

MANAGEMENT OF BORDERLINE CASE -A CASE REPORT

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Abstract

According to Buchin, any case is borderline when extraction of permanent teeth is required for an ideal and functional occlusion, but facial esthetics might get disturbed due to extraction, so a dichotomy exists diagnosis and treatment planning of borderline cases.¹This case report discusses one of the borderline case done with Damon™ Self- ligating bracket system, a synonym for non-extraction treatment modality, by extracting all first premolar. As extraction decision is made by considering the various factors such as; Tooth material-arch length discrepancy, soft tissue facial profile, nose prominence, and maxillary dental protrusion, vertical dimension, lip procumbency, crowding, sagittal dimension, incisor – mandibular plane angle (IMPA), lower lip to the E-plane as suggested by Ricketts and midlineetc.²

Key Words: Damon™ Self- ligating bracket system, Borderline case, Ceramic brackets, Extraction vs Non-extraction. Prominent nose. soft tissue profile.

INTRODUCTION

Damon™ Self-ligating bracket system, a synonym for non-extraction treatment, works on expansion principle. Self-ligating system (SPEED, TIME, DAMON Q etc) is not new in orthodontics but its popularization is quite new, as history of Self-ligating system starts from Russell attachment, first Self-ligating system. The Damon™ philosophy works on the principle of using threshold force. A very low force when applied, lip restricts anterior movement of the dentition and the tongue contribute to posterior expansion.¹A number of case reports have documented increased arch length with the Damon Self-ligating system, upto more than 10mm in intermolar region that facilitates non-extraction. The long-term stability of this significant change is highly reliant on permanent retention.⁴

In 20th centenary, Angle favoured non-extraction philosophy based on line of occlusion. Calvin Case, says extractions should never be done to facilitate orthodontic mechanics but should provide the best treatment.⁵Keedy remarks that extraction is determined by muscle tension and stability.

CASE REPORT

A 20 yr female patient comes to the dept. of orthodontics and dentofacial orthopedics with complaint of irregularly placed upper front teeth.

DIAGNOSIS

Extra orally, mesocephalic head and a mesoprosopic facial type is seen. Patient's profile is convex, with a posterior facial divergence. Nasolabial angle was acute, more of due to prominent nose, and potentially incompetent lips. Patient showed an orthognathic chin with a vertical pattern (Figure 1).

An intraoral examination reveals Class I canine and molar relation bilaterally. A "U shaped" maxillary and mandibular arch, with proclined maxillary incisors and 3 mm of overjet and overbite. Rotation was observed with

respect to 11,12,13,14,21,22,23,24. Smile assessment revealed 5 mm of incisor display without any gingival exposure. Patient oral hygiene status was good. TMJ examination shows no history of pain or clicking while various jaw movements. The right and left excursive movements were normal with a maximum mouth opening of 40 mm (Figure. 1).

HISTORY

Patient does not give any relevant medical history. Patient gives the history of dental filling with uneventful experience.

Orthopanthamogram (OPG) and Cephalometric analysis

Third molars were present inOPG. Optimum alveolar bone level were present for orthodontic mechanotherapy (Figure 1).

Cephalometric examination revealed pretreatment ANB angle of 4⁰ suggesting Skeletal Class II malocclusion. Patient exhibited an increased mandibular plane angle and an increased incisor mandibular plane angle. Dento-alveolar analysis showed proclined upper and lower anteriors with increased interincisal angle (Figure. 1).

Model analysis

Arch perimeter analysis concluded a 1.5 mm of maxillary tooth material excess and Carey's analysis showed 6.5 mm mandibular tooth material excess. Bolton says mandibular anterior tooth material excess of 0.4 mm while overall mandibular tooth material excess was 0.5 mm.

Treatment Goals:

1. To obtain a static and functional occlusion
2. Stability of the achieved result.

Treatment Objectives:

1. To level and align the teeth.
2. To maintainan ideal overjet and over bite.
3. To maintain Class I canineand molar relation.
4. To achieve lip competency.
5. To maintain the stability of result.

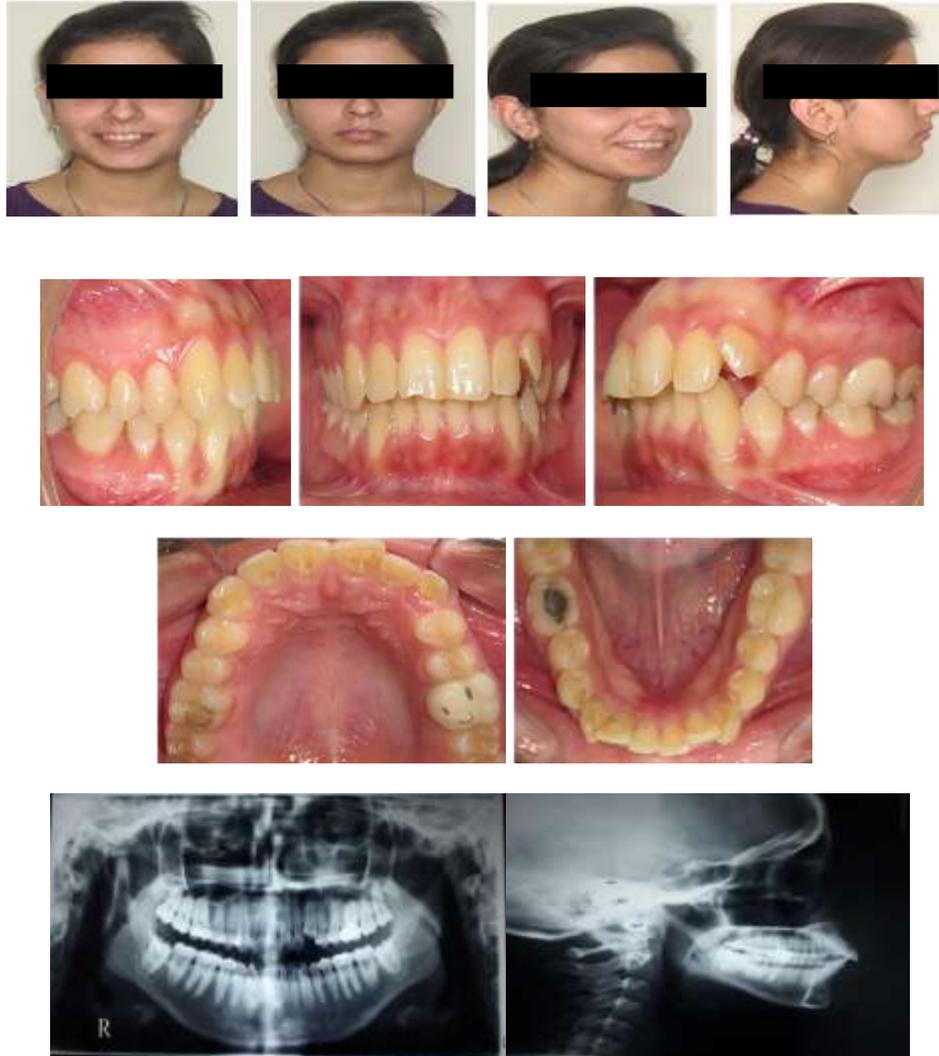


Figure 1: Pre-Treatment Records

| Measurements | Norm | Pre-Treatment | Post Treatment |
|--------------------------------|------------------------------|------------------|------------------------------|
| SNA (angle) | 82 ⁰ | 85 ⁰ | 82 ⁰ |
| SNB (angle) | 80 ⁰ | 81 ⁰ | 80 ⁰ |
| ANB (angle) | 2 ⁰ | 4 ⁰ | 2 ⁰ |
| U I to N-A(mm) | 4 mm | 5 mm | 3 mm |
| UI to N-A(angle) | 22 ⁰ | 27 ⁰ | 22 ⁰ |
| L I to N-B (mm) | 4 mm | 6 mm | 4 mm |
| L I to N-B (angle) | 25 ⁰ | 30 ⁰ | 26 ⁰ |
| U I to LI (Interincisal-angle) | 131 ⁰ | 117 ⁰ | 128 ⁰ |
| MPA | 32 ⁰ | 33 ⁰ | 32 ⁰ |
| IMPA | 90 ⁰ | 98 ⁰ | 94 ⁰ |
| Lip strain | Equal to upper lip thickness | 3mm | Equal to upper lip thickness |

Table 1 (Reading of patient's lateral cephalogram tracing)

Treatment alternatives:

1. Non-extraction approach, as with Damon™ Self – ligating system.
2. Extraction 14, 24, 34, 44 for achieving better smile and aesthetic.

Treatment Plan:

Both treatment alternatives were discussed with patient and her parents. Patient was co-operative and willing for both options. We choose for all four first premolar extraction option with group B anchorage considering her smile and soft tissue profile.

Treatment progress:

Maxillary and mandibular first premolars were extracted. Fixed orthodontic appliance with a pre-adjusted edgewise appliance of 0.022” slot (Damon™ Clear²) bracket

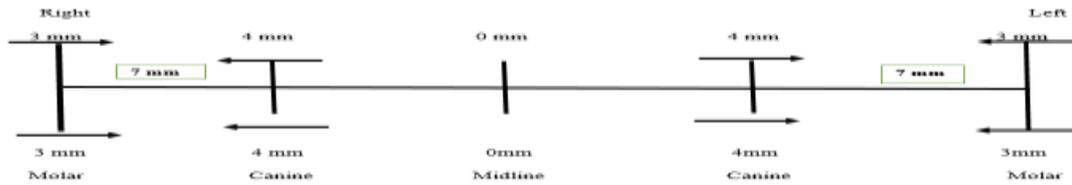


Figure 2: Dental VTO (Anticipated Treatment Plan)

prescription. To level and align both arches, an initial 0.014" round NiTi arch wire (3M Unitek™ Nitinol Super Elastic Wire) was used. Gradually upper and lower 0.019" x 0.025" SS wire were reached. At the end of 20 weeks, enough leveling and aligning had occurred. Enmass retraction of anterior teeth were carried out using

an active tie-back. After the closure of extraction space, 0.014" round NiTi wire (3M Unitek™ Nitinol Super Elastic Wire) were used for 20 weeks for final settling. Followed which brackets were debonded. Fixed upper and lower bonded retainers were given after debonding.



Figure 3: Mid-Treatment Records

Treatment Result:

Post treatment facial photographs showed a satisfactory facial esthetic, with Class I canine and molar bilaterally.

This resulted in an enhanced self- esteem of the patient (Figure 4). Movement of the maxillary incisors contributed to correction of lip strain. Fig 5- shows superimposition after treatment completion.





Figure 4: Post-Treatment Records

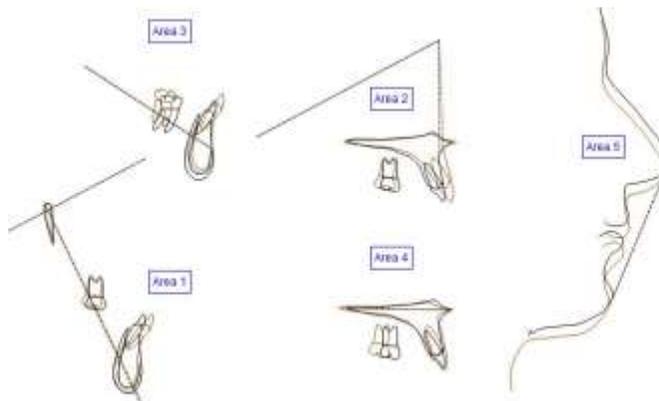


Figure 5- Superimposition: Sella – Nasion at Nasion. Red Line-Pre-treatment, Black Line – Post-treatment

DISCUSSION

Class I malocclusion, were treated by: extraction and non-extraction alternatives. Extractions are done to correct crowding, protrusion and the overlying soft tissue. In non-extraction cases expansion of the arches, molar distalization or proximal stripping are done. Straight soft tissue profile and upright incisor position are pre-requisite for non-extraction.⁶⁻⁷

Deciding factors for extraction involves need to obtain space, to align teeth or retract anterior teeth, tooth material and arch length discrepancy, lip strain. Extraction to align teeth may compromise facial esthetics, making it “dish-in” profile.³

CONCLUSION

Damon™ bracket system cannot rescue extraction on the expense of expansion of arches, as advised by Damon™ system. Whether to extract the teeth or not depends not only the space requirement to correct the malocclusion but depends on various factors like stability of treatment result achieved, as stated by Proffit et al an increase in intercanine and intermolar width of more than 3mm is not stable. In lower arch much expansion does not occur because of thicker bone than in maxilla.

Declaration of patient consent

The author certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity can't be guaranteed.

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