Evaluation of Computer-guided Condylar Positioning Device in Bilateral Sagittal Split Ostetomies

Thesis

Submitted for Partial Fulfilment of the Requirements for the Doctor's Degree in Oral and Maxillofacial Surgery

By

Adel Hamdy Abou-ElFetouh

B.D.S., M.Sc.

Faculty of Oral and Dental Medicine,
Cairo University

2012

Supervisors

Dr. Maha Mohamed Hakam

B.Ch.D., M.Sc., Ph.D. (Cairo)

Professor of Oral and Maxillofacial Surgery, Faculty of Oral and Dental Medicine – Cairo University.

Dr. Ahmed Abd ElMonoem Barakat

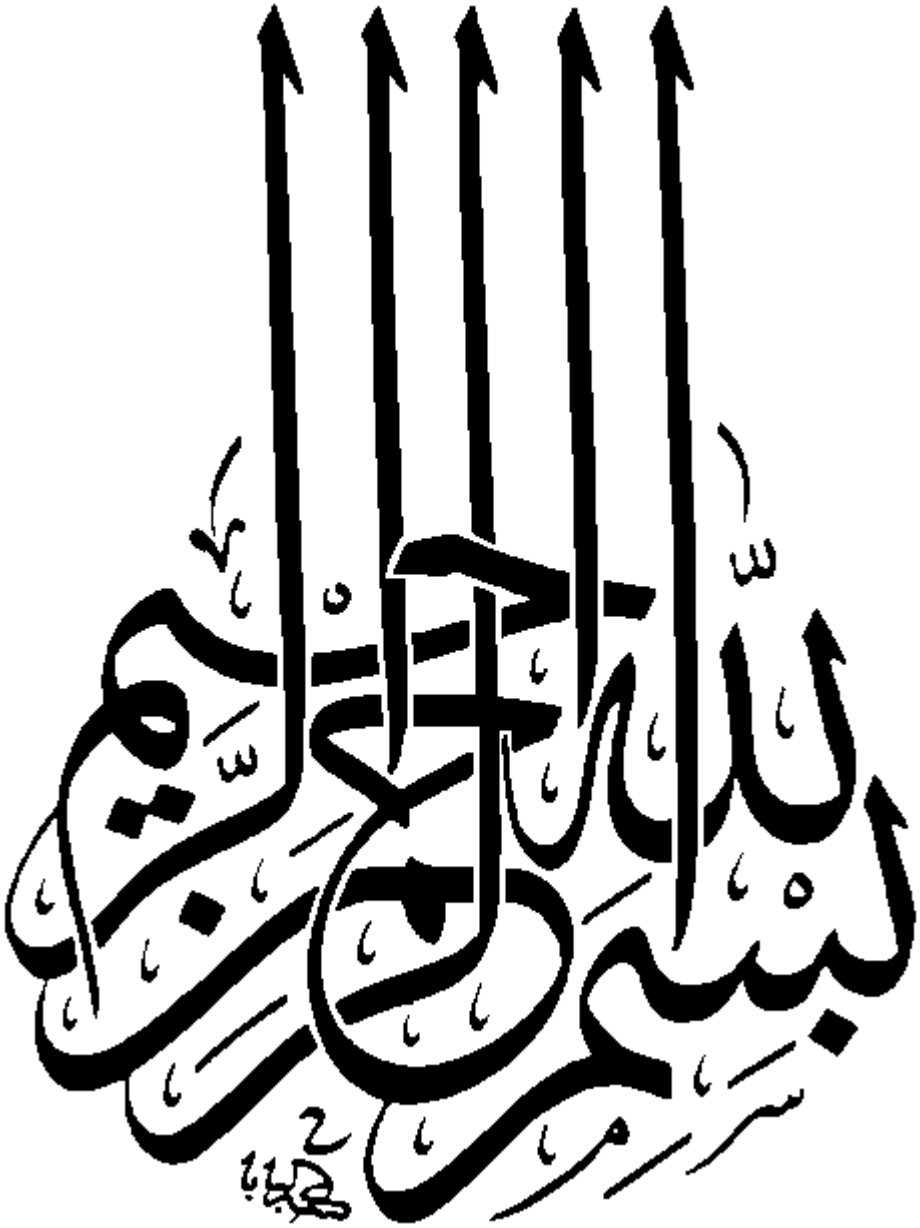
B.Ch.D., M.Sc., Ph.D. (Cairo)

Professor of Oral and Maxillofacial Surgery, Faculty of Oral and Dental Medicine - Cairo University.

Dr. Hesham ElHawwary

B.D.S., M.Sc., Ph.D. (Cairo)

Lecturer of Oral and Maxillofacial Surgery, Faculty of Oral and Dental Medicine – Cairo University


بسم الله الرحمن الرحيم

Acknowledgement

No words can express the great grace that ALLAH has endued upon me. He granted me the will and patience to fulfill this demanding piece of work.

My deepest thanks and gratitude to *Dr. Ahmed Barakat*; my tutor, mentor and elder brother. Your highly motivated, innovative, inspirational and responsible character had and will continue to have a great influence on me. Many colleagues insist that I am becoming a miniature replica of your highly admired self; and to tell you the truth; this is a true pleasure for me and an honour I do not deserve...

I would also like to thank *Dr. Maha Hakam;* my dear professor*;* for her continuous support and guidance that paved the way for this work. Your enlightened thoughts and bright ideas added a lot to the genuineness of our research.

My deepest sense of gratitude goes to my parents whom I love and admire more than they think I do! They taught me how to strive for perfection and raised me up to be self-dependent. Without their support and guidance, this research would never have been completed. I hope that this thesis in its final form is a modest reward for their efforts and patience throughout the years. And I also cannot forget to thank my younger sisters who have always been supportive and encouraging over the years.

Many thanks to my dear wife, her ideas and comments added positively to the value of this research. Without your emotional support, this paper would have never been possible. And to my son and daughter, your smiles were the only haven in the hard days.

I cannot forget to thank Dr. Amr Maher; our anesthesiologist, statistician and magician! You are a very special person to me.

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List of Abbreviations

٢D	Two Dimensional
٣D	Three Dimensional
AP	Anteroposterior
BSSO	Bilateral Sagittal Split Osteotomy
CAD	Computer Aided Design
CAD/CAM	Computer Aided Design / Computer Aided Manufacturing
CASS	Computer-Assisted Surgical Simulation
CBCT	Cone-Beam Computed Tomography
CMF	Cranio-Maxillofacial
CPD	Condylar Positioning Device
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
FOV	Field of View
I.M.	Intramuscular
IAN	Inferior Alveolar Nerve
ICP	Iterative Closest Point
ISMDM	Iterative Surface-Based Minimal Distance Mapping
IVRO	Intraoral Vertical Ramus Osteotomy
Lt	Left
MI	Maximal Intercuspation

MIO	Maximal Incisal Opening
MMF	Maxillomandibular Fixation
MRI	Magnetic Resonance Imaging
MSCT	Multi-Slice Computed Tomography
NHP	Natural Head Position
PA	Posteroanterior
Rt	Right
SLO	Short Lingual Osteotomy
SNAP	Sensory Nerve Action Potential
STL	Stereolithography
TMD	Temporomandibular Disorders
TMJ	Temporomandibular Joint
VRO	Vertical Ramus Osteotomy

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Bilateral saggital split osteotomies (BSSO) is one of the main orthognathic surgery tools for managing skeletal mandibular excess, deficiency or asymmetry. However, BSSO is known to be a technique-sensitive procedure with high reported incidences of inferior alveolar nerve injury, maldirected splits and post-surgical relapse.

Post-surgical relapse has been classified into immediate and delayed relapse. The immediate relapse has been mainly attributed to improper seating of the mandibular condyles in the glenoid fossae whereas delayed relapse has been attributed to unstable occlusion, inadequate fixation and condylar resorption.

Good dental occlusion following BSSO is dependent on a normal temporomandibular joint; that is, dental malocclusion or abnormal interdigitation with normal condylar position can be controlled postoperatively by orthodontic treatment, but an abnormal condylar position cannot be corrected postoperatively and eventually disrupts postoperative occlusal stability. There are many factors affecting postoperative condylar position—for example, the surgeon's experience, movement (forward, backward, or rotational) of the distal segment of the mandible, the anatomic shape and orientation of the proximal segment, and the fixation method. Various authors have stressed avoiding condylar displacement and have suggested several methods for guiding the postoperative position of the condyle.

Inferior alveolar nerve affection; whether temporary or permanent; is said to be due to medial reflection and retraction, direct injury during medial cutting, chisel injury during splitting, drilling through the canal during screw fixation and