

Case Reports

Reverse twin block and facemask: A better option for class III treatment?Prof. Dr. Y Rajmohan Shetty¹, Prof. Dr. Amitha M. Hegde², Dr. Anisha Keshan³, Prof. Dr. Manju R⁴¹Professor, Department of Pedodontics and Preventive Dentistry, A B Shetty Memorial Institute of Dental Sciences, NITTE University, Mangalore, Karnataka²Senior Professor and Head, Department of Pedodontics and Preventive Dentistry, A B Shetty Memorial Institute of Dental Sciences, NITTE University, Mangalore, Karnataka³Post graduate, Professor, Department of Pedodontics and Preventive Dentistry, A B Shetty Memorial Institute of Dental Sciences, NITTE University, Mangalore, Karnataka⁴Professor, Department of Pedodontics and Preventive Dentistry, A B Shetty Memorial Institute of Dental Sciences, NITTE University, Mangalore, Karnataka***Corresponding author**

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Abstract: A lot of treatment options are available to treat a young individual with class III malocclusion. Most of them aim at correcting the maxillary deficiency and hardly any changes are seen in mandible. Moreover, most of the treatments are time consuming. This case report discuss a treatment option for three children between the age group of 8 to 10 years having class III malocclusion, with reverse twin block and facemask. The treatment outcomes were effective and the duration was shorter.

Keywords: facemask, reverse twin block, early treatment

INTRODUCTION

As an individual grows, the maxilla and mandible can achieve different sagittal relationship. Class III skeletal malocclusion is either due to mandibular prognathism or maxillary retrognathism [1]. Conventionally, the treatment approaches for correcting a class III malocclusion is done by growth modifications. Various treatment options for a class III malocclusion are bionator, frankel's III, eschlar appliances, chin cup, reverse twin block and facemask therapy [2].

Face mask, an orthopedic appliance essentially causes maxillary anterior displacement, improvement in facial profile, counter-clockwise rotation of the maxilla, mandibular backward and downward rotation, proclination of the maxillary incisors retroclination of the mandibular incisors, and increase in vertical dimension [3]. Twin block technique can be used for functional correction of class III [4]. Changes are mainly dento-alveolar. Skeletal change is limited to slight downward and backward rotation of the mandible, with an associated increase in anterior, vertical dimension [5]. This case report aims at describing three case scenarios where children between 8- 10 years are treated with a combination appliance of reverse twin block and facemask and showed results as

early as in four months.

CASE REPORTS**CASE 1:**

An 8 year old girl child reported to the department of pediatric dentistry with a chief complaint of lower teeth been in front of upper teeth. On clinical examination, patient's facial profile was concave with a prominent lower lip and a deficient mid face. The molar relation was angle's class III with an negative over jet of 3.5mm and a overbite of 3mm. Cephalometric analysis (table 1) showed a skeletal class III malocclusion which was due to maxillary retrusion (SNA 77°) as well as mandibular prognathism (SNB 79°). The child had a vertical growth pattern (y axis 68°).

Cervical maturation assessment on the lateral cephalogram showed that patient may be just around the mixed dentition growth spurt. Considering all the factors a combination appliance of reverse twin block and face mask was decided for the child. The aim of the treatment was to improve spatial jaw deformity, functional imbalance and to achieve desirable anterior occlusion and normal craniofacial growth.

The patient was educated and motivated to wear the appliance and was recalled every three weeks to assess the prognosis and correct usage of the appliance. Oral hygiene instructions were given at every appointment. The patient was asked to wear the face mask for 10 hours with a force of 350 Gms on each

side. At the end of three months a remarkable change was seen on the appearance of the child and a cephalometric analysis was done (table 1). The SNA was increased to 80 and there was a reduction of 2° in SNB. There was an edge to edge bite with a generalised open bite of 2mm all around. Esthetics was improved.

Table 1: Pre and post treatment cephalometric analysis of case 1

Angular measurement's	pre	post	Normal values (9yrs)
N-S-Ar (saddle)	122	126	123±5
S-Ar-Go (articular)	138	140	143±6
Ar-Go-Me (gonial)	142	148	128±7
Sum of above	397	404	396±6
Ar-Go-N	56	58	52-55
N-Go-Me	80	84	78.3
SNA	77	80	79
SNB	79	77	74.3
ANB	-1	3	4.7
SN-PR	76	84	84
SN-ID	77	80	81
Pal-MP(basal plane angle)	30	32	32.9
Y axis	68	71	66
I-SN	96	108	96-100
I-MP	92	90	88-90
I-I	120	114	135
MP	40	42	32
Pal- Occ	15	15	11
Mp-Occ	15	17	14
Extent of Maxillary basal	37 mm	37.5 mm	44 mm
Extent of Mandibular basal	54 mm	54 mm	67 mm
Ramal length	39.5 mm	40 mm	46 mm



Fig 1: Extra oral Pictures of Case 1

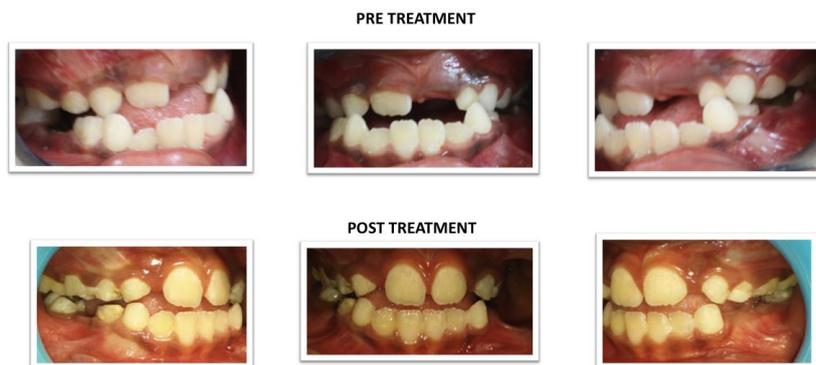


Fig 2: Intraoral Pictures Of Case 1

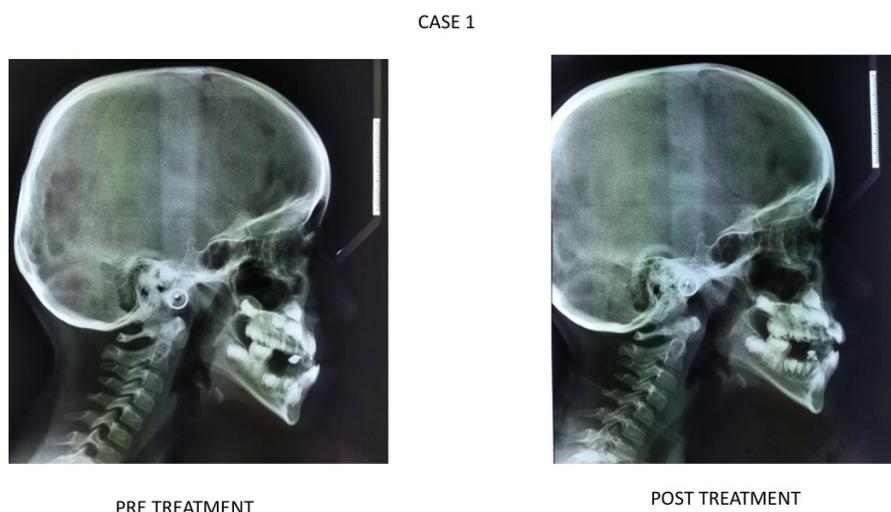


Fig 3: Lateral Cephalograms Of Case 1

CASE 2:

Another 8 year old girl child reported to the department of pediatric dentistry with a chief complains of forwardly placed lower teeth. On clinical examination, patient’s facial profile was concave with a prominent lower lip and a deficient mid face. The molar relation was angle’s class III with an edge to edge bite. Cephalometric analysis (table 2) showed a skeletal class III malocclusion which was due to maxillary retrusion (SNA 76°). There was prognathism of mandible seen and the SNB was 78° cervical maturation assessment on the lateral cephalogram showed that patient may be just around the mixed dentition growth spurt. A

combination appliance of reverse twin block and face mask was decided for the child. The patient was asked to wear the face mask for 10 hours with a force of 350 Gms on each side.

At the end of only three months a remarkable change was seen on the appearance of the child. A positive overjet of 1 mm was obtained and the single tooth cross bite was corrected. Cephalometric analysis was done (table 2). The ANB increased from -2 to 0. There was an increase in SNA by 1° and a reduction in SNB by 1°. Saddle angle increased by 2 which suggests retrusion of mandible.

Table 2: Pre and post treatment cephalometric analysis of case 2

Angular measurement's	pre	post	Normal values (9yrs)
N-S-Ar (saddle)	123	125	123±5
S-Ar-Go (articular)	148	145	143±6
Ar-Go-Me (gonial)	127	124	128±7
Sum of above	398	394	396±6
Ar-Go-N	54	53	52-55
N-Go-Me	73	71	78.3
SNA	76	77	79

SNB	78	77	74.3
ANB	-2	0	4.7
SN-PR	78	79	84
SN-ID	78	77	81
Pal-MP(basal plane angle)	25	23	32.9
Y axis	66	67	66
I-SN	105	106	96-100
I-MP	92	88	88-90
I-I	127	131	135
MP	35	34	32
Pal- Occ	10	11	11
Mp-Occ	15	12	14
Extent of Maxillary basal	29 mm	29.5 mm	44 mm
Extent of Mandibular basal	62 mm	62 mm	67 mm
Ramal length	41 mm	42 mm	46 mm



Fig 4: Extra oral Pictures of Case 2



Fig 5: Intraoral Pictures of Case 2

CASE 2



Fig 6: Lateral Cephalograms of Case 2

CASE 3:

Another 10 year old boy reported to the department of pediatric dentistry with a chief complaint of irregularly placed upper right front teeth. On clinical examination, patient’s facial profile was concave with a prominent lower lip and a deficient mid face. Intra oral examination revealed a mixed dentition. The molar relation was angle’s class I with anterior crossbite. Cephalometric analysis (table 3) showed a skeletal class

III malocclusion which was due to mandibular protraction (SNB 84°). Considering all the factors a combination appliance of reverse twin block and face mask was decided for the child. The patient was asked to wear the face mask for 10 hours with a force of 350 Gms on each side. At the end of only two months remarkable change was seen on the appearance of the child. A positive overjet of 1 mm was obtained. Cephalometric analysis was done (table 3).

Table 3: Pre and post treatment cephalometric analysis of case 3

Angular measurement's	pre	Post	Normal values (9yrs)
N-S-Ar (saddle)	124	125	123±5
S-Ar-Go (articular)	137	140	143±6
Ar-Go-Me (gonial)	133	130	128±7
Sum of above	394	395	396±6
Ar-Go-N	58	55	52-55
N-Go-Me	72	74	78.3
SNA	80	81	79
SNB	84	80	74.3
ANB	-4	1	4.7
SN-PR	83	83	84
SN-ID	84	81	81
Pal-MP(basal plane angle)	23	32	32.9
Y axis	64	65	66
I-SN	111	114	96-100
I-MP	89	86	88-90
I-I	130	125	135
MP	31	35	32
Pal- Occ	8	6	11
Mp-Occ	15	25	14
Extent of Maxillary basal	40 mm	40.5 mm	44 mm
Extent of Mandibular basal	65mm	65 mm	67 mm
Ramal length	45 mm	45 mm	46 mm



Fig 7: Extra oral Pictures of Case 3



Fig 8: Intraoral Pictures of Case 3

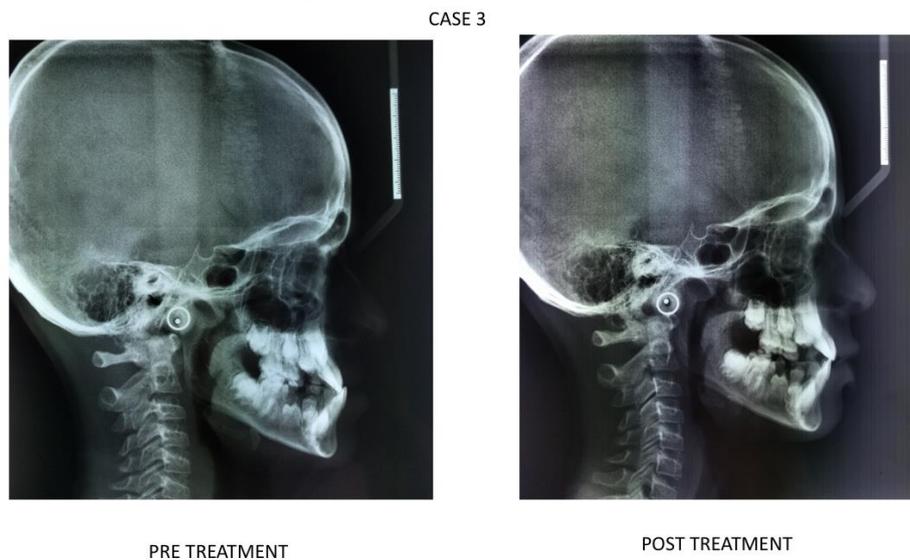


Fig 9: Lateral Cephalograms of Case 3



Fig 10: Superimposition of Pre and Post Lateral Cephalograms of the Three Patients

DISCUSSION:

Treating a malocclusion at an early age by utilising growth spurts has a lot of advantages like avoiding complex orthodontic treatment, avoiding psychologic trauma at adolescent age. The treatment plan in the present case scenario aimed at correcting the maxillary retrognathism and the mandibular prognathism with the help of reverse twin block and face mask. A combination appliance is designed so as to correct multiple problems and to combat the deficiency of one appliance with other.

Facemask along with Rapid maxillary expansion protracts maxilla and pulls the maxilla outward and downward where as reverse twin block acts by restricting the mandibular growth and maintaining the mandible at a retruded position at centric occlusion. A combination appliance will act both on maxilla and mandible unlike single appliance which acts on individual jaws.

A lot of changes were observed as early as in 3 months like the SNA increased by around 2 degrees SNB decreased by 2 degrees in all the three cases. An increase in Y axis was also seen which indicated vertical growth of the jaws which is common with myofunctional and orthopedic changes. In one of the cases, the basal plane angle and the mandibular plane angle decreased two months after appliance delivery because of correction of edge to edge bite. There was an increase in maxillary basal length in all the three cases and no change in the mandibular basal length. However, the ramal length increased by 1 mm in one of the cases.

A wide variety of changes has been found in the literature. The changes normally observed after maxillary expansion and protraction have been the anterior displacement of the maxilla, with an increase of

the SNA angle. This is possible due to the anterior shift of point A, and to the mandibular clockwise rotation, with retro positioning of point B. Additionally, a backward and downward rotation of the mandible occurs, resulting in changes of the Y axis. The retroclination of the mandibular incisors increases, causing a decrease of the IMPA value [6]. Kidner *et al.*; in their evaluation of the reverse twin block appliance on 14 subjects less than 12 years of age found that the changes were mainly dentoalveolar and the skeletal changes limited to slight downward and backward rotation of the mandible [7].

Combination therapy with reverse twin block and face mask maximizes the forward component of force on maxilla converting the technique to functional orthopedic system. Clark states that reverse angulations of block harnesses occlusal forces to advance the maxilla and maxillary dentition while using the mandible as an anchorage and restricting its development [8]. The additional functional forces with the reverse twin block would keep the maxilla protracted whenever the facemask is not worn. In contrast the effect of the reverse twin block appliance alone is primarily limited to the dentition due to proclination of the upper incisors and retroclination of the lower incisors [2].

CONCLUSION:

This case report demonstrates the use of myofunctional and orthopedic appliance at a very early age and the advantage of attaining quick positive result. Face mask has always been a treatment of choice for class III malocclusion and has shown successful results. But a combination of reverse twin block and facemask therapy has shown more promising results in a shorter duration of time and should be used in a regular basis for treatment of class III malocclusion in growing children.

REFERENCES:

1. Guyer EC, Ellis EE 3rd, McNamara JA Jr, Behrents RG. Components of class III malocclusion in juveniles and adolescents. *Angle Orthod.* 1986 Jan; 56(1):7-30.
2. Chugh VK, Tandon P, Prasad V, Chugh A. Early orthopedic correction of skeletal Class III malocclusion using combined reverse twin block and face mask therapy. *J Indian Soc Pedod Prev Dent.* 2015 Jan-Mar;33(1):3-9
3. Verma G, Nagar A, Tandon P, Verma SL. Management of developing Class III malocclusion. *Indian Journal of Oral Sciences.* 2014 Sep 1; 5(3):134.
4. Sargod SS, Shetty N, Shabbir A. Early class III management in deciduous dentition using reverse twin block. *Journal of Indian Society of Pedodontics and Preventive Dentistry.* 2013 Jan 1; 31(1):56.
5. Kidner G, DiBiase A, DiBiase D. Class III Twin Blocks: a case series. *J Orthod.* 2003 Sep;30(3):197-201
6. Seehra J, Fleming PS, Dibiase AT. Reverse Twin Block appliance for early dental Class III correction. *J Clin Orthod.* 2010 Oct;44(10):602-10
7. Franchi L, Baccetti T, McNamara JA. Postpubertal assessment of treatment timing for maxillary expansion and protraction therapy followed by fixed appliances. *Am J Orthod Dentofacial Orthop.* 2004 Nov;126(5):555-68
8. Clarke WJ. Treatment of Class III malocclusion. In: *Twin block Functional therapy.* 2nd ed. London: Mosby, 2002: 229.