CHAPTER 1

INTRODUCTION

1.1. Rationale

Pediatric dental practice requires a restorative material that can be easily placed with a reliable adhesion to tooth structures. A dislodged filling is an inconvenience to both patient and dentist. Nowadays composite has become popular restorative materials for primary teeth. Not only because the materials of choice, but also the growing demand from parents in providing esthetic restorations to their children.

Although no report, dislodgement of composite from the cavity preparation, particularly in primary teeth, is often seen. Technique sensitive is always claimed to be a cause of the failure. It is frequently involved the moisture on prepared dentin surface which possibly come from the fluid in dentinal tubules. A continuous outward flow of fluid in dentinal tubules is normally found from exposed dentin (Matthews and Vongsavan, 1994). The fluid flow rate depends on tissue fluid pressure of the pulp which depend on the state of pulpal microvasculature (Johnson *et al.*, 1973; Matthews and Vongsavan, 1994). The outward flow in the tubules can lead to the reduction in the odontoblast layer by aspiration of the cells into the dentinal tubules under exposed dentin, caries, or leaky fillings (Johnson *et al.*, 1973). In

addition, some studies found the number of dentinal tubules per mm^2 increased with dentin depth from the dentinoenamel junction (DEJ) (Garberoglio and Brannstrom, 1976; Fosse *et al.*, 1992). Thus the closer to the pulp, the higher moisture contents. This may affect the efficiency of the restoration.

Studies on efficacy in bond strength of composite material to tooth surface, especially in permanent teeth, is prevalent, but less found in primary teeth. Moreover, those studies experimented in dry teeth that differ from the tooth in oral environment conditions which surrounding temperature and intrapulpal pressure in the tooth may play a part on the material efficacy.

The study reproduces oral environment on bond strength of adhesives in primary teeth has no report elsewhere. The purpose of this research is to investigate the effect of pulpal pressure on the bond strength of adhesives in primary incisors *in vitro*. We anticipate that this research will provide benefit information for dentist in selecting proper adhesive materials for restoration in primary teeth and for future research to develop effective materials for restoration under different pressure conditions.

1.2. Objective

To investigate the effect of pulpal pressure on adhesive bond strength in primary incisors *in vitro*.

1.3. Hypothesis

The adhesive bond strength on dentin surfaces at different intra-pulpal pressure differs from the atmospheric intrapulpal pressure.