CHAPTER I

INTRODUCTION

1.1 RATIONALE

Non-syndromic hypodontia and orofacial clefts are common craniofacial anomalies. Genetic factors had been implicated in hypodontia and orofacial clefts. Several different loci and genes (*IRF6*, *MSX1*, *PVRL1*, *TBX22*, *FGFR1*, *TP63*, *EDA*, *PAX9* and *PITX2*) have been found to be associated with these conditions (Jugessur and Murray, 2005; Kolenc-Fuse, 2004). *Msx1* is an especially strong candidate gene associated with the cleft palate, maxillary hypoplasia and a failure of tooth development in the knockout mouse (Satokata and Maas, 1994). Mutations in *MSX1* have been known to be the causes of tooth agenesis (OMIM 106600), orofacial cleft (OMIM 608874) and Witkop Tooth-Nail syndrome (OMIM 189500). Several association studies of the gene with cleft lip and cleft palate (CL/P) and cleft palate only (CPO) have supported the roles of *MSX1* in non-syndromic clefting in different populations (Lidral et al., 1998; Jugessur et al., 2003). Furthermore, a study of a Dutch family with tooth agenesis and various combinations of CL/P and CPO also showed a nonsense mutation in *MSX1* (van den Boogaard et al., 2000). There have been several studies about the association between orofacial clefts and *MSX1* mutations in Southeast-asian populations (Suzuki et al., 2004; Vieira et al., 2005; Tongkobpetch et al., 2006). Therefore, we hypothesize that syndromic and non-syndromic hypodontia and orofacial clefts in Thai population may be the results of *MSX1* mutations as well.

1.2 OBJECTIVES

1.2.1 To find *MSX1* mutations in patients with syndromic and non-syndromic hypodontia.

1.2.2 To find *MSX1* mutations in patients with syndromic and non-syndromic orofacial clefts.

1.3 HYPOTHESIS

H_0: *MSX1* mutations are not detected in Thai patients with non-syndromic hypodontia.

H_1: *MSX1* mutations are detected in Thai patients with non-syndromic hypodontia.

H_0: *MSX1* mutations are not detected in Thai patients with non-syndromic orofacial clefts.

H_1: *MSX1* mutations are detected in Thai patients with non-syndromic orofacial clefts.

H_0: *MSX1* mutations are not detected in Thai patients with syndromic orofacial clefts with hypodontia.

H_1: *MSX1* mutations are detected in Thai patients with syndromic orofacial clefts with hypodontia.