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Babylon university _ Faculty of Dentistry
Orthodontics Department

Correction of Unilateral Condylar Hyperplasia and Severe Facial Asymmetry

A research submitted to the scientific committee of the orthodintics

department in the college of dentistry ,Babylon university as a partial

fulfillment *for graduation.*

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بسم الله الرحمن الرحيم

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا ۖ إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ ﴿٣٢﴾

صدق الله العلي العظيم

(البقرة /32)

الإهداء:

بدأنا بأكثر من يد وقاسينا أكثر من هم وعانينا الكثير من الصعوبات وها نحن اليوم والحمد لله نطوي تعب الإيام وخلاصة مشوارنا بهذا العمل .

الحمد لله الذي وفقنا لتثمين هذه الخطوة في مسيرتنا الدراسية ببحثنا هذا ..

ثمرة جهدنا ونجاحنا مهداة الى الوالدين الكريمين حفظهما الله ...

لكل العائلة الكريمة التي ساندتنا ولا تزال تساندنا ..

الى رفقاء المشوار اللذين قاسمونا لحظات ب حلوها ومرها .....

الى كل من كان لهم اثر في حياتنا.....

ش

شكر وتقدير

الحمد لله الذي لا يحمد غيره . بعد ان انهينا هذا البحث المتواضع وانطلاقًا من مبدا (مَن لم يشكرْ المَخْلوق لم يشكرْ الخالق) يسرنا ان نقدم خالص شكرنا وتقديرنا الى استاذنا الفاضل (وسام وهاب الحمادي) الذي رافقنا في مسيرتنا لانجاز هذا البحث وكانت له بصمات واضحة من خلال توجيهاته وانتقاداته البناءة والدعم الاكاديمي

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1-Introduction

Condylar hyperplasia is (CH) an uncommon malformation of the mandible involving change in size and morphology of the condylar neck and head. CH is an anomaly that usually occurs unilaterally and equally affects in both men and women.

CH of the mandible is a state of overdevelopment that can lead to facial asymmetry, mandibular deviation, malocclusion and articular dysfunction. The disorder is self-limiting, but as long as it remains active, the asymmetry progresses together with the associated occlusal changes. The etiology of the unilateral hyperplasia of the condyle is still under discussion.

The diagnosis of this pathology is initially made with facial analysis and imaging; Generally, there is no pain associated with the affected joint, although joint noises linked to CH and deviation of the mouth opening towards the contralateral side.

From the point of view of facial analysis, the patient with CH and AFD are initially evaluated by means of a central line drawn up from the tip of the glabella, passing through the pronasal point to the end of the chin, where both hemifacial areas are identified in order to ascertain the difference in size and position between them .Developing facial asymmetry in growing patients with unilateral condylar hyperplasia has been a difficult treatment in orthodontics.

Progressive condylar overgrowth elongates the neck and ramus shifting the mandible to the other side. Lingual crossbite soon develops and a shift in the dental midline and chin towards the crossbite side ensues. Functional adaptation of the affected TMJ complex to the mandibular displacement takes place by remodeling of the glenoid fossa and the condyle. Thus, the condyle is distracted downward and forward relative to the glenoid fossa, while the condyle at the crossbite side is forced upward and backward [1,2]

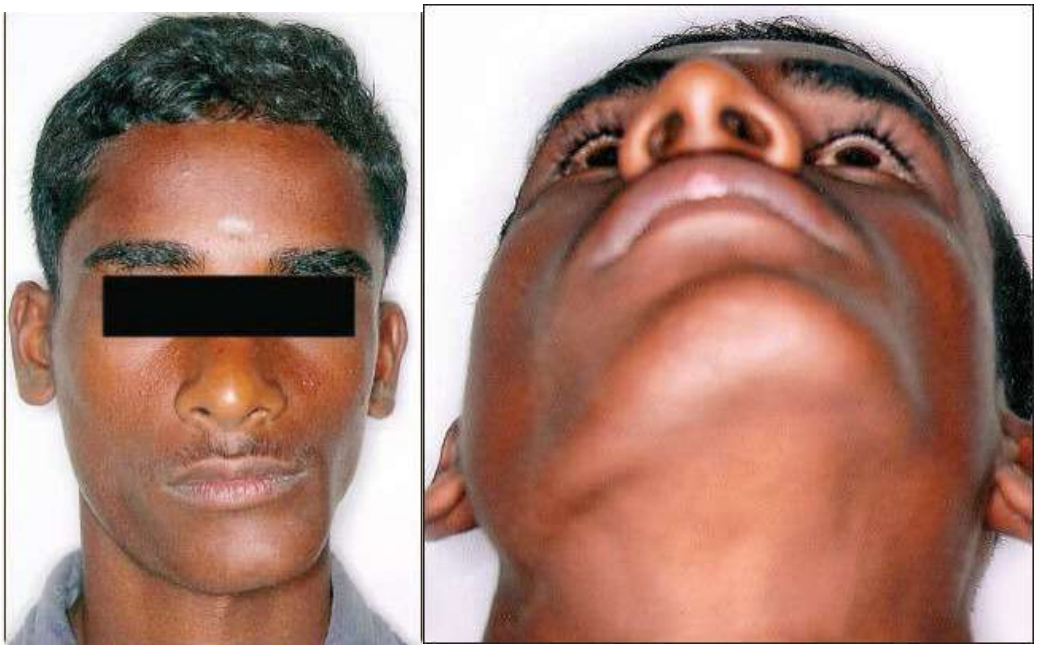


Fig 1

Orthopantamograph revealed significant uniform enlargement of the mandibular condyle and elongation and thickening of condylar neck in the right side, comparatively normal condyle of the left side.

1.1Historical Perspectives

- Kook & Kim [8] considered the establishment of a horizontal facial reference plane in relation to facial midline, is an efficient tool for assessment of facial asymmetry when using 3D CBCT images. They suggested a tangent to the inferior borders of orbital floors as a true horizontal reference line, other planes (lines) such as palatal, occlusal, anti-gonial and mental are then evaluated accordingly.

- Kim et al. [9] introduced a new orthosurgical approach to treat severe facial asymmetry due to hemimandibular hyperplasia. The difference in bone volume of the right and left body of the mandible necessitated additional contouring surgical procedures such as body osteotomy.

- Li et al. [10] in a 3Ds finite element analysis evaluated the stress distribution changes in the TMJ of asymmetric mandibular deviation of 19 patients treated with bilateral sagittal split ramus osteotomy; 12 patients (BSSRO) and seven patients with unilateral sagittal split ramus osteotomy (USSRO). The postoperative CT scanning showed almost no significant difference between the two surgical options during functional movements. The unbalanced stress distribution of the TMJ was significantly improved in USSRO as effectively as in BSSRO.

- Motamedi [16] in a comparative study of thirteen cases of unilateral condylar hyperplasia of the mandible were surgically treated (7 BSSRO and 6 USSRO); Unilateral ramus osteotomy was combined with a maxillary Le Fort I procedure to restore occlusal canting and facial symmetry in dentally compensated cases. Bilateral ramus osteotomy did not have any advantage over unilateral ramus osteotomy cases.

- Recently, single photon emission computed tomography (SPECT) has been proposed to replace serial clinical observations for the diagnosis of condylar hyperplasia. Surgical intervention to be effective, the status of the condylar bone growth has to be assessed precisely [12]

1.2 SUBJECTS AND METHODS

Four Patients (3 females and 1 male) with severe facial asymmetry due to unilateral condylar hyperplasia, were presented. Border line cases

with potential condylar growth (Age 10-25Y) were subjected to SPECT images prior to orthosurgical intervention.

The treatment procedure was selected according to: the condylar growth activity, severity of the dentofacial deformity and age of the patient.

Two was treated with bilateral sagittal split mandibular ramus osteotomy, One was treated with unilateral ramus osteotomy and Le Fort1 maxillary osteotomy, one with bilateral sagittal split ramus osteotomy with genioplasty,

2- CASES:

1.2 CLINICAL CASE:

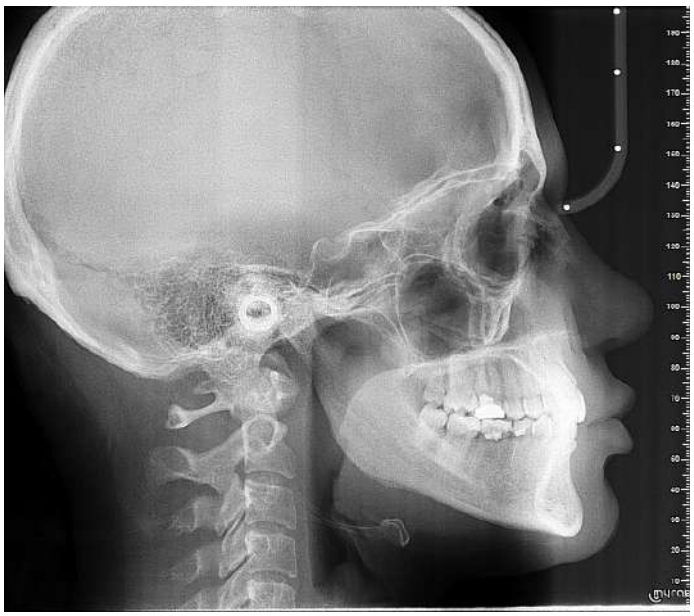


Fig2/Female is 22 years old come to our clinic , we noted she have asymmetry in her face and we took her cephlometrics radiography :
Based on clinical and manual method we need to

TOOLS:

1-ruler
2-protractor
3- Cephlometric radiography imaging

METHOD:

firstly, to calculate vales from cephlometrics we:

1-drawn line from sella turcica (s) to nasion (N) to form SN plane

2-from superior external auditory meatus (POR)ION to inferior orbital rim to make Frankfort plane

3- from anterior nasal spine (ANS) to the posterior nasal spine (PNS)to make maxillary plane (PLATAL PLANE)

4-from menton (ME) the most inferior point in the outline that across inferior lower mandibular border to make mandibular plane

5-also we drawn from the intercupation of upper posterior teeth at six and seven teeth. To make occlusal plane.

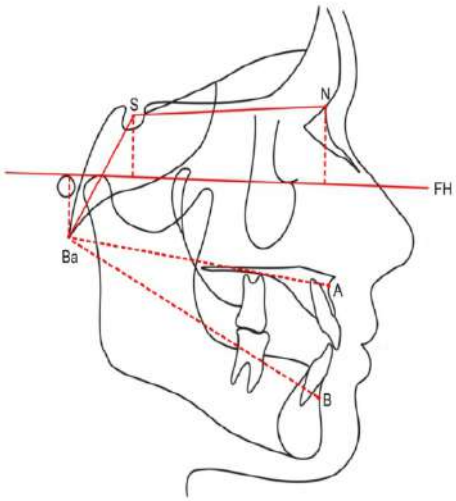
6- Drawn from nasion (N) to pogonion (POG).

FROM SATIGTAL VIEW :

SNA: Angle formed by the intersection of sella-nasion and point A

SNB: Angle formed by the intersection of sella-nasion and point B

ANB: Angle formed by the intersection of (point A , nasion , point B)



Indicator	Steiner normal values	Steiner computerised measurements
SNA	82	81.77
SNB	80	76.87
ANB	2	5.46
SND	76	74.53
1/NA mm	4	3.45
1/NB mm	4	4.63
1/NA grade	22	21.57
1/NB grade	25	23.78
1s/1i	131	-
SNOcl	14	17.88
Sngogn	32	32.17
1/Sna-Snp	110	-

. Computerised measurements results for the Steiner analysis parameter

BASED ON OUR MEASUREMENT OBTAIN :

SNA =80 SNB =78

ANB=SNA- SNB = +2

So patient have CI.I skeletal relation when comparison with normal values of steiner analysis.

FROM THE VERTICAL VIEW :

we measure the FMA (Frankfort mandibular angle)
FMA= 24 degree
So tend to deep bite and short face (breaky face)

LINEAR MC NAMARA ANALYSIS :

(N perpendicular Frankfort Horizontal plane) to A =2

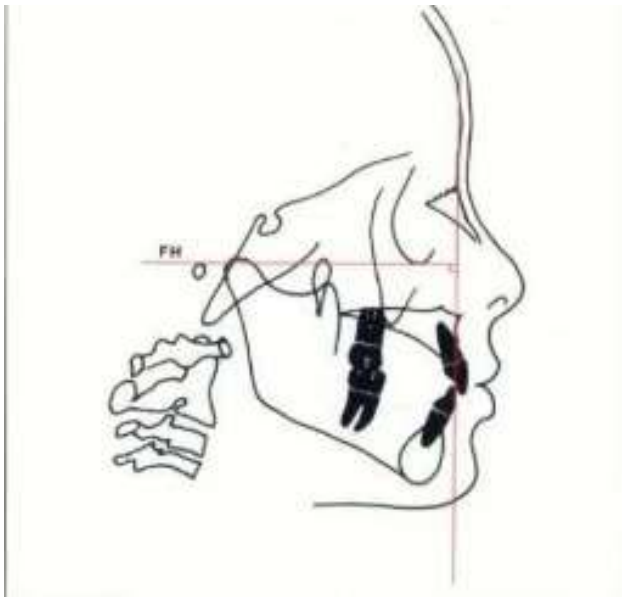


Table 2. Extended

Female			
McNamara Norm Mean ± SD	Turkish Norm Mean ± SD	Mean Difference	Significance
82.4 ± 3.0	81.3 ± 3.10	−1.10	**
0.4 ± 2.3	2.94 ± 1.76	2.54	***
120.2 ± 5.3	117.45 ± 4.61	−2.75	***
91.0 ± 4.3	89.14 ± 4.40	−1.86	**
29.2 ± 3.3	28.31 ± 4.69	−0.89	NS
66.7 ± 4.1	68.08 ± 5.06	1.38	NS
22.7 ± 4.3	23.92 ± 5.00	1.22	NS
−1.8 ± 4.5	6.11 ± 4.46	7.91	***
5.4 ± 1.7	5.80 ± 1.92	0.40	NS
2.7 ± 1.7	2.81 ± 2.17	0.11	NS

Fig3

JARABACK FR :

It is given by the formula :

POSTERIOR FACIAL HEIGHT X 100 % =
ANTERIOR FACIAL HEIGHT

70 X100% = 58 %
12

If ratio more than 65% expresses a horizontal growth pattern

Statistics & prevalence :

We made a statistic for fifth stage dental students which numbered 140 student and we found that 35 students suffer from facial asymmetry
(20) suffer from protruded of mandibular cl.III , SO prevalence of it (14%)
(15) suffer from protruded of maxillary cl.II , so prevalence of it (12.5 %)

ADOPATED CASAES: (Orthosurgical Correction of Unilateral Condylar Hyperplasia and Severe Facial Asymmetry: Case Series Study)

CHAPTER 6

2.2Cases1: Data Analysis, Diagnosis, Treatment Objectives and Treatment Planning:

A 25-years old male presented with a chief complaint of severe facial asymmetry, mandibular deviation to the left (9 mm) due to elongation of the right half of the mandible at puberty, severe left lingual crossbite and distorted occlusal plane. No history of trauma to the head or jaws. The patient had no medical or dental history (Fig. 4).

2.2.1 Data Analysis, Diagnosis

Frontal (PA) cephalometric analysis confirmed the difference between right and left halves of the face due to overgrowth of the right .Right condylon-menton is 22 mm longer than its left counterpart, Right Antigonion-menton is 35.1 mm longer than the left. The horizontal planes lost parallelism and reflected the severe asymmetry between right and left facial structures.

2.2.2 Treatment Objectives

1. Restore facial esthetics (harmony & balance)
2. Establish normal static and functional occlusion in 3Ds
3. Maintain life-long post-operative stability.

2.2.3 Treatment Procedures

After full data analysis and consultation of the patient with the maxillofacial surgeon, the decision was in favor of two-jaw surgery (Le Fort I osteotomy to reposition the maxilla in a more convenient location of anterior esthetic occlusal plane, and unilateral right sagittal ramus osteotomy that allows condylar settling in the glenoid fossa, correct the severe deviation of the chin to the left, and restore normal transverse and sagittal occlusal relationship .

Fig4. Clinical and radiographic examination revealed facial asymmetry. Lower wisdom teeth were extracted.

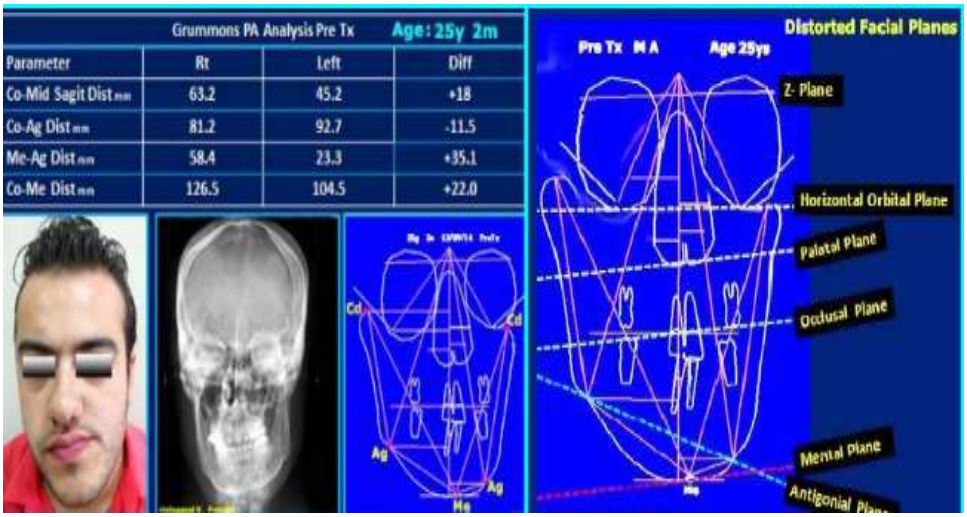


Fig.5.Grummons PA View: Assessing objectively the severity of facial asymmetry and distortion of

Fig6. Pre-surgical phase, attempt to decompensate the axial inclination of the anterior segment and level occlusal plane.

2.2.3 TREATMENT RESULT

Post treatment Figs, show satisfactory treatment outcome that met the expectations of the patient and health care providers.

2.2.4 Conclusions

Deliberate understanding of the available orthosurgical options that benefit the patient and the health care team, resulted in successful treatment outcome.

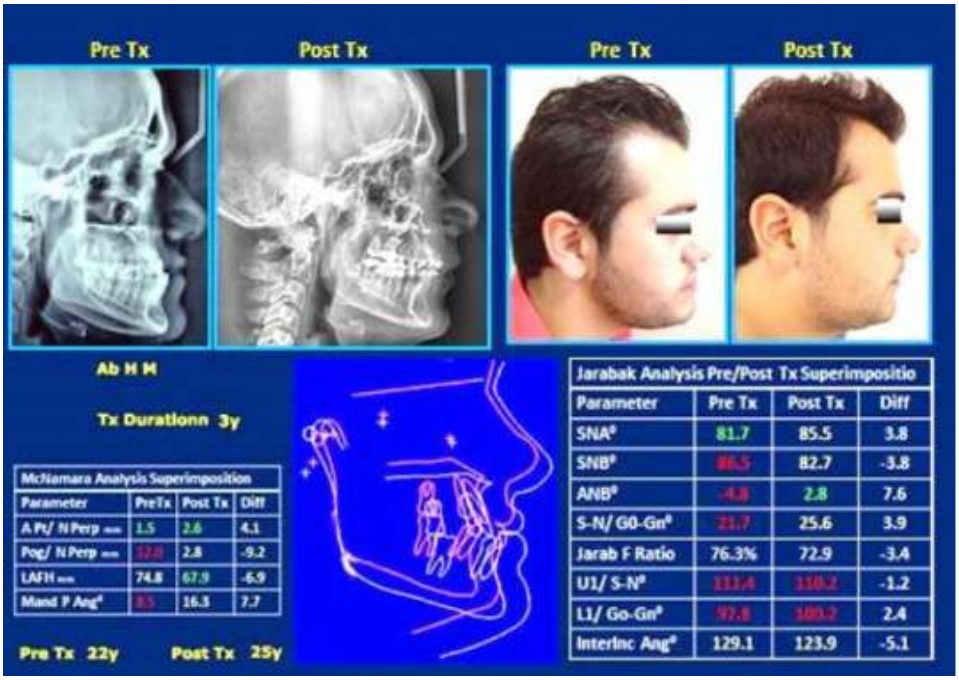


Fig. 7. Lateral Ceph (Pre/ Post Tx), Jarabak / McNamara Analyses reflecting improvement in vertical and sagittal dimensions.

Fig.8. Final occlusion (Post retention) and almost perfect facial symmetry

2.3CASE2:

A 22-year-old female presented with a chief complaint of major facial esthetic deformity. Clinical examination revealed a severe facial asymmetry expressed as chin deviation to the left 14,1 mm. The occlusion was distorted, edge-to-edge bite, bilateral Crossbite and midline dental deviation.

2.3.1Diagnosis, Treatment Objectives and Treatment Planning

Clinical examination and diagnostic records including dental casts and radiographs enabled the formulation of problem listing, treatment objectives and treatment planning. Frontal (PA) and lateral cephalometric analysis measured the facial deformity in 3Ds.

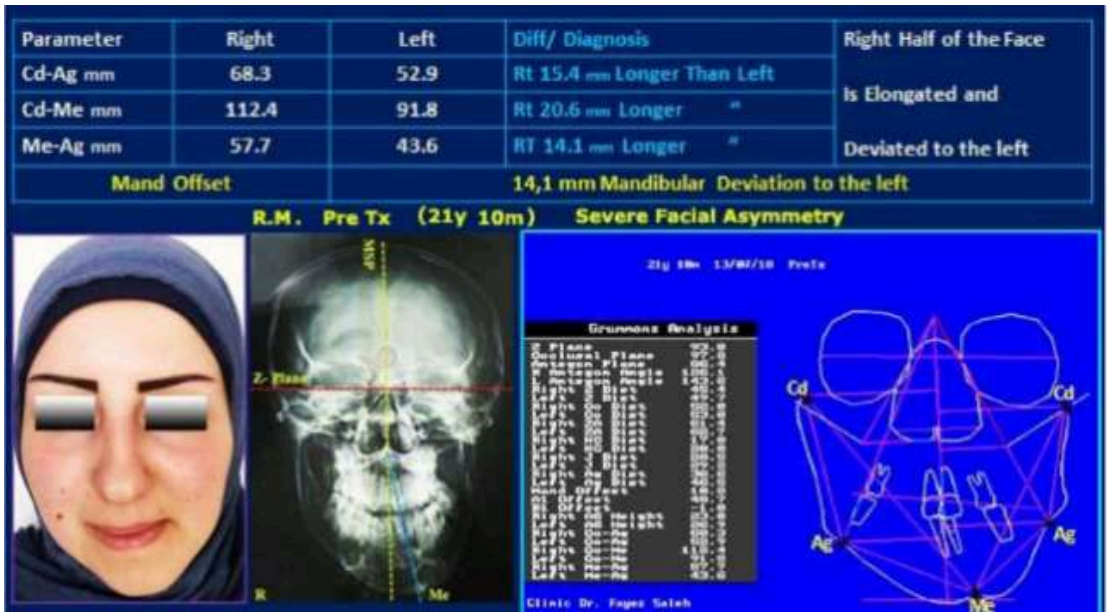


Fig9. Frontal (PA) Grummons analysis confirming 14.1 mm mandibular deviation to the left

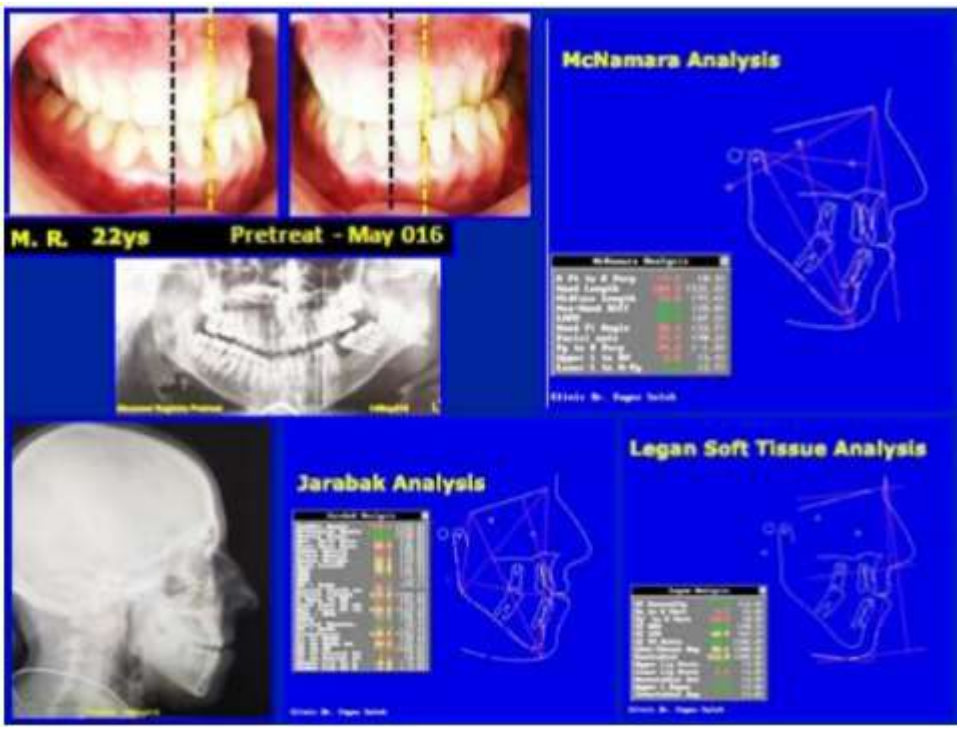


Fig. 10. Lateral cephalometric analyses (Jarabak, McNamara, and Legan soft tissue) revealed distortion in 3D

2.3.2:Treatment Objectives

(1) Restore normal facial esthetics .

(2) Correct occlusion in 3Ds .

(3) Maintain life-long stability.

2.3.3:Treatment Planning

After full review of the collected data and final joint consultation of the patient with the maxillofacial surgeon, the decision was in favor of mandibular bilateral split ramus osteotomy with Genioplasty.

Pre-surgical preparation of the case (Fig.11) achieved ideal arch form and succeeded in orthodontic leveling and alignment of dental arches (flattening of the maxillary occlusal plane and leveling curve of Spee), ready for surgery

Fig.11 Pre-surgical phase; maxillary arch expansion and decompensation of dentoalveolar functional biologic compensation

2.3.4:Surgical Phase

Bilateral sagittal split ramus osteotomy and genioplasty allowed proper condylar settling in the glenoid fossa, relieved tension on the TMJs, correct the severe deviation of the chin to the left, and restore normal transverse and sagittal occlusal relationship

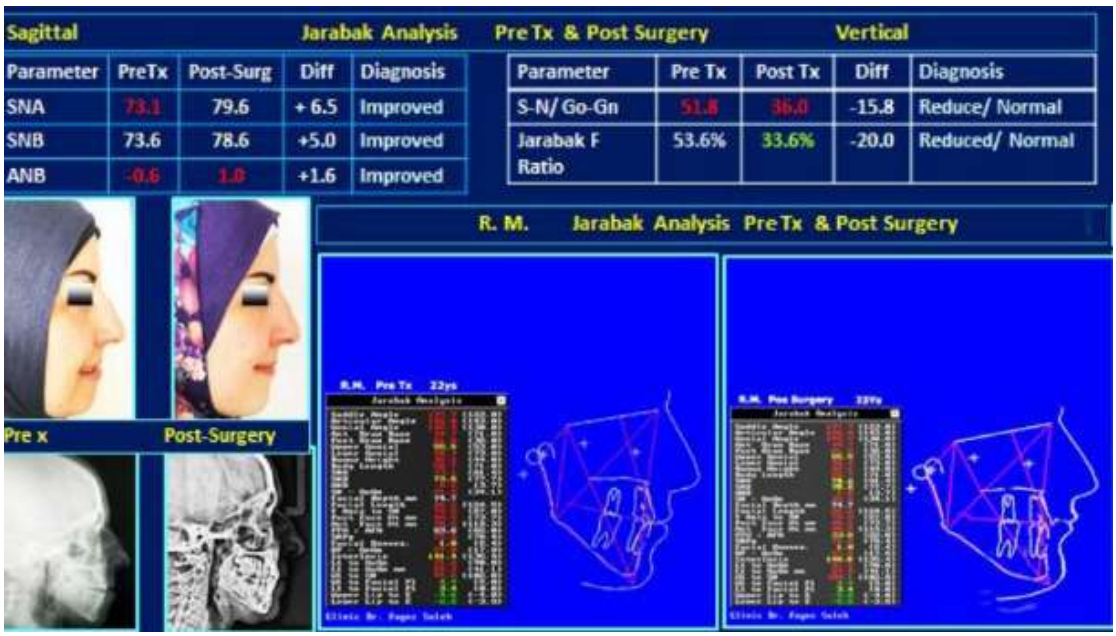


Fig 12 pre & Post Treatment Lateral cephalometric Jarabak analysis

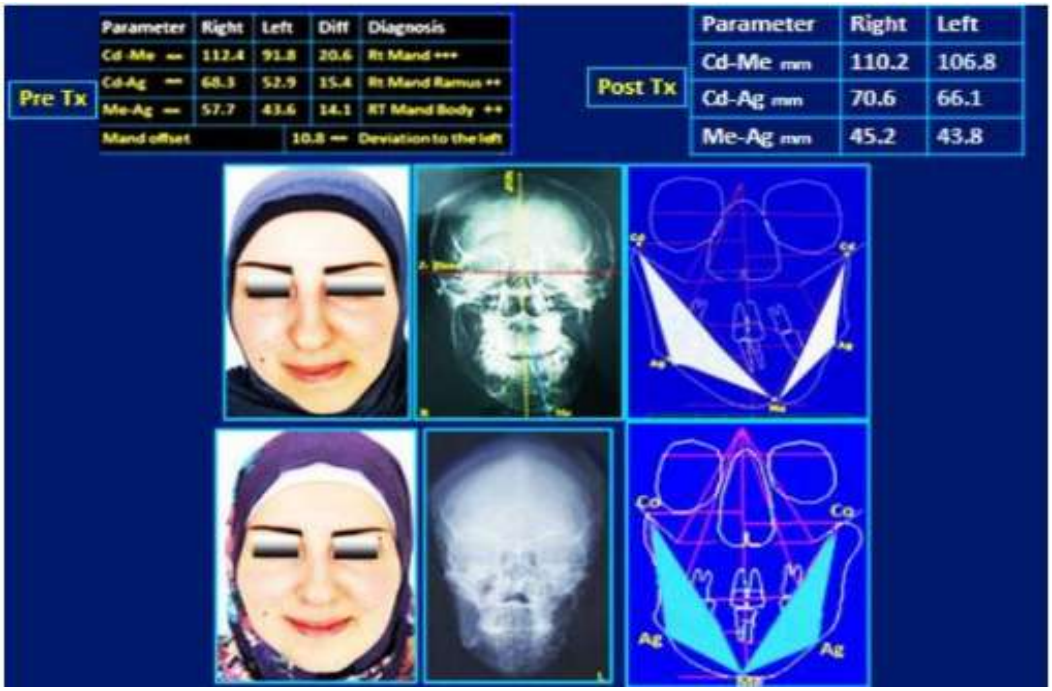


Fig 13 Pre & Post frontal facial view and Frontal Cephalometric Analysis (Perfect symmetry congruent triangles)

2.3.5 Re:sults and Conclusions

Collaboration and full understanding of the standards of care by practitioners resulted in the actual successful treatment outcome which was satisfactory and met the expectations of the patient and the health care team

2.4 CASE3:

10-year-old female patient referred from the pediatric clinic with space maintainers and Nance holding appliance. The chief complaint was the unaesthetic chin deviation, lingual crossbite and slight mandibular protrusion. Initial records revealed a left unilateral condylar hyperplasia causing facial asymmetry, mandibular deviation to the right, dental midline discrepancy, and class III malocclusion (Fig. 14).

Fig14. Initial records of case # 1 at 10 years of age (Developing Cl III Malocclusion, Midline Deviation, Buccal Crossbite

Fig. 15. Lateral Cephalometrics (McNamara & Jarabak Analyses) to assess the sagittal and vertical facial dimensions.

Lateral cephalometric, although it is not reliable in facial asymmetry cases, yet it is considered a supportive diagnostic tool for orthodontists in pre-surgical-phase, decompensation of the mal-aligned teeth and flattening occlusal plane and curve of Spee are all essential for repositioning of the arches during surgery. However, frontal (PA) Cephalometric analysis .

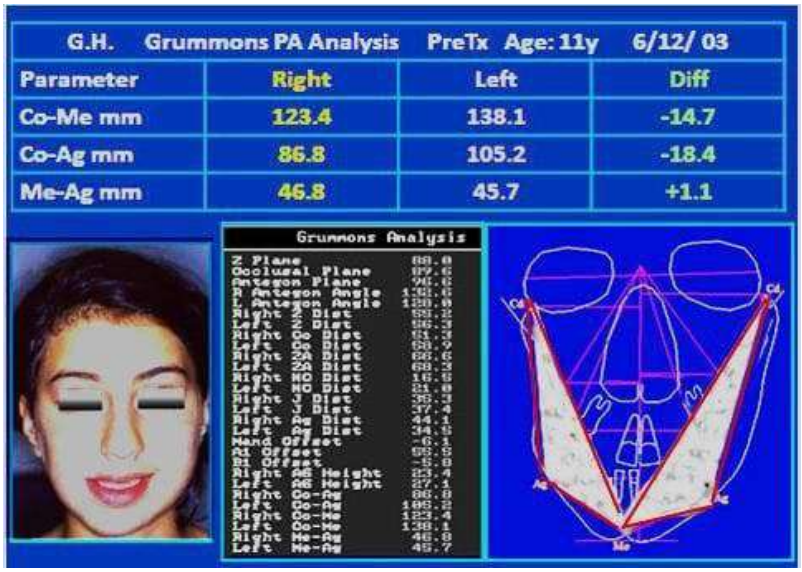


Fig16. Grummons frontal Cephalometric (PA) View to assess facial asymmetry at 11years old, Left condylon-menton exceeded the right by 14.7mm, and the left condylon-antigonion was 18.4mm longer than the right counterpart.

2.2.1 Treatment objectives:

1-To monitor the active growth potential of the left condyle .
2- Achieve normal functional and static occlusion.
3- Restore facial esthetics (symmetry, balance, and harmony).
4-Life-long stability of the treatment outcome.

2.2.1 Treatment Progress:

Treatment with fixed orthodontic appliance commenced in an attempt to control abnormal occlusal development. Progressive mandibular deviation continued after for 4 months of treatment, however, the maxillary arch form was almost ideal and maxillary occlusal plane was almost flat .

Fig17. Pre-Pubertal Growth Spurt- (Age 11y 4m)- Progressiv Mandibular Deviation

2.4.2 Surgical Phase

In view of the ideal maxillary arch form and flat Maxillary occlusal plane (Age: 15y 8m) Joint consultation with the maxillofacial surgeon took the decision to operate on the mandible (BSSRO) only.
Bilateral sagittal split ramus osteotomy (BSSO) allowed the rotation of the mandible and the dentition to interdigitate with the maxillary counterparts, this step relieved the tension at the affected TMJ and
relaxed the enlarged left condyle.

Fig18. Further investigation of unilateral condylar growth with clear deviation and lingual Crossbite. Maxillary arch with quadhelix and proper sequence of arch wires resulted in ideal arch form & normal occlual plane

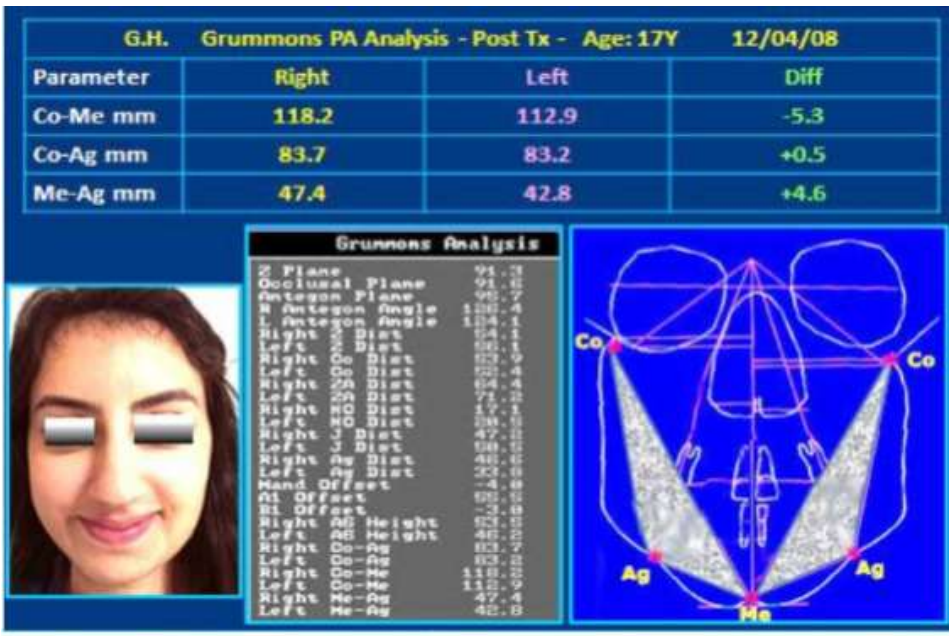


Fig19. Grummons Pa (Frontal) analysis objectively confirms Post-surgical perfect facial symmetry

Fig20. Post-surgical occlusion, Pre-finishing Occlusion and six year post-retention, stable occlusion

2.4.3 Treatment Results

As shown in Figs 19,20, the treatment objectives were achieved, facial esthetics including balance and harmony of the transverse, vertical and sagittal dimensions were satisfactory. Oro-facial muscles performed efficiently. Post-treatment occlusal stability was observed with success for six years.

AIMS OF PROJECT :

By comparing the clinical case with the cases quoted from above mentioned research , we noticed that not all the cases we see regarding facial asymmetry are classII and classIII
may be classI normal as seen in clinical cases fig (2)

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