

**Ministry of Higher Education  
& Scientific Research  
University of Baghdad  
College of Dentistry**



# **The usefulness of mandibular ramus as an indicator in sex differentiation using 3D Reconstructed Computed Tomography**

**A thesis**

**Submitted to the College of Dentistry Baghdad University in  
partial fulfillment of requirement for the degree of Master of  
Science in Oral and Maxillofacial Radiology**

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**IRAQ – BAGHDAD**

**2015 A.D.**

**1436 A.H.**

## **Abstract**

**Background:** Determination of sex from an unknown human bone is an important role in forensic and anthropology field. The mandible is the largest and hardest facial bone, that commonly resist postmortem damage and forms an important source of information about sexual dimorphism. Mandibular ramus can be used to differentiate between sexes and it also expresses strong univariate sexual dimorphism.

**Aim of study:** The purpose of this study is to assess the usefulness of mandibular ramus as an aid in sex differentiation using Computed Tomography scanning among Iraqi population.

**Material and Method:** Three Dimensional Reconstructed Computed Tomography scanning of 140 Iraqi Arab subjects, (70) males and (70) females with their age range from 20-60 years old were analyzed. Those patients attending Neuroscience Hospital in Baghdad city for CT scans for different diagnostic purposes from November 2014 to March 2015. By using axial and sagittal sections including right and left sides the following measurements were done: Maximum ramus breadth, minimum ramus breadth, condylar height or (maximum ramus height), projective height of ramus, coronoid height, bigonial breadth, bicondylar breadth, mandibular length and mandibular index. All measurements were made in millimeters unit.

**Results:** In the current study, the results were demonstrated on two categories of measurements, the first category was designed with the suggestion of presence of (hemi mandible) that is why the linear measurements were made for one side of the mandible (either right or left side) separately, this part in result is called "unilateral linear mandibular ramus measurements".

The second category was designed with suggestion of presence of (intact complete mandible); this part in result is called "bilateral linear mandibular ramus measurements". For the all measurements the mean value for male were highly significant than female with (P= value < 0.001). ROC curves were obtained for each

variable to observe their overall performance in sex determination. The area of maximum mandibular ramus height was found to be the best parameter according to ROC analysis to establish the diagnosis of male (ROC=0.952cm for both unilateral and bilateral measurements). Age showed no statistical difference in the current study.

**Conclusion:** 3D Reconstructed Computed Tomography scanning plays an important role as a diagnostic method for analyzing the linear measurements of the mandibular ramus in sex differentiation. Sex determination for isolated part of the skull (e.g. mandible) could be achieved, instead of complete skull, and the highest accuracy in sex determination can be obtained whether whole or part of mandible is available for examination.