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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/12777
DOI URL: http://dx.doi.org/10.21474/IJAR01/12777

RESEARCH ARTICLE

"UNILATERAL BIJAW PREMOLAR EXTRACTIONS FOR CORRECTION OF CROWDING, BUCCALLY PLACED CANINES AND ASYMMETRIC DENTAL MIDLINE" – A CASE REPORT

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Manuscript Info

Manuscript History
Received: 20 February 2021
Final Accepted: 24 March 2021
Published: April 2021

Key words:-
Unilateral Bijaw Premolar Extractions, Space Closure, Orthodontic Treatment, Crowding,Buccally Placed Canines, Midline Shift,Fixed Orthodontic Mechanotherapy, Correction Of Midline Shift, Orthodontic Camouflage, Therapeutic Extractions

Abstract

This case report is of a 22 year old male patient who presented with irregularly placed and crowded teeth in bothmaxillary and mandibular arch on the right side with both upper and lower dental midlines shifted to the patients right. This case was corrected non surgically merely by employing simple mechanics with the help of Fixed Orthodontic Mechanotherapy by extracting a single maxillary and mandibular 1st premolar of right side followed by retraction and closure of spaces with the help of Elastomeric chains. The case ended in a Class I Molar and canine relationship bilaterally. The case report emphasizes on the need for extracting 1st premolars only on 1 side in the upper and lower arch for the purpose of correcting the shifted dental midlines. The extractions also favour correction of crowding and buccally placed upper and lower canines on the right side. Following fixed orthodontic treatment, marked improvement in patient's smile was achieved and there was a remarkable increase in the patient's confidence and quality of lifeThe profile changes and treatment results were demonstrated with proper case selection and good patient cooperation with Fixed appliance therapy. The patient was extremely satisfied with the results at the end of treatment.

Introduction:-

Nowadays, patients with the slightest misalignment of teeth demand Orthodontic treatment to get it corrected and improve their smile and facial profile. Facial Esthetics has been in increasing demand in today's century.

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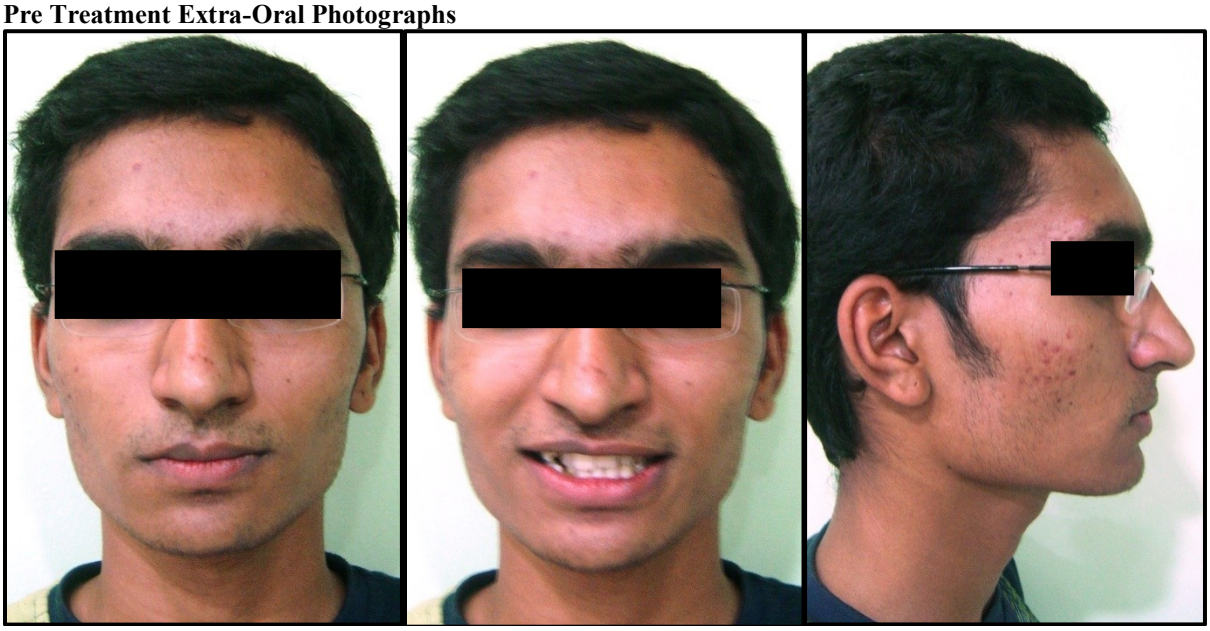
Orthodontic treatment can significantly alter and improve facial appearance in addition to correcting irregularity of the teeth. Class I malocclusion is the 2nd most prevalent malocclusion after Class II.[1,4,5]Over the last few decades, there has been an increase in the awareness about orthodontic treatment which has led to more and more adults demanding high quality treatment in the shortest possible time with increased efficiency and reduced costs.[2,3,7]There are many ways to treat Class I malocclusions, according to the characteristics associated with the problem, such as anteroposterior discrepancy, age, and patient compliance.[6]The indications for extractions in orthodontic practice have historically been controversial.[8]. On the other hand, correction of Class I malocclusions in growing patients, with subsequent dental camouflage to mask the skeletal discrepancy, can involve either retraction by non extraction means simply by utilizing the available spaces or by extractions of premolars.[9,10]Lack of crowding or cephalometric discrepancy in the mandibular arch is an indication of 2 premolar extraction. Fortunately, in some instances satisfactory results with an exceptional degree of correction can be achieved without extraction of permanent premolars[11-13]. This case presents the correction of irregularly placed and crowded teeth in both maxillary and mandibular arch on the right side with both upper and lower dental midlines shifted to the patients right. This case was corrected non surgically merely by employing simple mechanics with the help of Fixed Orthodontic Mechanotherapy by extracting a single maxillary and mandibular 1st premolar of right side followed by retraction and closure of spaces with the help of Elastomeric chains. The case ended in a Class I Molar and canine relationship bilaterally. The case report emphasizes on the need for extracting 1st premolars only on 1 side in the upper and lower arch for the purpose of correcting the shifted dental midlines. The extractions also favor correction of crowding and buccally placed upper and lower canines on the right side. Following fixed orthodontic treatment, marked improvement in patient's smile was achieved and there was a remarkable increase in the patient's confidence and quality of life

Case report

Extra-oral examination

A 22 year old male patient presented with the chief complaint of irregularly placed and crowded teeth on the right side . On Extraoral examination, the patient had an Orthognathicfacial profile, grossly symmetrical face on both sides, competent lips ,shallow mentolabial sulcus and an averageNasolabial Angle , a Leptoprosopic facial form, Dolicocephalic head form, average width of nose and mouth, a consonant smile arc and posterior divergence of face along with an average to horizontal growth pattern. The patient had no relevant prenatal, natal, postnatal history, history of habits or a family history. On Smiling, there was excessive show of maxillary anterior teeth with slightly broad buccal corridor spaces. The upper and lower dental middles were not coincident with the facial midline and both were shifted to the patients right side. The patient had a toothy smile a non consonant smile arc. The patient was very dissatisfied with his smile.

Pre Treatment Extra-Oral Photographs



Intra-Oral Examination

Intraoral examination on frontal view showed presence of crowded upper and lower dentition on the right side. The upper dental midline was not coincident with the lower dental midline with a shift in the upper midline towards the right by 1.5 mm and shift in the lower midline also towards the right by 3 mm . On lateral view the patient showed the presence of Class I incisor relationship with an average overjet and overbite, a Class I canine relationship on the left side and a Class I Molar relationship bilaterally. Right side shows presence of buccally placed upper and lower canine and crowding in the canine and premolar region both in the upper and lower arch. The upper and lower arch shows the presence of a "U" shaped arch form.

Pre Treatment Intra-Oral Photographs

Pre Treatment Cephalometric Summary

PARAMETERS	PRE- TREATMENT
SNA	82°
SNB	80°
ANB	2°
WITS	0mm
MAX. LENGTH	99mm
MAN. LENGTH	98mm
IMPA	96°
NASOLABIAL ANGLE	102°
U1 TO NA DEGREES	26°
U1 TO NA mm	3mm
L1 TO NB DEGREES	27°
L1 TO NB mm	2mm
U1/L1 ANGLE	129°
SADDLE ANGLE	136°
ARTICULAR ANGLE	144°
GONIAL ANGLE	122°

FMA	**24°**
Y AXIS	**65°**

Diagnosis
This 22 years old male patient is diagnosed with a Class I malocclusion on a Class I skeletal base, an average to horizontal growth pattern, crowding in upper and lower right region, buccally placed upper and lower canine and both upper and lower dental midlines shifted to the patients right.

List Of Problems
1. Crowding in maxillary and mandibular right region
2. Buccally placed maxillary and mandibular right canines
3. Non coincident dental midlines

Treatment Objectives:-
1. To correct crowding in the maxillary and mandibular right region
2. To correct the dental midlines
3. To correct buccally placed maxillary and mandibular right canines

Treatment Plan
1. Extraction of 14and 44
2. Fixed appliance therapy with Pre-adjused Edgewise bracket system
3. Initial leveling and alignment with 0.012", 0.014", 0.016", 0.018", 0.020" Nitiarchwires following sequence A of MBT
4. Retraction and closure of spaces by use of 0.019" x 0.025" rectangular NiTi followed by 0.019" x 0.025" rectangular stainless steel wires.
5. Final finishing and detailing with 0.014" round stainless steel wires
6. Retention by means of Begg's Wrap-around retainers along with lingual bonded retainers in the upper and lower arch

Model Analysis

Bolton ratio:-
Mandibular anterior excess:- 0.48 mm
Mandibular overall excess:- 0.17 mm

Ashley Howe's index:-
Need for extraction

Pont's Index :
Expansion not needed

Arch Perimeter Analysis :
Need to extract 1st premolars

Careys Analysis :
Need to extract 1st premolars

Chadda's Index :
Expansion not needed

Treatment Progress
The maxillary and mandibular 1st premolar of right side was first extracted. Complete bonding & banding in both maxillary and mandibular arch was done, using Pre-adjusted Edgewise bracket system. Initially a 0.012" NiTi wire was used which was followed by 0.014 , 0.016", 0.018", 0.020" Nitiarchwires following sequence A of MBT. After 6 months of alignment and leveling NiTi round wires were discontinued. Retraction and closure of spaces was then started by use of 0.019" x 0.025" rectangular NiTi followed by 0.019" x 0.025" rectangular stainless steel wires.

Reverse curve of spee in the lower arch and exaggerated curve of spee in the upper arch was incorporated in the heavy archwires to prevent the excessive bite deepening during retraction process and also to maintain the normal overjet and overbite. Group A anchorage was maintained in the upper and lower arch on right side. Retraction and closure of spaces was done with the help of Elastomeric chains delivering light continuous forces and replaced after every 4 weeks due to force decay and reduction in its activity. Finally light settling elastics were given with rectangular steel wires in lower arch and 0.012" light NiTi wire in upper arch for settling , finishing, detailing and proper intercuspation. The crowded dentition and buccally placed canines on the right side were corrected at the end of the fixed apppliance therapy. The upper and lower midlines were also corrected and were coincident, both with each other and also with the facial midline. The patient had a pleasant and consonant smile arc on smiling.

Post Treatment Cephalometric Readings

PARAMETERS	POST-TREATMENT
SNA	81°
SNB	80°
ANB	1°
WITS	0mm
MAX. LENGTH	98mm
MAN. LENGTH	98mm
IMPA	94°
NASOLABIAL ANGLE	105°
U1 TO NA DEGREES	25°
U1 TO NA mm	2mm
L1 TO NB DEGREES	24°
L1 TO NB mm	2mm
U1/L1 ANGLE	132°
SADDLE ANGLE	136°
ARTICULAR ANGLE	142°
GONIAL ANGLE	122°
FMA	25°
Y AXIS	66°

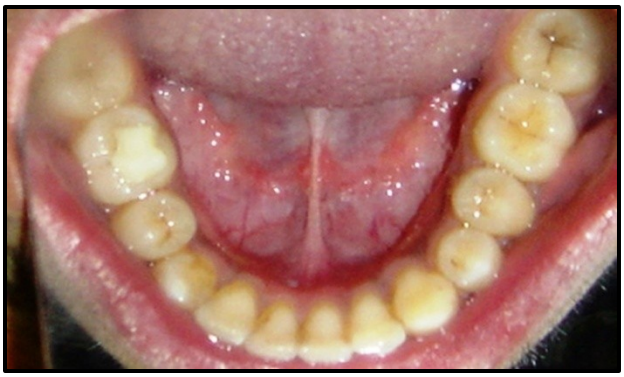
Discussion:-

The patient's chief complaint irregularly placed and crowded teeth on the right side.The selection of orthodontic fixed appliances is dependent upon several factors which can be categorized into patient factors, such as age and compliance, and clinical factors, such as preference/familiarity and laboratory facilities. The execution of only Fixed appliance therapy and extraction of only upper and lowerright premolars appropriately resulted in correction of all the patients problems such as crowding, buccally placed canines in the upper and lower right side and midline shift.A well-chosen individualized treatment plan, undertaken with sound biomechanical principles and appropriate control of orthodontic mechanics to execute the plan is the surest way to achieve predictable results with minimal side effects.Treatment of a Class I malocclusion with extractions of all 2 premolars is challenging. Class I malocclusion might have any number of a combination of the skeletal and dental components. Hence, identifying and understanding the etiology and expression of Class I malocclusion and identifying differential diagnosis is helpful for its correction. In this case we choose to use Pre-adjusted Edgewise bracket system .The execution of all 2premolar extractions of the right side followed by Fixed appliance therapy appropriately resulted in an improvement in the patient's smile in this case. The most important point to be highlighted here is the decision to extract 2 premolars. After analysing the case thoroughly and reading all pretreatment cephalometric parameters along with evaluating the patients needs clinically, a decision was made of extracting the maxillary and mandibular right 1st premolars. The patients upper and lower midlines were shifted to the right side and were non-coincident with each other and also with the facial midline. Due to the midlines being shifted, there was crowding in the maxillary and mandibular premolar region with both the upper and lower canines placed buccally in the arch. Proximal stripping with retraction and closure of spaces could not be executed in this case as the space created would not be sufficient to correct the 3 main problems namely; crowding, midline correction and buccally and highly placed canines. Hence it was decided to extract 2 premolars on the right side, one in the upper and one in the lower arch, as this would be sufficient to correct all the patient problems and achieve all the treatment goals. Extractions on the left side were not needed as the patient had no other problems like proclined or forwardly placed

anterior dentition. The unaesthetic smile was only due to the discrepancy in midlines and crowding in the right region. All these findings made it essentially imperative to extract maxillary and mandibular right 1st premolars. There was improvement in occlusion and smile arc at the end of the traetment. Successful results were obtained after the fixed Pre-adjusted Edgewise appliance therapy within a stipulated period of time. The overall treatment time was 17 months. After this active treatment phase, the smile of this 22 year old male patient improved significantly as seen in the post treatment Extra oral photographs. Removable Begg's retainers were then delivered to the patient along with fixed lingual bonded retainers in upper and lower arch. One year follow up check-up was done and did not reveal any drastic untoward changes in the patients smile and profile.

Post Treatment Extra-Oral Photographs

Post Treatment Intra-Oral Photographs



Comparison Of Pre And Post Treatment Cephalometric Readings

PARAMETERS	PRE- TREATMENT	POST-TREATMENT
SNA	82°	81°
SNB	80°	80°
ANB	2°	1°
WITS	0mm	0mm
MAX. LENGTH	99mm	98mm
MAN. LENGTH	98mm	98mm
IMPA	96°	94°
NASOLABIAL ANGLE	102°	105°
U1 TO NA DEGREES	26°	25°
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ARTICULAR ANGLE	144°	142°
GONIAL ANGLE	122°	122°
FMA	24°	25°
Y AXIS	65°	66°

Conclusion:-

This case report shows how the correction of crowded dentition can be managed alongside fixed orthodontic treatment with just the extraction of 2 premolars, thus lowering the treatment time and enhancing the smile of the patient.The planned goals set in the pretreatment plan were successfully attained. Good intercuspation of the teeth was obtained and the unaesthetic appearing malocclusion was corrected. The molars were settled in a full cusp Class I relationship bilaterally. Incisors and canines were also settled in a Class I relationship. The maxillary and mandibular teeth were found to be esthetically satisfactory in the line of occlusion with a pleasing consonant smile arc at the end of treatment. The correction of the malocclusion was achieved and crowding was unraveled with a significant improvement in the patient aesthetics and self-esteem. The patient was very satisfied with the result of the treatment.

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