

CHAPTER I

INTRODUCTION

1.1 Background

Successful orthodontic therapy depends on not only human skills and knowledge of treatment steps but also on used biomaterials. One of the major components of orthodontic therapy is archwires. Archwires are defined as devices comprising a wire conforming to the alveolar or dental arch, which is used as an anchorage for correcting irregularities in the position of teeth [1].

Archwires have been a mainstay in orthodontic treatment since its infancy. Archwires materials are utilized with an assortment of fixed as well as removable appliances to correct malocclusions. Archwires engaged into brackets bonded onto individual teeth effectively transmit forces to the dentition, ultimately resulting in tooth movement [2].

Archwire should move the teeth with light and continuous forces, which increase patient comfort and optimize the treatment process. The material used for the archwire should have good elasticity and strength. Several alloys meet these criteria and have been used as orthodontic archwires, such as stainless steel, cobalt–chromium alloy, titanium–nickel alloy, titanium-molybdenum, and titanium-niobium [3]. Among the alloy, stainless steel is most widely used material and available in Indonesia's market.

In this study, stainless steel archwire will go through a heat treatment process to improve its mechanical properties. So that, the archwire could receive a greater force to move the teeth, and also have a greater wire activation capability with longer activation time span.

1.2 Problem statement

How the heating influence the stainless steel (SS) to get its tensile strength and microstructure.

1.3 Aim

Aims of this study are to identify influence heat treatment process on stainless steel (SS) alloy and optimizing process parameters that resulted in a well wire tensile strength.

1.4 Benefit

The expected benefit from this final project is to have a better tensile strength properties of wire.

1.5 Scope of problem

As for the scope of problem of this study:

- A. Using stainless steel (SS) as the material
- B. Using UTM mini to get the tensile strength of stainless steel (SS)
- C. Using heat treatment

1.6 Writing system

This final project writing referring to writing system as follows:

CHAPTER I : Introduction that examine about background, problem statement, purpose, benefit, scope of problem, and writing system.

CHAPTER II: Literature review which contain, wire, heat treatment, tensile test, and observe with SEM.

CHAPTER III: Methodology which contain about test method and observing the material.

CHAPTER IV: Data and discussion which contain about result along with analysis

CHAPTER V: Conclusion which contain about conclusions obtained during the completion of this final project, as well as suggestions for further research.