

## Comparative Study Of Soft Tissue Changes With Bionator And Twin Block Treatment

### Abstract

Facial analysis is used to identify positive and negative facial traits in an effort to optimize facial changes. During the last few decades, orthodontics researchers have put on increasing amount of efforts into the investigation of evaluating changes in the soft tissue profile produced by various means of Orthodontics treatment. This is because of the fact that attainment of optimum soft tissue facial balance and harmony is now considered as one of the main goals of orthodontics treatment rather than setting for a good occlusion. In the field of dentofacial orthopedics correcting the skeletal, dental and soft tissues morphology at an young age provide a basis for continuing normal development of this structure. Serial lateral cephalometric radiographs were taken before and after successful treatment in cases of treated groups with class - 1 molar relationship and acceptable soft tissue profile.

This study was conducted to compare the soft tissue changes in the facial profile brought about by a removable functional appliance. The Removable functional appliances chosen in this study were the Bionator and Twin Block appliances. Pre and post treatment lateral Cephalometrics radiographs were study.

**In this Present study:** There was comparison of soft tissues changes between the bionator group and twin block group. The bionator and the twin block groups showed significant changes in the soft tissue facial complex as compared to the untreated group.

Pre and post treatment lateral Cephalometric radiographs of 30 children having class II division I malocclusion and aged between 9-13 years were obtained out of these 10 children were successfully treated with Bionator and 10 were successfully treated with Twin Block & remaining 10 children consisted of untreated group.

It would be reasonable to assume that the result of the study could be used as an additional guide to the Orthodontist regarding his choice of functional appliances.

### Key Words

Twin block (T1), Bionator (T2), Class II div 1, Cephalometrics, Soft tissue landmark

### Introduction

Soft tissue goals are not given importance it deserved; hence it was not until the 1950's that attempts were made to study soft tissue profile relation to orthodontics treatment. After 1950 soft tissue measurements' were introduced into cephalometrics and were quickly recognized as important factor in treatment planning

In modern orthodontics era Dr. Edward H angle was one of the first to write about facial harmony, emphasizing the importance of soft tissue in orthodontics treatment planning. Importance of soft tissue in orthodontics diagnosis and treatment planning was also emphasized by Dr. Charles tweed, Dr. William downs, stoner Lindquist etc.

### Aims and Objectives

The objective of this study is to cephalometrically compare the soft

tissue changes occurred between Bionator and twin block appliances in class-II div-1 cases over a period of nine months.

### Material and Methods

The 30 subjects were selected for the study from general Indian population. These patients were having class-II div-1 malocclusion between age group ranging 9-12 years. These 30 subjects were selected from general population by fulfilling the following selection criteria.

1. Skeletal and dental angle's class-II div- 1 malocclusion.
2. Angle ANB } 5
3. Positive VTO (visualise treatment objective)
4. Horizontal growth pattern with angle FMA { 25
5. Overjet 6-10 mm.
6. Positive overbite
7. Lateral cephalogram orthopentamograph and handwrite

<sup>1</sup> Rajinder Gupta

<sup>2</sup> Sanjeev Soni

<sup>3</sup> Pankaj Gupta

<sup>4</sup> Jasjit Kaur

<sup>5</sup> Navneet Sharma

<sup>6</sup> Harpal Singh

<sup>1</sup> Prof and Head

<sup>2</sup> Reader

Department of Orthodontics

<sup>3</sup> Reader

Dept of Oral & Maxillofacial Surgery  
Desh Bhagat Dental College,  
Sri Muktsar Sahib, Punjab.

<sup>4</sup> Assistant Professor

Department of Prosthodontics

<sup>5</sup> Reader

Dept of Oral Medicine & Radiology  
HDC, Sunder Nagar, Himachal Pradesh

<sup>6</sup> Prof and Head,

Department of Prosthodontics  
Desh Bhagat Dental College,  
Sri Muktsar Sahib, Punjab.

### Address For Correspondence:

Dr. Rajinder Gupta

Prof and Head,

Department of Orthodontics,  
Desh Bhagat Dental College,  
Sri Muktsar Sahib, Punjab.

Mobile: 9814900885,

Email-rajgupta\_ortho@yahoo.co.in

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radiographs were obtained from each of the subject.

The 30 patients were divided into the following three groups of 10 patients each.

- The Bionator removable appliance were given to 10 indian patients taken from general population
- The twin block removable appliance were given to 10 indian patients taken from general population
- 10 Patients with untreated group.

Sr No	Number Of Patients	Appliance Treatment Given
1	10	Bionator Appliance
2	10	Twin Block
3	10	Untreated Group

The study was undertaken to compare soft tissue changes in skeletal and dental class-II div-1 cases. The cephalometric analysis was done on the lateral cephalograms of these patients .

**Cephalometric Analysis:** The following points were traced on the soft tissue profile as seen on the lateral cephalogram. The following measurements were obtained from these lateral cephalograms. The values obtained from cephalograms were statistically analyzed and results were obtained.

The following points were traced on the soft tissue profile as seen on the lateral cephalogram.

1. Glabella (G)- The prominent point in mid-sagittal plane on the forehead.
2. Soft Tissue Nasion (N)- The soft tissue counterpart of the hard tissue nasion (N).
3. Point 'P' - The most prominent point on the tip of the nose.
4. Subnasale (Sn) - The point of which the nasal septum merges with the upper cutaneous lip in the mid sagittal plane.
5. Labrale superius(Ls) - A point indicating the mucocutaneous border of the upper lip.
6. Stomion superius ( Stms) - Lowermost point on the vermilion of upper lip.
7. Stomion inferius (Stmi)- Upper most point on the vermilion of the lower lip.
8. Labrale Inferius (Li)- A point indicating the mucocutaneous border of lower lip.
9. Mentolabial sulcus (Ils) - The point of greatest concavity in the midline between the lower lip & chin.



10. Soft tissue pogonion ( Pog)- The most anterior point on soft tissue chin.
11. Soft tissue menton ( Me)- The most inferior point on the soft tissue chin.

## Results

**1. Angle anb:** Angle anb decreased by 3.3% (p<0.001) in group and by 2.2% (p<0.001) in t2 group.

**2. Lower anterior facial height:** The lower anterior facial height increased.

**a.Facial convexity:** Decrease in facial convexity t2 group was more than t1 group.

**b. inter labial gap:** The interlabial gap decreased after treatment by 2.2mm(p<0.05)in the t1 group and by 3.2 mm

**3. Lower anterior facial height (soft issues):** These findings indicate that like the skeletal LAFH, the soft tissue LAFH also increased after functional therapy. This increase was however more after Twin block treatment than after bionator treatment.

**4. Maxillary Prognathism:** This was no significant post-treatment change in position of maxillary in either of the 2 study groups

Comparison Of Soft Tissue Changes Between Bionator And Twin Block Groups

1	MEASUREMENT	TREATMENT GRP. (T1)		CONTROL GRP. (C)		MEAN DIFF.	't' VALUE	'p' Value
		Mean	S.D.	Mean	S.D.			
A	SKELETAL							
1.	Angle ANB	-3.3°	0.4216	-2.2°	0.4216	-1.1°	5.8341	<0.001
2.	LAFH (ANS-Me)	+3.15mm	0.4743	+4.8mm	1.6855	1.6mm	2.9783	<0.01
B	SOFT TISSUE							
I	FACIAL							
1.	Facial convexity	-4.15°	0.5297	-2.4°	2.9515	-1.75°	1.8455	NS
2.	Interlabial Gap	-2.2mm	0.8882	-3.2mm	2.2509	1.0mm	1.3068	NS
3.	LAFH (Sn-Me)	+3.25mm	0.6687	+4.8mm	0.9189	-1.55mm	4.3130	<0.001
II	MAXILLA							
	Max. Prognathism	+1.6mm	0.8433	+0.9mm	0.8759	0.7mm	1.8209	NS
III	MANDIBULE							
	Mand. Prognathism	-5.2mm	1.1832	-6.95mm	1.5961	0.3mm	0.4777	NS
IV	UPPER LIP							
1.	Length	+2.2mm	1.6865	+2.6mm	1.8974	-0.4mm	0.4983	NS
2.	Thickness	+0.25mm	1.3176	+1.6mm	2.0111	-1.35mm	1.7756	NS
3.	Procumbency							
a.	U.Lip-'S' line	-2.2mm	1.8135	-2mm	1.4142	-0.2mm	0.2756	NS
b.	U.Lip-'E' line	-1.3mm	2.0028	-2.3mm	1.0593		1.3957	NS
c.	Nasolabial Angle	+6.85°	4.8256	+8.8°	8.0939	-1.95°	0.6544	NS
d.	H-Angle	-3.7°	4.2960	-4.5°	2.6771	-0.8°	0.4998	NS
V	LOWER LIP							
1.	Length	+2.25mm	1.1365	+2.1mm	0.9944	.15mm	0.3414	NS
2.	Thickness	-1.35mm	1.0554	-2.1mm	3.4785	.75mm	0.6524	NS
3.	'B' thickness	+0.1mm	1.8529	+1.2mm	0.4216	-1.1mm	1.8305	NS
4.	Procumbency							
a.	l lip to 'S' line	+2.25mm	0.7528	+0.45mm	1.3427	1.75mm	1.4507	NS
b.	l lip to 'E' line	+1.65mm	0.4743	+1.2mm	1.3984	0.45mm	0.9637	NS
c.	Mento labial sulcus	-2.1mm	0.6146	-2.05mm	1.3006	-0.05mm	0.1099	NS
d.	Mentolabial Angle	+22.85°	1.4347	+23.1°	3.8118	-0.25°	0.0569	NS
VI	NOSE							
	Prominence	+1.7mm	0.6749	+1.4mm	2.7568	0.3mm	0.3343	NS
VII	CHIN							
1.	Pog' thickness	+1 mm	1.4337	+0.6mm	1.4298	+0.4mm	0.6247	NS
2.	'Z'-Angle	+6.1°	1.005	+5.5°	1.8409	+0.6°	0.9046	NS

**5. Mandibular Prognathism:** All these findings indicated that the improvement in the soft tissue facial convexity was brought about more by the forward movement of the pg point rather than any restrictive effect.

**6. Nasolabial Angle:** Although it increased

**7. H-Angle:** Post-treatment evaluation of H-Angle showed a reduction

**8. Lower Lip Length:** The length of the lower lip increased

**9. Mentolabial:** The depth of Mentolabial sulcus decreased

**10. Mentolabial Angle:** After treatment the lower lip uncurled. Thus increasing the Mentolabial angle.

**11. Nose Prominence:** Significant change in the prominence of the nose.

**12. Z Angle:** This angle increased after treatment.

#### Discussion

When treatment is done in a mixed dentition stage, functional appliances are said to bring about marked improvement in the skeletal relationships, while these functional appliances affect the hard tissues, they also produce a marked improvement in the soft tissue facial balance and harmony.

**Skeletal:** A significant decrease in angle SNA along with an angle SNB with the use of functional appliances.

**Lower anterior facial height:** There was a significant post-treatment increase in the skeletal lower anterior facial height in both the treatment groups as compared to minimal changes in control group.

**Facial:** Facial convexity showed a significant post-treatment decrease this decrease in facial convexity was, to a greater extent, the result of soft-tissue pogonion coming forward.

#### Summary and conclusion

The purpose of this study was to compare the changes in the soft tissue profile brought about by the removable functional appliances. The removable functional appliances chosen in this study were the bionator and twin block

appliances.

Thus, based on the sample of this study, the following conclusions can be drawn:

- Treatment with the bionator as well as twin block leads to appreciable decrease in soft tissue facial convexity.
- No restraining effect on the maxilla was observed after bionator or twin block treatment.
- Minimal effect on upper lip length and thickness was observed after treatment with either of these functional appliances.
- In case of treatment with a removable functional appliance, patient cooperation is a very important factor if this factor is overcome, then this appliance can be equally efficient as affixed functional appliance.

#### References

1. Anderson PJ, Donald R, Joondeph, David I, Turpin. A cephalometric study of profile changes in orthodontically treated cases ten years out of retention. *Am. J. Orthod* 1973; 43: 324-336.
2. Battaglie JM. Profile changes in class II division I malocclusion: A comparison of the effects of edgewise and frankel appliance therapy. *European journal of orthodontics* 1989; 11:243-253.
3. Burstone CJ. The integumental profile. *Am. J. orthod* 1958; 44: (1) 1-25.
4. Burstone CJ. Lip posture and its significance in Treatment planning. *Am. J. Orthod* 1967; 52(4) 262-284
5. Chaconas SJ, Batroff JD. Prediction of normal soft tissue changes. *Am. J.*

*orthod* 1975; 45(1)12-19.

6. Clark WJ. The twin blocks traction technique. *European journal of orthodontics* 1982; 4: 129-138.
7. Jacobson A. *Radiographic cephalometric from basics to video imaging* Quintessence Publication Co, Inc 1995; 239-253.
8. Kazutaka K. Soft tissue adaptability to hard tissues in facial profile. *Am. J. Orthod*; 1998; 1:193-199.
9. Lange DW. et.al. Changes in soft tissue profile treatment with the Bionator. *The Angle Orthodontist*. 1995; 65:423-430
10. Legan HL, Burstone CJ, Soft tissue cephalometric analysis for Orthognathic Surgery. *J. Oral Surgery*; 1981 38; 746-751.
11. Looi KL, Mills JR. The effect of two contrasting forms of Orthodontics treatment on the facial profile" *Am. J. Orthod*; 1986; 89:507-517.
12. Luder HU. Skeletal profile changes related to Patterns of activator effect. *Am. J. Orthod*; 1982 81; 390-396
13. Lund DI and Sandler PJ. The effect of Twin Blocks; A prospective controlled study. *American Journal of Orthodontics and Dentofacial Orthopedics*; 1998 113; 104-110.
14. Mamandars AH, Allen LP. Mandibular response to Orthodontics treatment with the Bionator appliances. *Am. J. Orthod. Dentofac. Orthop.* 1990; 97:2:113-120.
15. McNamara James Jr. Components of Class II malocclusion in Children 8-10 years of age. *The Angle Orthodontist*; 1981 51; 8:177-202.

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