

**Cephalometric Study for Iraqi Adult Subjects  
with CI I and CI III Skeletal Relationships and  
Their Effects on Masseter Muscle Thickness  
Using Ultrasonography**

*A thesis*

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## **Abstract**

**Background:** Masseter muscle is one of the most obvious muscles of mastication and considered as one indicator of jaw muscle activity. It has a major influence on the transverse growth of the midface and the vertical growth of the mandible. Craniofacial morphology is orchestrated by both skeletal structures and muscular tissue. The skeletal structures, cranial base, maxilla and mandible have been found to contribute largely to variations in craniofacial morphology.

**The aims of the study:** This study was undertaken to determine the role of cephalometric analysis for discrimination between Cl I and Cl III skeletal relationships, determine the role of ultrasonography in determination of masseter muscle thickness, compare masseter muscle thickness between Cl I and Cl III skeletal relationships, and determine the effect of gender on masseter muscle thickness.

**Material and method:** The sample in the current study consisted of 70 Iraqi subjects (40 males and 30 females) with age range (18-25 years). They were divided in to 2 groups according to the skeletal relationship as depending on ANB angle: class I skeletal relationship (20 males and 15 females) and class III skeletal relationship (20 males and 15 females). The collected sample include patients attended to the Dental Radiology Clinic at the College of Dentistry, University of Babylon for different diagnostic purposes and the ultrasonographic investigation was done in Ultrasonographic Department /Al Hilla General Teaching Hospital from November 2013 to February 2014. Standardized lateral cephalogram were taken to determine the facial morphology, six angular measurements and eight linear cephalometric measurements were assessed. The masseter muscle thickness was measured using ultrasonography in relaxed and contraction conditions for both right and left sides.

**Results:** The various parameters measured for males and females in each class and the comparison shown statistically significant differences between them ( $P < 0.05$ ). The mean differences of masseter muscle thickness on both sides were zero, showing the absence of any noticeable or statistically significant difference between right and left sides ( $P > 0.05$ ). Among males, masseter muscle thickness become thicker compared to females in each class ( $P < 0.05$ ). Subjects with skeletal class III had a significantly thicker masseter muscle thickness compared to those with class I relationship ( $P < 0.001$ ). Gender variation shows significant difference in masseter muscle thickness during rest and occlusion conditions ( $P < 0.001$ ).

**Conclusion:** Cephalometric analysis served to demonstrate the skeletal morphologies and provide a base for discrimination between class I and class III skeletal relationships. Ultrasonographic scanning is an important imaging procedure. It is reproducible and simple method for accurately measuring masseter muscle thickness. The ultrasonographic study has revealed variations in masseter muscle thickness among individuals with different skeletal morphologies in each gender on one hand and between males and females in each skeletal class on the other hand.