Discomfort, Expectations and Experiences during Treatment of Class II Malocclusion with Clear Block and Twin Block Appliance - A Pilot Survey

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ABSTRACT

BACKGROUND

Skeletal class II division 1 malocclusion is an antero posterior discrepancy between maxilla and mandible which is usually treated by functional appliances when the patient is in the growing phase. It has been shown that these functional orthodontic appliances may lead to pressure on the oral mucosa, soft tissue tension, oral constriction, toothache and pain. They may also lead to fatigue or to functional speech and respiratory disorders, and they may affect the appearance of the face. All of these undesired consequences affect the patients' degree of compliance in a negative manner, and may in turn affect the patients' perception towards the treatment. This study was conducted to investigate patient perception of treatment need, appliance acceptance, expectations of treatment influence on oral health, value of dental aesthetics and information concerning treatment procedures.

METHODS

Total 30 samples were selected 15 samples were cases treated with twin block appliance and other 15 samples were treated with clear block appliance. After 8 months of treatment, a questionnaire survey was conducted assessing discomfort, expectations and experiences of all patients being treated with clear block appliance and twin block appliance.

RESULTS

Clear block seemed to be better with regard to all the parameters used in the study but on statistical analysis the difference between the two groups was insignificant.

CONCLUSIONS

Clear block appliance was designed to increase the compliance of the patient. However, clear block and twin block appliance have similar effects.

KEY WORDS

Class II, Clear Block, Twin Block

BACKGROUND

Skeletal class II division 1 malocclusion is an antero posterior (AP) discrepancy between maxilla and mandible which often results from either maxillary prognathism or mandibular retrognathism or a combination of both. In cases of growing class II division 1 with functional retrusion of lower jaw,[1] treatment can be done either by using removable myofunctional appliance or fixed functional appliance.

The term functional appliance refers to a variety of orthodontic appliances designed to induce a change in activity of the various muscle groups that influence the function and the position of the mandible in order to transmit forces to the dentition and the basal bone.[2] Altering the sagittal and vertical mandibular position causes changes in muscular forces and result in orthopaedic and orthodontic changes.[3-5] During functional appliance treatment, this alteration in forces may lead to pain and discomfort at various levels. It has been shown that the orthodontic appliances may lead to pressure on the oral mucosa, soft tissue tension, oral constriction, toothache and pain.[6,7] It has also been noted that removable appliances additionally may lead to fatigue or to functional speech and respiratory disorders, and they may affect the appearance of the face.[8]

Informing patients about possible problems and discomfort throughout functional treatment is beneficial in order to enhance the appliance efficiency and patient compliance.[9] It is known that patient cooperation may decline due to discomforts such as narrowing of the oral cavity and soft tissue irritation when orthodontic appliances are implemented. Speech difficulties can also be observed among patients, and the appearance of the appliances may be unpleasant during social interactions.[10,11,12] All of these undesired consequences affect the patients degree of compliance in a negative manner, and it is necessary to explain possible discomforts and how to eliminate them.[13,14] In this sense, it is important that the orthodontists select the suitable appliance for the patient.[15]

While selecting the functional orthodontic appliances, acceptability and intraoral condition of the patients should be taken into consideration. One way of assessing the acceptability of an appliance is to conduct surveys asking about the experiences of patients and their parents.[16,17]

Several types of myofunctional appliances are presented in the literature for the correction of class II division 1 malocclusion which are aimed at improving skeletal imbalances, arch form and the orofacial function.

To increase the compliance of the patient, clear block appliance was designed in our department.[18] It has a great advantage of being highly aesthetic and retentive, thereby improving the patient compliance manifold. It is less bulky and as this appliance consists of the thermoplastic material involving whole of the maxillary and mandibular dental arch, there is no development of posterior open bite, which is a routine finding with other mandibular advancement appliances. Moreover, because of lower incisor covering, there is decreased tendency of proclination of mandibular incisors, resulting in increased stability of mandibular incisors. Also, this appliance is easy to fabricate and requires minimal laboratory procedure, thus it is more cost effective. However, there is no much data available on the acceptance of this appliance by the patients.

Therefore, this study was conducted to investigate patient perception of treatment need, appliance acceptance, expectations of treatment influence on oral health, value of dental aesthetics and information concerning treatment procedures.

METHODS

This descriptive analytical study was conducted from October 2017 to July 2018 in the Department of Orthodontics and Dentofacial Orthopaedics. Ethical clearance was received from the ethical committee of Sharad Pawar Dental College and Hospital. 30 samples were selected from the cases seeking myofunctional treatment in the Department of Orthodontics and Dentofacial Orthopaedics. They were divided into 2 groups

1. Cases treated with twin block appliance - 15 of total sample
2. Cases treated with clear block appliance - 15 of total sample

After 8 months of treatment, a questionnaire survey was conducted assessing discomfort, expectations and experiences of all patients being treated with clear block appliance and twin block appliance. The questionnaire was validated by Dental Educational Unit (DEU). All the questions were close ended. It was a descriptive analytical study.

The questionnaire consisted of 17 different questions like does the appliance fall while sleeping, why did the patient opt for the particular treatment, any difficulties faced while sleeping or eating food, how was the experience with the appliance any pain or discomfort or did the appliance make the patient feel socially acceptable or not or did the patient had any problems with the speech or any gag reflex was experienced, was the appliance easy to wear, did it break got removed or during the treatment and how would the patient rate the appliance on wearing it. All the questions were graded as -

1. Very Good
2. Good
3. Average
4. Poor

The grading was based on the 4 point Likert scale. The data was collected by the authors. The questionnaires were given to the patients and got them filled at the specified time when they reported to the department.

Statistical Analysis

Statistical analysis was done by using descriptive and inferential statistics using chi-square test and software used in the analysis were Statistical Package for the Social Sciences (SPSS) 22.0 version and GraphPad Prism 7.0 version and $P < 0.05$ was considered as level of significance.

The questionnaire was validated by the institutional ethical committee.

RESULTS

As per our questionaries' we analysed the experiences of patients wearing clear block appliances. It was found that 80 percent of patients wearing clear block, experienced good fit of the appliance whereas 67 percent of patients wearing twin block experienced good fit of the appliance (Table 1, Q1).

When questions regarding the comfort of the patient with this appliance was analysed (Table 1, Q3, 7, 8, 14), about 80 % of the patients rarely experienced any difficulty in falling asleep while wearing the clear block appliance and 60 percent of patients wearing twin block appliance experienced any difficulty while asleep.

| Sl. No.	Question	Twin Block	Clear Block	χ2-Value	P-Value
Question 1	Very good	5 (33.33 %)	6 (40 %)	0.71	0.86, NS
	Good	5 (33.33 %)	6 (40 %)		
	Average	3 (20 %)	2 (13.33 %)		
	Poor	2 (13.33 %)	1 (6.67 %)		
Question 2	Very good	11 (73.33 %)	11 (73.33 %)	0.00	1.00, NS
	Good	0 (0 %)	0 (0 %)		
	Average	0 (0 %)	0 (0 %)		
	Poor	4 (26.67 %)	4 (26.67 %)		
Question 3	Very good	2 (13.33 %)	4 (26.67 %)	4.09	0.25, NS
	Good	6 (40 %)	8 (53.33 %)		
	Average	3 (20 %)	0 (0 %)		
	Poor	4 (26.67 %)	3 (20 %)		
Question 4	Very good	3 (20 %)	4 (26.67 %)	0.90	0.82, NS
	Good	5 (33.33 %)	6 (40 %)		
	Average	3 (20 %)	3 (20 %)		
	Poor	4 (26.67 %)	2 (13.33 %)		
Question 5	Very good	3 (20 %)	8 (53.33 %)	3.93	0.26, NS
	Good	6 (40 %)	3 (20 %)		
	Average	4 (26.67 %)	2 (13.33 %)		
	Poor	2 (13.33 %)	2 (13.33 %)		
Question 6	Very good	3 (20 %)	6 (40 %)	1.70	0.63, NS
	Good	5 (33.33 %)	3 (20 %)		
	Average	4 (26.67 %)	4 (26.67 %)		
	Poor	3 (20 %)	2 (13.33 %)		
Question 7	Very good	6 (40 %)	4 (26.67 %)	7.32	0.06, NS
	Good	2 (13.33 %)	7 (46.67 %)		
	Average	3 (20 %)	4 (26.67 %)		
	Poor	4 (26.67 %)	0 (0 %)		
Question 8	Very good	3 (20 %)	10 (66.67 %)	7.70	0.05, NS
	Good	8 (53.33 %)	2 (13.33 %)		
	Average	2 (13.33 %)	2 (13.33 %)		
	Poor	2 (13.33 %)	1 (6.67 %)		
Question 9	Very good	4 (26.67 %)	6 (40 %)	0.65	0.88, NS
	Good	5 (33.33 %)	4 (26.67 %)		
	Average	4 (26.67 %)	3 (20 %)		
	Poor	2 (13.33 %)	2 (13.33 %)		
Question 10	Very good	0 (0 %)	0 (0 %)	2.01	0.36, NS
	Good	8 (53.33 %)	9 (60 %)		
	Average	2 (13.33 %)	4 (26.67 %)		
	Poor	5 (33.33 %)	2 (13.33 %)		
Question 11	Very good	4 (26.67 %)	5 (33.33 %)	0.56	0.90, NS
	Good	4 (26.67 %)	5 (33.33 %)		
	Average	4 (26.67 %)	3 (20 %)		
	Poor	3 (20 %)	2 (13.33 %)		
Question 12	Very good	4 (26.67 %)	7 (46.67 %)	1.96	0.58, NS
	Good	4 (26.67 %)	4 (26.67 %)		
	Average	4 (26.67 %)	3 (20 %)		
	Poor	3 (20 %)	1 (6.67 %)		
Question 13	Very good	4 (26.67 %)	7 (46.67 %)	1.92	0.58, NS
	Good	5 (33.33 %)	4 (26.67 %)		
	Average	3 (20 %)	3 (20 %)		
	Poor	3 (20 %)	1 (6.67 %)		
Question 14	Very good	3 (20 %)	7 (46.67 %)	2.47	0.47, NS
	Good	6 (40 %)	4 (26.67 %)		
	Average	4 (26.67 %)	3 (20 %)		
	Poor	2 (13.33 %)	1 (6.67 %)		
Question 15	Very good	2 (13.33 %)	5 (33.33 %)	1.83	0.60, NS
	Good	7 (46.67 %)	6 (40 %)		
	Average	4 (26.67 %)	3 (20 %)		
	Poor	2 (13.33 %)	1 (6.67 %)		
Question 16	Very good	0 (0 %)	0 (0 %)	0.62	0.73, NS
	Good	1 (6.67 %)	1 (6.67 %)		
	Average	8 (53.33 %)	10 (66.67 %)		
	Poor	6 (40 %)	4 (26.67 %)		
Question 17	Very good	2 (13.33 %)	3 (20 %)	1.27	0.73, NS
	Good	6 (40 %)	7 (46.67 %)		
	Average	4 (26.67 %)	4 (26.67 %)		
	Poor	3 (20 %)	1 (6.67 %)		
Table 1. Comparison of Discomfort, Expectations and Experiences during the Treatment of Class II Malocclusion with Twin Block and Clear Block Appliances.					
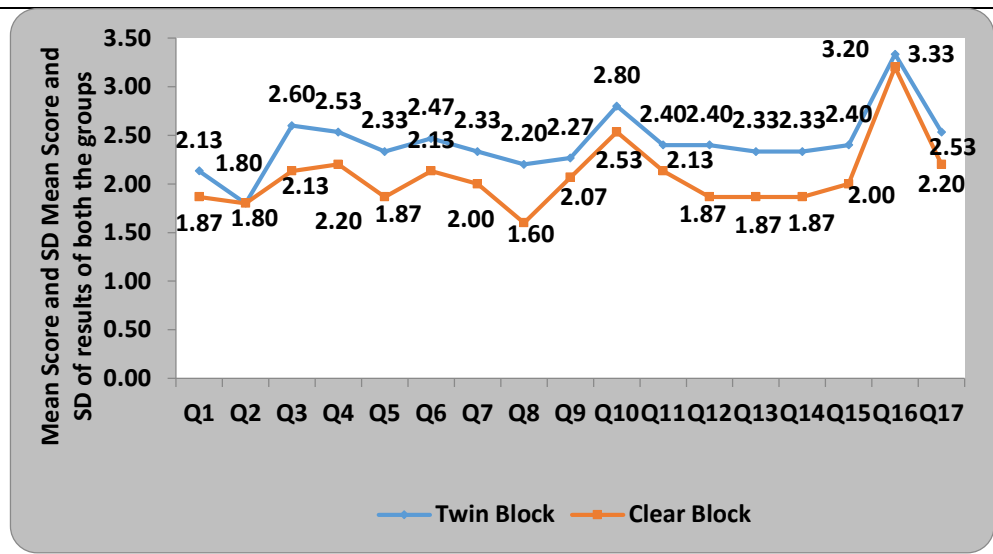
Figure 1. Comparative Evaluation of Discomfort, Expectations and Experiences during Treatment of Class II Malocclusion with Twin Block and Clear Block Appliances.

72 % of the patients were quite comfortable with the use of clear block appliance. 53 % of patients wearing twin block were comfortable with the appliance (Q3).

No discomfort or slight amount of discomfort was noted in around 80 % of the patients wearing clear block and in 73 % of patients wearing twin block (Q8). It was noted that 72 % and 60 % of the patients hardly complained of any injury by any part of the clear block and twin block appliance respectively (Q14).

When speech was noted, 60 % and 53 % of patients rarely had any speech discomfort in clear block and twin block appliance respectively (Q10) whereas 67 % and 60 % almost took around a week to adapt to proper acceptable speech in clear block and twin block appliance respectively (Q16).

About 66 % and 53 % of the patients rarely had any difficulty while mastication in clear block and twin block appliance respectively (Q4). 73 % clear block wearers and 60 % twin block wearers found the appliance socially acceptable

(Q5) 60 % of clear block patient and 53 % of twin block patient experienced less breakages with appliance (Q6.). 66 % of the clear block and 52 % of twin block patients rarely forgot to wear the appliance (Q11).

72 % of clear block and 55 % of twin block patients found it easy to wear and remove the appliance (Q12, 13). 73 % of clear block and 60 % of twin block patients wearing appliance were happier with the aesthetic appeal (Q15) and understood the need to wear them for future improved aesthetics.

(Q2) 66 % of clear block and 53 % of twin block patients rarely experienced gag reflex (Q17) and the overall experience was good with the use of clear block and twin block appliance (Q9). However, even though the clear block seems better with all these parameters on statistical analysis, the difference between the two groups was insignificant.

DISCUSSION

Patient response is an important aspect in myofunctional therapy. Patients may experience many difficulties and discomfort at various levels. Pain, toothache, difficulty in speech, oral ulcers due to pressure and impingement of appliance on the soft tissues are some of the difficulties experienced by the patient.[19] Also, the bulky appearance of the appliance makes it less socially acceptable.

Clear block appliance, being one of the newer functional appliances, was expected to have all the problems related to functional appliance.

From the results obtained, it was concluded that patients of both groups were comfortable with the appliance as it had a proper fit in the mouth. However, number of patients wearing clear block appliance with positive feedback were more than twin block appliance. This result contraindicates literature which mentioned that functional appliance cause discomfort to the patients. Akshay et al. (2017)[20] evaluated patients' response in twin block appliance and concluded that some amount of discomfort was experienced by the patients during the meals. Although, in a randomised trial control study by Hans George Sergle et al. (2000)[21] stated that patient's reaction to the treatment was responsible for the amount of acceptability and adaptation of the appliance with comfort.

Speech acceptability is the second most problem faced by the patients. From the results obtained from this study, majority of the patients from both the groups had acceptable speech and this acceptability was observed after 1 week of appliance wear. It was observed that patients wearing clear block appliance had greater amount of acceptability than patients wearing twin block appliance but was not significant. Previous studies have concluded that there is high degree of speech impairment in appliances such as bionator and headgear.[21] Also, functional appliance such as twin block led to speech impairment.[19]

Thus, it can be concluded from the above findings that speech impairment was observed considerably less in clear block appliance than twin block appliance but no significant difference was observed between the two.

Clear block and twin block appliance were also found to be socially acceptable among the patients and also there was an ease of mastication. More acceptance was seen with patients wearing clear block appliance but no significant difference was found between clear block and twin block. According to some studies, compliance with the treatment of functional appliance

was related to the social acceptance of the appliance. All the complaints of the patients were related to its social acceptability and not due to discomfort or appliance acceptability.[21]

Since clear block appliance does not consist of any wire component, its wear and removal were found to be easy with less breakages and damage to the appliance. Other functional appliances such as bionator, activator, twin block consist of wire components and thus their wear and removal were difficult with considerably more chances of breakages and damage to these appliances. Also, it was observed that patients with clear block appliance experienced considerably lesser gag reflex than patients wearing twin block appliance.

From the above observations, it was concluded that patients with clear block appliances were overall happy, satisfied and content with the appliance when compared with patients with twin block appliance. This positive response of the patients increases the acceptability towards the treatment pertaining to skeletal corrections.

CONCLUSIONS

Clear block appliance was designed to increase the compliance of the patient. It proved to be the best alternative to other myofunctional appliances. However, clear block and twin block appliance have similar effects. Acceptability and satisfaction of both the appliances is similar among the patients.

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