increased patient's esthetic demands and anxiety due to metallic allergies and metallic bad esthetics lead to the development of metal-free prosthesis. Flexible denture base materials have been developed in1950 and underwent several improvements to meet such demands [(5)]. However, scarce information is available on the stress distribution encountered when these flexible materials

are used in combination with conventional acrylic resin complete over dentures.