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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

Assessment of Muscular Characteristics After Mandibular Setback: Intraoral Vertical Versus Sagittal Split Ramus Osteotomy

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List of Abbreviations:

3D: Three Dimensional

ABM: Anterior Border of masseter

ANOVA: Analysis Of Variance

Ar – Go – Me: Articulare - Gonion – Menton

BSSO: Bilateral Sagittal Split Osteotomy

CBC: Complete Blood Count

CBCT: Cone Beam Computed Tomography

CT: Computed Tomography

DFD: DentoFacial Deformity

EMG: ElectroMyoGram

EVRO: Extraoral Vertical Ramus Osteotomy

FHP: Frankfurt Horizontal Plane

IAN: Inferior Alveolar Nerve

ILO: Inverted L Osteotomy

INR: International Normalized Ratio

IV: IntraVenous

IVRO: IntraOral Vertical Ramus Osteotomy

MMF: Maxillo – Mandibular Fixation

MP: Mandibular Plane

MRI: Magnetic Reasonance Imaging

N: Newton

NSD: NeuroSensory Disturbance

Pog: Pogonion

PSI: Patient Specific Implant

PT: Prothrombin Time

PTT: Partial Thromboplastin Time

SARPE: Surgically Assisted Rapid Palatal Expansion

SN: Sella Nasion

SSRO: Sagittal Split Ramus Osteotomy

STL: Stereolithographic

TMJ: Temporo – Mandibular Joint

USB: Universal Serial Bus

VAS: Visual Analog Scale

VRO: Vertical Ramus Osteotomy

VSO: Vertical Subcondylar Osteotomy

VSSO: Vertical SubSigmoid Osteotomy

Introduction

Dentofacial deformity (DFD) is a multifactorial condition which affects the position and the size of the upper and lower jaws. DFD Patients exhibit different symptoms including impaired chewing, deglutition, phonation, breathing and aesthetics in addition to a decreased well-being and an affected quality of life. [1]

Orthognathic surgery has been used worldwide to correct severe dentofacial anomalies and it is associated with benefits and risks. Benefits include an improvement in esthetics, mastication and airway patency. Risks include general anasesthia (Mortality and Morbidity), nerve damage, undesirable soft and hard tissue changes, wound infection and relapse.

A major concern of any orthognathic surgery or orthodontic treatment is the amount of relapse occurring. Several studies compared between the relapse occurring after Bilateral Sagittal Split Osteotomy (BSSO) and IntraOral Vertical Ramus Osteotomy (IVRO), they concluded that there was an insignificant difference in relapse tendency between BSSO (with miniplates fixation) and IVRO (without fixation – only Maxillo – Mandibular Fixation (MMF)). [2]

In 2015, a systematic review with meta analysis was done to evaluate the difference in Stability or Neurosensory Function between BSSO and IVRO for Mandibular Setback. It concluded that both BSSO and IVRO have the same good stability. In addition, the results showed that IVRO significantly decreased the incidence of neuro sensory disturbance of the inferior alveolar nerve after mandibular setback surgery compared with the BSSO. [3]

AlAbdullah et al used Electromyogram (EMG) to assess the relation between the masticatory muscles activity and the facial growth pattern. They found out that the EMG of temporalis and masseter at maximum intercuspation gave higher values in the horizontal growth pattern group but in vertical growth patterns gave lower values. They suggested that the masticatory and perioral muscles activity play an important role in the development of the facial growth pattern. [4]

Orthognathic patients are always concerned about the timing of returning to normal masticatory function. In our study , we are comparing between the Bilateral Sagittal Split Osteotomy (BSSO) and the Intraoral Vertical Ramus Osteotomy (IVRO) regarding the biting force progress during the different phases of healing.

Review of Literature

Classification of dentofacial deformities:

Angle classified dental malocclusion into 3 categories: Class I, Class II, and Class III. These dental occlusion patterns are reflected onto the facial profile, as a result it became a way of classifying skeletal relationships of the maxilla and mandible into Class I, Class II, and Class III, where skeletal Class I: The maxillary base is in a normal anteroposterior relationship to the mandibular base, Skeletal Class II: The mandibular base is posterior to the maxillary base because of maxillary prognathism, mandibular retrognathism, or both, and Skeletal Class III: The mandibular base is anterior to the maxillary base because of maxillary retrognathism, mandibular prognathism, or both. [5]

McNamara in 1981 [6] analyzed skeletal class II malocclusion and he found that the most common feature for class II malocclusion is a retrusive mandible. The position of the maxilla varied where it was found in a neutral/normal position.

Skeletal Class III (Prevalence / Diagnosis / Clinical Features)

Skeletal class III described by Angle is considered as a rare dentofacial deformity. It is believed that it has a genetic and familial etiological factor. Reported prevalence rates were as follows: 2.5% in Australia, 4.3% in southern Italy, 5.8% in Colombia, 10.3% in central Turkey and 31.4% in South Korea. [7,8]

The patient's chief complaint is often a poor facial appearance but it may be accompanied by functional problems, temporomandibular disorders, or psychosocial handicaps. [9]

The etiological factors are still not well understood and this creates difficulties for prognosis and treatments. There are several hypotheses for the etiology, including: a small angle at the cranial base, which might displace the mandibular fossa forward and cause the anterior displacement of the mandible, a mismatching between the sizes of both arches such as having the mandibular angle more obtuse than normal, abnormal development of the mandibular body, and genetic or exogenous factors, such as thumb-sucking or early loss of the first molars or permanent teeth. [10]

Various distinct cephalometric features have been observed in class III patients, such as an acute cranial base angle, a short and retrusive maxilla, proclined upper incisors, retroclined lower incisors, an excessive lower anterior face height, short anterior cranial base length and obtuse gonial angle.[11,12]

Non Surgical Management of Skeletal Class III

Non – surgical management of class III Patients might start during their growth phase using functional appliances, interceptive and/or corrective orthodontics, although it is controversial. For adults, dental compensation using fixed orthodontics can be done in mild or moderate cases. [13]

Mandibular growth occurring after puberty is considered as the main cause of failure with orthopedic or orthodontic treatment and as a result class III patients must wait until cessation of growth to receive definitive surgical management. However, delaying the treatment until adulthood might cause more problems with pain, speech, airways, anatomy, occlusion, temporomandibular joint, chewing function, esthetics and psychological factors. [14]