CHAPTER I

INTRODUCTION

1.1 Research Background

Temperomandibular Joint (TMJ) is a joint that connects lower jaw (mandible) to the bone at the side of the head (temporal bone). The joints are flexible and can move smoothly rotation and sliding by the eminence, enabling us to talk, chew, and yawn. However, the important functions of it are mastication and speech (Murphy, 2011).

Nevertheless, Temperomandibular Disorders (TMD) is also known as jaw joint problem and it is closely related to wearing and tearing. It can be categorized into three main categories, muscle disorders, derangement disorders and degenerative disorders. However, it may be cause by injuries, wear due to aging, and behavioural factors (Murphy, 2011).

Other than that, the slope of the regression line was used to describe muscle fatigability. Nevertheless, a research shows that there were no changes in fatigability between the right and left trapezius of the TMJ or between the left trapezius of the health and TMD groups. The linear regression for median frequencies in the right trapezius of the TMD group showed a slope of -0.15 to plus minus 0.33, which was smaller than the slope of the healthy group with -044 tol plus minus 0.46. These results suggested that the fatigability of the right trapezius was lower in the TMD group than in the healthy group and it is not
significant to differentiate the condylar head asymmetry in TMD (Ritzel et al., 2007).

The relationship or correlation between TMD and the head of condyle has stated that the anatomy of the articular eminence may predispose to disk displacement, and the disk displacement may lead to changes in its shape. This is due to the reduction or flattening in the posterior slope of the articular eminence. The joint with disk displacement without reduction (DDWOR) showed that it was less prominent than in those with disk displacement with reduction (DDWR). DDWOR result in progressive internal derangement (ID) of TMJ (Kurita et al., 2000). However, the condyle has a special multidirectional capacity for the growth and adaptive remodelling of temporomandibular joint (TMJ). Being part of TMJ structure, it plays an important role in the stability of long-term treatment results for orthodontic and orthognatic patients (Krisjane et al., 2007).

CBCT currently is widely used by most of the dental practitioners. Nevertheless, it is at the same time has been limited used due to cost, availability and radiation dose consideration. It also provides a multi-planar imaging towards the dental practitioners and allows the creation in “real-time” on the axial plane, 2D, and 3D images. This is from the coronal, sagittal and oblique view of the images plane (Scarfe & Farman, 2008).

Based on the gathered information, it has attracts the author’s interest to do a research on the height of head of condyle. Basically on patient that suffers TMD on cone beam CT (CBCT) scanning in Rumah Sakit Gigi dan Mulut, UNPAD.
1.2 **Problem Identification**

Based on the background that has been explained above, it can be stated that: How is the image on the height of the condyle head on a TMD patient using CBCT in Rumah Sakit Gigi dan Mulut, UNPAD.

1.3 **Aim and Objective**

The aim of this research is to collect data on the image of height of the head of condyle on TMD suspected patient by using CBCT in Rumah Sakit Gigi dan Mulut, UNPAD.

The objective of this research is to know how to measure the differences between the heights of the head of condyle on a TMD suspected patient by using CBCT in Rumah Sakit Gigi dan Mulut, UNPAD based on CBCT.

1.4 **Benefit**

The theoretical benefit of this research is to add up some of the information that can be used in future references for the dentists or general practitioners in Rumah Sakit Gigi dan Mulut dan Fakultas Kedokteran Gigi Universitas Padjadjaran on the height of the head of condyle on a TMD patient.

The practical benefit from this research is that the dentist or general practitioners could identify the height of the condyle head in a TMD patient where
it could be utterly helpful for the dentists to provide such service for attending cases that are related to the subject above.

1.5 Conceptual Framework

The condyle has few special directional scopes for the growth and adaptive remodelling in encountering the displacement of mandibular and its rotations. The entire ramus will move or change due to the adaptation of the condylar capacity (Krisjane et al., 2007).

During the growth and in response to orthodontic treatment the mandibular rami and condyle develop in many directions relative to all possible individual variations. The evidence is that rami and condyles might play an adaptive role in the skeletal growth and response to treatment comes from the findings of implant studies (Krisjane et al., 2007). Change in occlusion (orthodontics, orthognatic surgery) could contribute to remodelling of the articular structures of the TMJ and could be a reason for condylar resorption and changes in the mandibular structure (Barghan et al., 2012).

However, the following measurements were done: height of condyle – linear distance between the top of condyle and cross sectional line that goes from the most prominent point of condyle and is perpendicular to the tangent of ramus mandibulae. The study has approved by Rigas Stradin University Ethical committee (Krisjane et al., 2007). In one study on the height of the head of condyle, it is found that with a new generation of dentofacial imaging system based on cone-beam CT (CBCT) scanning, the mean height of condyle between
right side and left side have been calculated with its result, 3.7mm and 3.6mm respectively. Statistically shows that the difference is not significant (Tsiklakis et al., 2004).

The study concluded that they assume more adaptive remodelling has been made in the structures of processus condylaris. It is indicated that condyle functions, as a regional field of growth provide an adaption for its own localized growth circumstances, just like all the other regional fields accommodate their own particular localized growth circumstances. Although correlated of condyle there are two regional growth sites that are essentially separate and develop under different regional conditions and control (Krisjane et al., 2007).

The changes in macroscopically can be determined by our owned naked eye. For instance, to check the erosions, deviation in form (flattening and osteophytes) by using a magnifying viewer with a built in light source and registration scale from 0 to 1 showing that there are no changes or any changes respectively (Kaleem et al. 2007). Measurements of the condylar head were done from the continuous distance between the top of the condyle and crossectional line that goes from the highest part of the condylar head and is upright to tangent of ramus mandibular (Krisjane et al., 2007).

The height of the head of condyle plays an important role in adaptive remodelling. Without knowing the differences of the height of it, one cannot know whether it is a normal height or a height of a TMD. Therefore, from here, it can relate to the TMD’s height of the head of condyle where this will show the differences between one another, because TMDs normally show a variety of
condylar asymmetry of the height of the condylar head. That is why in making research on the height of the head of condyle on TMD suspected patient has been chosen to compare the differences between themselves and to see the differences toward the normal ones (Dos et al., 2011).

However, Cone Beam CT (CBCT) scan is being used because it has many advantages in using it. First, CBCT has the ability to reduce the examination time. Other than that, it too increases the sharpness of the images that is caused by the translation of the patient, also reduces the distortion of the image that is caused by the internal patient movements, and CBCT increases the efficiency of the X-Ray tube (Scarfe & Farman, 2008).

Besides that, to every advantage, there will be the disadvantage. As for the disadvantage of the CBCT, it has a limitation in image quality towards larger field of view. This is due to the noise and contrast resolution because vast amounts of scattered radiation will be detected (Scarfe & Farman, 2008).

According to a research made by the Departemen Geriatri Rumah Sakit Umum Pusat Nasional Cipto Mangunkusumo, Jakarta, Indonesia it has been done on elderly with the range of age 60-91 years old. It stated that TMD get worse as you grow older. Male elderly suffers TMD more, and generally elderly that looses 13 teeth may have a higher risk of suffering TMD (Himawan et al., 2007).
1.6 Research Method

The method used for this research is simple descriptive research with purposive sampling method by using the archive data collected in Oral and Maxillofacial Radiology Department of RSGM UNPAD, Sekeloa, Bandung.

1.7 Location and Time of Research

The research is held in Rumah Sakit Gigi dan Mulut, UNPAD, Bandung from year 2011 to 2013. The research is specifically been held in Department of Oral and Maxillofacial Radiology in the Rumah Sakit Gigi dan Mulut, UNPAD.