Chapter 1

Introduction

Hydroxyapatite (HAp) has attracted much attention as a substitute material for damaged teeth and bone over the past decades. This is due to its structural similarity to main inorganic substitutents incorporating various calcified tissues of vertebrates. In fact, it has been proved as a bioactive implant material to be biocompatible with surrounding tissues. Furthermore, it has been used as a bone substitute material in the preperation of artificial bone and teeth. Although hydroxyapatite has been considered as a promising ceramic material, its properties must still been modified to some extent prior to use. It has been reported that several syntheses of hydroxyapatite by various methods are developed in order to increase its mechanical properties in compliance with particular applications in the area of orthopaedics.

It has been shown that hydroxyapatite prosesses good biocompatibility with bone tissue as well as dental implant (Jarcho et al.,1976). However the application of hydroxyapatite produced by chemical processes is limited owing to its high cost of production. Meanwhile the preperation of hydroxyapatite from animal bone has also been successful (Lorprayoon, 1989). By this method, defatted cattle bone is proceeded through calcination to remove all organic matters and then is dissolved in aqueous nitric solution. Subsequently hydroxyapatite is obtained as white precipitate from the solution by treatment with ammonium hydroxide solution at pH 10.5. Apparently, the cost of

hydroxyapatite obtained from the above simple method is much cheaper compared to other chemical methods.

For the purpose of extensive applications to both medical and dental laboratories the mechanical properties of hydroxyapatite are expected to be increasing when it is treated through ceramic processing. However its characteristics such as porosity, specific surface area and morphology would have been affected. Consequently, many investigations relating to the modification of mechanical properties of hydroxyapatite have currently been carried out elsewhere.

Objective and Scope

The aim of this work is to study the mechanical strengthening of hydroxyapatite prepared from cattle bone ash. This is done with two different hydroxyapatites; one that is easily sintered and another that is poorly sintered, is made. The mechanical strength of the former as body coated with a combination of these hydroxyapatite having lower thermal expansion coefficient by air spray method is determined.

The scope of this work involving the powder preperation and forming of hydroxyapatite as well as coating and sintering is outlined in the flow chart as shown in Fig. 1.1.

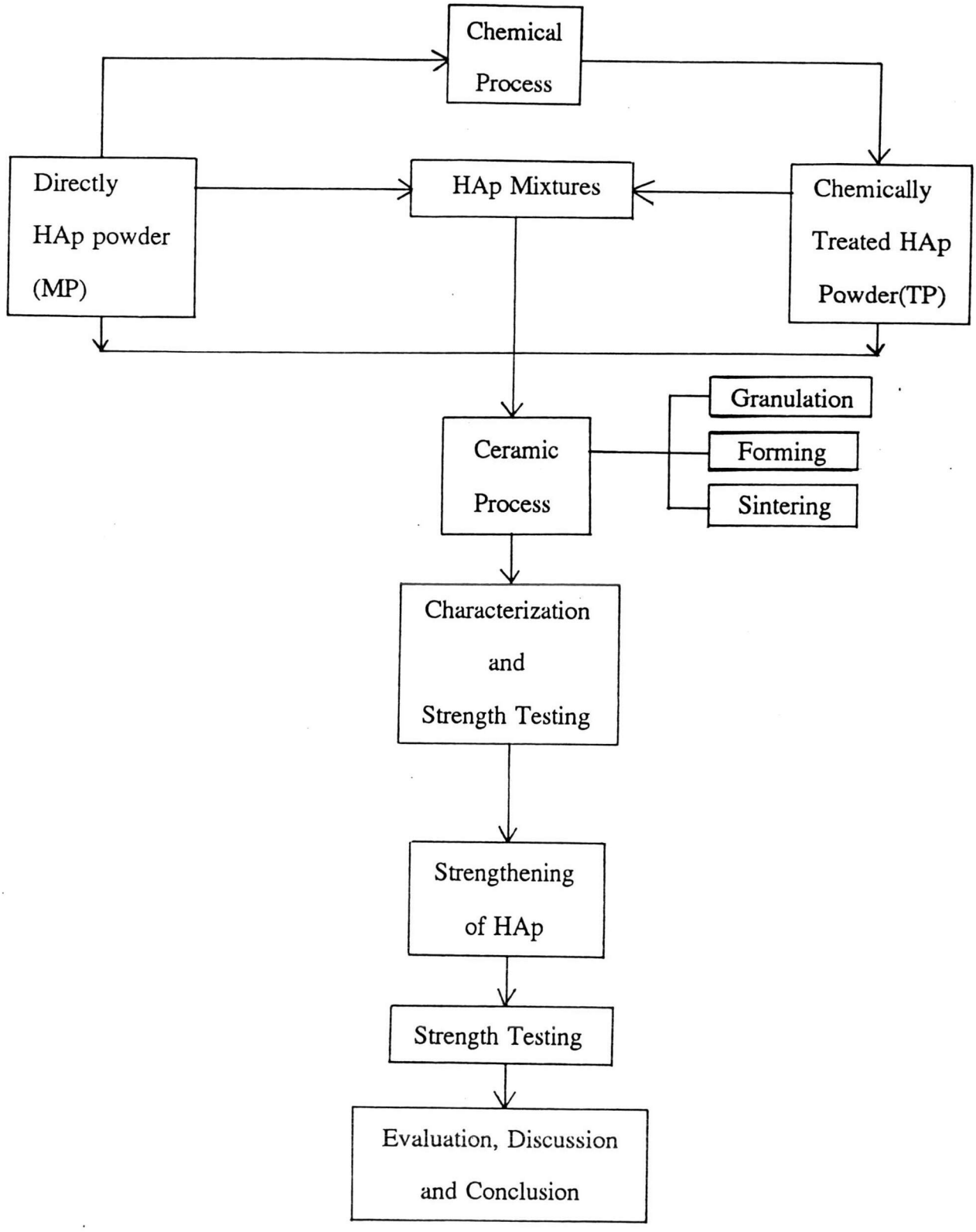

Figure 1.1 Flow chart of the research work.