

**Mandibular Movements Analysis of Full
Mouth Rehabilitation Patients Using the
Improved Stereographic TMJ Fully
Adjustable Articulator System
(An in vivo study)**

**A Thesis Submitted to the Council of the College of Dentistry,
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ABSTRACT

In this research, attention has been paid to the movements of the human mandibular condyles within the temporomandibular joint; mandibular movement occurs in three dimensions and is extremely complex. Temporomandibular joints, anterior and posterior teeth, ligaments, muscles and the neuromuscular system govern the mandibular motions. It is necessary for the general practitioner to have a good knowledge of the interactions between occlusal and articulatory surfaces on one hand and the complex movements of the mandible on the other.

The structures of the stomatognathic system function as a unit. Moreover, understanding and treating this system which requires knowledge of the component parts and their relationships is thoroughly discussed.

The most documented advances which included the development of fully adjustable articulators and mandibular movement recording devices, including the pantograph and the stereograph are also explained and documented in details.

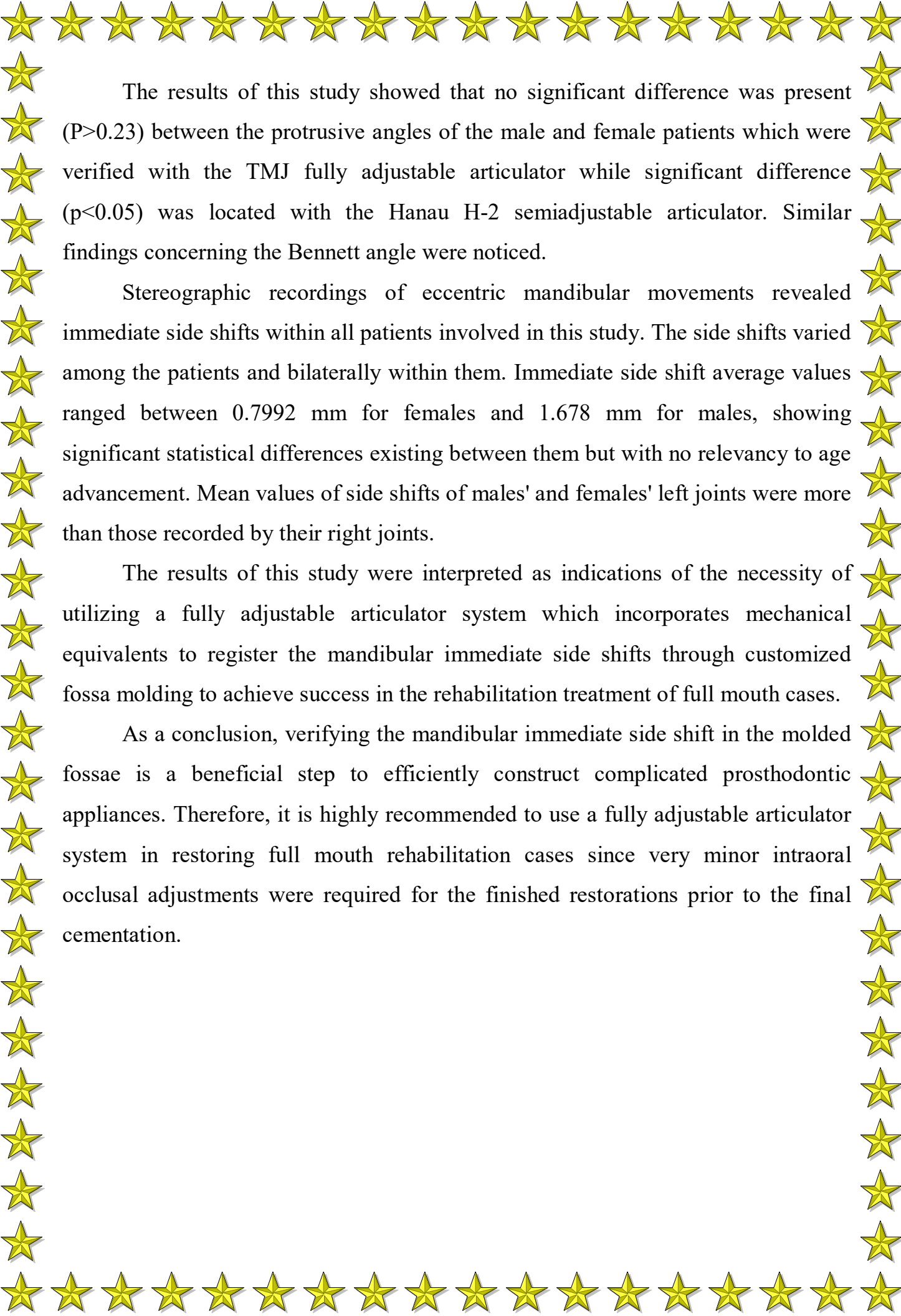
The clinical part of this study investigated the presence and amount of Bennett mandibular immediate side shift in Iraqi patients seeking full mouth rehabilitation treatment.

Three-dimensional condylar movements of fifty asymptomatic patients were recorded with a stereographic fully adjustable articulator system during protrusion, left and right eccentric mandibular movements.

Custom-made protractors were constructed to modify the TMJ fully adjustable articulator in order to verify the protrusive angles of each patient to figure out the suitable fossa analog for each case.

The hinge axis location, amount of protrusive angles and Bennett angles verified by the TMJ fully adjustable articulator system were compared to those verified by the Hanau H-2 semiadjustable articulator.

Using a kinematic hinge axis locator, it was revealed that 28% of the patients possessed terminal hinge axes located in an anterior-inferior position to their arbitrary hinge axes from the superior border of the tragus of the ear.



The results of this study showed that no significant difference was present ($P>0.23$) between the protrusive angles of the male and female patients which were verified with the TMJ fully adjustable articulator while significant difference ($p<0.05$) was located with the Hanau H-2 semiadjustable articulator. Similar findings concerning the Bennett angle were noticed.

Stereographic recordings of eccentric mandibular movements revealed immediate side shifts within all patients involved in this study. The side shifts varied among the patients and bilaterally within them. Immediate side shift average values ranged between 0.7992 mm for females and 1.678 mm for males, showing significant statistical differences existing between them but with no relevancy to age advancement. Mean values of side shifts of males' and females' left joints were more than those recorded by their right joints.

The results of this study were interpreted as indications of the necessity of utilizing a fully adjustable articulator system which incorporates mechanical equivalents to register the mandibular immediate side shifts through customized fossa molding to achieve success in the rehabilitation treatment of full mouth cases.

As a conclusion, verifying the mandibular immediate side shift in the molded fossae is a beneficial step to efficiently construct complicated prosthodontic appliances. Therefore, it is highly recommended to use a fully adjustable articulator system in restoring full mouth rehabilitation cases since very minor intraoral occlusal adjustments were required for the finished restorations prior to the final cementation.