

## **CHAPTER 1**

### **INTRODUCTION AND OBJECTIVES OF STUDY**

## 1.1 INTRODUCTION

The most commonly used denture base resin is heat-polymerized polymethyl methacrylate (PMMA). Visible light-polymerized denture base polymers were later introduced in the 1980s, and it was promoted on the basis that the material does not contain methyl methacrylate monomer. **Triad** is the first system of visible light-polymerized urethane dimethacrylate (UDMA) denture base polymer (Dentsply Int. York, USA) and was advocated based on its biocompatibility, low bacterial adherence, ease of fabrication and manipulation, patient acceptance and ability to bond to other denture base resins (Ogle et al., 1986). The latest addition to light-activated UDMA denture base polymer is known as **Eclipse Prosthetic Resin System** (Dentsply Int. York, USA). Studies had shown that Eclipse resin exhibited significantly better mechanical properties compared to PMMA denture base polymers (Sun et al., 2003, Ali et al., 2008).

Regardless of the materials used for denture construction, the denture needs to be regularly modified as the alveolar ridge progressively resorbed and the denture becomes less fit. There are two main treatment options to manage the problem of denture becoming less fit due to the resorption: either to construct a new denture, or to restore the fit of the existing denture by relining.

Reline is defined as the procedure used to resurface the tissue side of a denture; it produces an accurate foundation of the denture bearing area (The Glossary of Prosthodontic Terms, 2005). This eliminates making a new denture and some clinicians believe that this is more time saving and economical. Many hard auto-polymerizing reline resins had been investigated for their properties (Arima et al., 1995, 1996a; Wyatt et al., 1986, Murphy et al., 1986), and one common cause of concern with relining material is failure in adhesion to the denture base resin. A weak bond could cause

delamination of the materials, reduce the mechanical strength of the relined denture, harbour bacteria and promote staining (Arena et al., 1993, Smith & Power 1991).

The ability of PMMA denture base resin to bond to various reline resins had been investigated (Takahashi and Chai, 2001a,b, Leles et al., 2001, Cucci et al., 1998, Arena et al., 1993). However, little is known regarding the bond strength of Eclipse denture material to the available reline materials. It is clinically important to know which reline can reliably bond to the material to reduce clinical failure. Therefore, it is the purpose of this in-vitro study to evaluate the shear bond strengths of UDMA (Eclipse) and PMMA (Meliodent) denture base polymers to different reline materials.

## **1.2 OBJECTIVES OF THE STUDY**

1. To evaluate the shear bond strengths of a light-polymerized UDMA and a heat-polymerized PMMA denture base polymer when they were relined with hard chairside and laboratory-processed reline materials.
2. To determine the type of bonding failure that occurred between the denture base and reline material.