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RESEARCH ARTICLE

PATIENT EXPERIENCES WITH FIXED TWIN BLOCK

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ABSTRACT

The aim of this study was to assess the patient's attitude and follow the progress of patient's adaptation to discomfort with the use of fixed twin block. **Materials and Methods:** A total of 20 patients undergoing treatment with fixed twin block rated their experiences after 7 days, 14 days and 30 days of appliance insertion. **Results:** The majority of respondents reported being affected by (in descending order) sore teeth, pain in the jaw, headache, muscle pain and sleep discomfort. These negative effects generally decreased over time. Discomfort with functional activities seemed to be at its maximum during the initial days with all the patients having discomfort while eating. 75% and 85% patients had discomfort while speaking and tissue soreness respectively. However, functional activities improved with progressive use of the appliance**. Conclusion:** The results of the study indicate that most patients experience some discomfort and functional limitations; however, the effect generally diminishes with time and patients adapt to the appliance

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INTRODUCTION

Class II malocclusion has been found to be one of the most common malocclusions for which treatment is sought orthodontically. Of this 20- 30% comprises of young growing children (McNamara, 1981; Proffit, 1998). The most commonly used treatment for correction of Class II malocclusion in growing children with deficient mandible includes functional orthopaedic appliance (Schaefer *et al*., 2004; Clark, 2010) therapies. They can be grouped into removable or fixed appliances (Wahl, 2006; Dandajena, 2010). The main disadvantage of using a twin block appliance is the total dependence on patient's compliance for effective results (Clark, 2010). This can be overcome by use of fixed functional appliances which are non-compliance alternatives like Jasper jumper, Forsus (Vogt, 2006; Jones *et al*., 2008; Ross *et al*., 2007) Powerscope (Arora, 2008), Herbst, (O'Brien, 2003) etc.

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Fixed twin blocks provide a simple non-compliant solution to Class II malocclusion treatment. These can be used alone as a functional appliance to correct the Class II problem followed by placement of the fixed appliance later (Malik *et al*., 2006). Another alternative is to use the fixed twin blocks in conjunction with an existing full-bonded appliance (Mote, 2011). This allows harnessing of growth potential of the patient. A determining factor in the decision to seek orthodontic treatment is the desire to improve dentofacial appearance, thus leading to improvements in social life and self-confidence (Birkeland *et al*., 2000; Utomi, 2007). Successful orthodontic treatment depends on patient acceptance of the orthodontic techniques with minimal patient discomfort and maximum patient satisfaction (Stewart et al., 1997;Sergl et al., 1998). Thus an attempt was made to reduce the size of twin block appliance and use it concurrently with fixed appliance in patients with mandibular retrusion who reported for treatment in their late pubertal growth spurt. Currently, there is no published data to assess patient experiences with fixed twin block and assess the change in perception on gradual use of the same. Therefore, the overall aim of this study was to develop and implement a survey in

order to assess patient's experience with the fixed twin block. Clinicians may find this information useful in assessing and motivating a patient who may be undergoing treatment using fixed twin block.

MATERIALS AND METHODS

A total of 20 patients were recruited for the study which comprised of 12 females and 8 males (mean age 15± 0.2 years) who reported to the Department of Orthodontics and Dentofacial Orthopaedics, PGIDS, Rohtak for the purpose of orthodontic treatment. These patients had a Class II div 1 malocclusion with mandibular retrusion, suited for functional jaw orthopaedics. Since these patients were found to be in late pubertal growth spurt, (assessed using CVMI growth status Baccetti et al., 2015) it was decided to treat these patients using fixed twin block (Figure 1) so as to harness their growth potential to the maximum without the potential risk of non compliance. Patients who had already achieved their full growth potential were excluded from the study. The aim of this study was to conduct a survey to assess patient experiences with the use of fixed twin block. An attempt was also made to assess the change in attitude of patient with regular use of the same appliance at 7 days, 14 days and 30 days.

Each patient treated with fixed twin block was given a questionnaire (Appendix) for assessment of their difficulty/discomfort with the use of the appliance. The patients were assessed at 7days, 14 days and 30 days post insertion. Informed consent was obtained from the subjects' parents regarding participation in the study. The questionnaire was based on previous studies (O'Brien et al., 2003; Bowman *et al*., 2013; Gandhi, 2013) where similar survey was done on patients who were using fixed functional appliances. It was formulated in English and verbally translated in Hindi. In case of any query or further explanation solicited by the patient, the same researcher further explained the question in the local language. At the end of the data collection period, all responses were collected and subjected to statistical analysis. Descriptive statistics as well as Pearson Chi Square test were calculated. P values of less than 0.05 were considered as statistically significant. Analysis were performed using the Statistical Package for Social Sciences (SPSS) Version 25.0, SPSS Inc. Chicago.

RESULTS

All the patients felt that they were given complete information about the appliance including post insertion instructions before wearing it. Responses regarding the initial effect of fixed twin block on certain functions (speech and eating) are shown in Table 1. Out of 20, 15 patients confessed that the appliance looked scary and overwhelming to them when they looked at it for the first time (Table 2). 15% of the patients complained of soft tissue lacerations while using the appliance (Table 3). Responses about pain and sleep discomfort at different time intervals of 7 days, 14 days and 1 month post insertion are given in Table 4. The majority of respondents reported being affected by (in descending order) sore teeth, pain in the jaw, headache, muscle pain and sleep discomfort. The pain in teeth seemed to disappear with regular use of the appliance with 70% patients having no pain at 14 days which reduced further to 95% having no pain at 30 days of use. 95% of the patients had no jaw pain, 90% no muscle pain and 85% patients no headache at 30 days.

Sleep discomfort was reduced dramatically in these patients with 100% of the patients having difficulty in ability to sleep at 30 days (Table 4). Discomfort with functional activities seemed to be at its maximum during the initial days with all the patients having discomfort while eating. 75% and 85% patients had discomfort while speaking and tissue soreness respectively. With progressive use of the appliance, functional activities improved. There was no discomfort while talking (75%) and eating (50%) and 75% patients did not have any tissue soreness at 14 days. This reduced further at 30 days to 90%, 80% and 85% respectively (Table 6). Chi square test was applied for correlation of pain and other parameters between 7 and 14 days, 7 and 30 days respectively (Table VI). There was a significant decrease in teeth pain, discomfort while eating and talking and tissue soreness at 14 days. When the same parameters were compared at 7 days and 30 days of appliance use the results were highly significant with teeth and jaw pain and functional activities. The pain reduction in muscles, was however not significant. Sleep disturbance, headache had a reduction, though the results were non-significant.

DISCUSSION

Orthodontics involves a large array of age range of patients who are treated for different kinds of malocclusions. The choice of treatment is largely influenced by the developmental age of the patient which in turn influences the psychological aspect of treatment, the appliance designs and the cooperation of the patient. The current study focuses on the patient perception to the use of fixed twin block. The results from this analysis could be of special interest to clinicians as the interpretation may help them prepare their patients for the inconveniences that may be faced by their patients on use of this appliance.

Tables 1 and 2 provide information about the general view of the patient towards the appliance. While majority of patients felt that they were explained in detail about the appliance by their clinician initially, most of the patients were unhappy and felt discomfort and embarrassment on use of the appliance in the initial days. This could be due to the acrylic show of the appliance. The discomfort may be due to the strained musculature and the positive pterygoid response (Clark, 2010). Pain in teeth, muscles and jaws was found to be significant in the initial few days of appliance use. This could have a major psychological impact on the patient's attitude towards use of the appliance. O'Connor *et al* reported pain to be greatest dislike during treatment and rated it as the fourth among major apprehensions and fear towards orthodontic treatment (O'Connor, 2000). This could be the likely reason for about 30% of the patients who requested the discontinuation of the appliance on initial use. Although on counselling by the operator, the patients agreed to continue the treatment further. Pain is a subjective behaviour and depends on many factors like age, gender, emotional state and stress, cultural differences and previous pain experiences (Ngan, 1989).

In our study, discomfort was found to be maximum in the initial 7 days of appliance use. Similar result has been found in the past studies (Bowman et al., 2013; Stewartet al., 1997; Gandhi et al., 2013) 50 % of our patients reported a little difficulty in speaking in the initial 7 days. Bowman *et al*. (2013) also reported initial discomfort with FFRD In study by Bowman (Bowman *et al*., 2013), 13.4% patients reported that FFRD affected their speech and 65.2% reported it affected their chewing.

Table 1. Responses to questions 2 and 3

Questionnaire	n (%)			
	Not at all	A little	A lot	Does not worry me
Did you feel embarrassment/discomfort in front of others while talking	4(20%)	14(70%)	2(10%)	0(0%)
Did you feel embarrassment/discomfort in front of other while eating?	4(20%)	12(60%)	2(10%)	2(10%)

Table 2. Responses to questions 1,5 and 6

Questionnaire	Yes	No
Did your doctor in terms of pain/discomfort and its impact explain you properly about the appliance on daily activity	20(100%)	0(0%)
Did you ask the doctor to remove the appliance because you felt it is too hard to have it in your mouth for the long time	6(30%)	14(70%)
Did the appliance look scary/ overwhelming to you when u looked at the appliance for the first time	15(75%)	5 (25%)

Table 3. Soft tissue lacerations

Soft tissue lacerations	Receiving of appliance	Using the appliance	Breakage of appliance	None of the above
	0 (0%)	3 (15.0%)	0 (0%)	17 (85.0%)

Table 4. Teeth pain, jaw pain, muscle pain, headache, sleep discomfort at 7 days, 14 days and 30 days respectively

Questionnaire	7 days,n (%)			14 days,n (%)			30 days,n (%)		
	Not at all	a little	a lot	Not at all	a little	a lot	Not at all	a little	a lot
Teeth pain	7 (35.0%)	12 (60.0%)	1 (5.0%)	14 (70.0%)	5 (25.0%)	1 (5.0%)	19 (95.0%)	1 (5.0%)	0 (0%)
Jaw pain	11 (55.0%)	8 (40.0%)	1 (5.0%)	14 (70.0%)	5 (25.0%)	1 (5.0%)	19 (95.0%)	1 (5.0%)	0 (0%)
Muscle pain	15 (75.0%)	4 (20.0%)	1 (5.0%)	15 (75.0%)	4 (20.0%)	1 (5.0%)	18 (90.0%)	2 (10.0%)	0 (0%)
Head ache	14 (70.0%)	5 (25.0%)	1 (5.0%)	12 (60.0%)	7 (35.0%)	1 (5.0%)	17 (85.0%)	3 (15.0%)	0 (0%)
Sleep Discomfort	16 (80.0%)	3 (15.0%)	1 (5.0%)	15 (75.0%)	4 (20.0%)	1 (5.0%)	20 (100.0%)	0 (0%)	0 (0%)

Table 5. Discomfort with Functional Activities at 7 days, 14 days and 30 days respectively

Questionnaire	7 days,n (%)			14 days,n (%)			30 days,n (%)		
	Not at all	a little	a lot	Not at all	a little	a lot	Not at all	a little	a lot
Discomfort while talking	5 (25.0%)	10 (50.0%)	5 (25.0%)	15 (75.0%)	4 (20.0%)	1 (5.0%)	18 (90.0%)	2 (10.0%)	0 (0%)
Discomfort while eating	0 (0%)	2 (10.0%)	18 (90.0%)	10 (50.0%)	9 (45.0%)	1 (5 .0%)	16 (80.0%)	4 (20.0%)	0 (0%)
Tissue Soreness	3 (15.0%)	12 (60.0%)	5 (25.0%)	15 (75.0%)	4 (20.0%)	1 (5.0%)	17 (85.0%)	2 (10.0%)	1 (5.0%)

Table 6. Changes in positive perception of pain by patient with time

Questionnaire		Patient perception at 7 days	Patient perception at 14days	Patient perception at 30 days	P(7-14)	P(7-30)
Teeth pain	Present	13	6	1	0.0267*	0.0001**
	Absent	7	14	19	-	-
Jaw pain	Present	9	6	1	0.3272	0.0084*
	Absent	11	14	19	-	-
Muscle pain	Present	5	5	2	1.000	0.4075
	Absent	15	15	18	-	-
Headache	Present	6	8	3	0.5073	0.4506
	Absent	14	12	17	-	-
Sleep Discomfort	Present	4	5	0	0.7050	0.1060
	Absent	16	15	20	-	-
Discomfort while talking	Present	15	5	2	0.0016*	0.0001**
	Absent	5	15	18	-	-
Discomfort while eating	Present	20	10	4	0.0004**	0.0001**
	Absent	0	10	16	-	-
Tissue Soreness	Present	17	5	3	0.0003**	0.0001**
	Absent	3	15	17	-	-

*P< 0.05 – significant, **P<0.001 - highly significant

Figure 1. Fixed Twin Block

Gandhi *et al* stated 37.5% difficulty in speech, 50% with eating with FFRD group. 62.5% of patients reported problems with speech and eating respectively in patients with MPA IV appliance (Gandhi *et al*., 2013). Arora *et al*. (2018) reported similar results with 53.8% and 46.2 % discomfort on speaking with Powerscope and Forsus respectively. They reported 30.8% and 53.8% discomfort on eating with Powerscope and Forsus respectively. In our study, about 90% patients had more discomfort while eating at 7 days. This may be attributed to the acrylic bite blocks. The discomfort in speaking was found to be similar to previous studies. Owing to the more comfortable and less bulky nature of the twin block, the soft tissue lacerations were found to be minimal with only 15% patients reporting soft tissue lacerations with use of this appliance.

On comparing the amount of discomfort experienced by the patients over time, we found a significant decrease in discomfort while speaking and chewing ($P<0.001$). Similar results have been reported in previous studies (Aroraet al., 2018; Stewartet al, 1997; Serglet al., 1998). Although no attempt was made to quantify the amount of reduction in discomfort over time by the previous studies, these studies concluded a reduction in discomfort and similar complaints with time. Segl *et al*. (Sergl *et al*., 1998) stated a reduction in number of complaints with time in patients with both fixed and removable appliances. This implies that the patients to some extent accept these side effects and also become habitual and tolerant to them with gradual use of the appliance. This study provides a comprehensive understanding of the patient's experiences with use of fixed twin block in patients with retrusive mandible in late pubertal stage. This information could be useful to judge the apprehensions of the patient on use of the appliance. However, confounding factors like expertise of the operator, doctor patient relationship, clinical setting, socioeconomic status and ethnicity of the patient could play a role in influencing the results (Stewart, 1997). Thus a study on a larger sample size is solicited in the future.

Conclusion

In general, the results of this study highlight a strong interrelationship between patient's attitudes and pain perception at the beginning of fixed twin block appliance, and their capability to accommodate to discomfort associated with the same. Most patients experience some discomfort and functional limitations on the initial days of appliance insertion; however, the effect generally diminishes significantly with time and patients adapt to the appliance.

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APPENDIX

Questionnaire for evaluating patient attitude and pain perception for orthodontic treatment

1. Did your doctor in terms of pain/discomfort and its impact explain you properly about the appliance on daily activity?

Yes No

2. Did you feel embarrassment/ discomfort in front of others while talking?

(a) Not at all (b) a little (c) a lot (d) does not worry me

3. Did you feel embarrassment/discomfort in front of others while eating?

(a) Not at all (b) a little (c) a lot (d) does not worry me

4. Did you get any soft tissue lacerations?

(a) Receiving of the appliance (b) Using the appliance
(c) Breakage of appliance (d) None of the above

5. Did you ask the doctor to remove the appliance because you felt it is too hard to have it in your mouth for a long time?

Yes No

6. Did the appliance look scary/ overwhelming to you when u looked at the appliance for the first time?

Yes No

7. Did anyone ever tease you because of the appliance?

Yes No

Please circle that fits your experience regarding having appliance in the mouth 7 days after its insertion:

(A) Pain/discomfort/soreness

Teeth

(a) Not at all (b) a little (c) a lot

Jaws

(a) Not at all (b) a little (c) a lot

Muscles

(a) Not at all (b) a little (c) a lot

Headache

(a) Not at all (b) a little (c) a lot

(B) Your ability to sleep properly:

(a) No difference (b) Slightly worse (c) Much worse

(C) Discomfort with functional activities

While eating

(a) Not at all (b) a little (c) a lot

While speaking

(a) Not at all (b) a little (c) a lot

Soft Tissue soreness

(a) Not at all (b) a little (c) a lot

Please circle that fits your experience regarding having appliance in the mouth 14 days after its insertion:
(A) Pain/discomfort/soreness

Teeth

(a) Not at all (b) a little (c) a lot

Jaws

(a) Not at all (b) a little (c) a lot

Muscles

(a) Not at all (b) a little (c) a lot

Headache

(a) Not at all (b) a little (c) a lot

(B) Your ability to sleep properly:

(a) No difference (b) Slightly worse (c) Much worse

(C) Discomfort with functional activities

While eating

(a) Not at all (b) a little (c) a lot

While speaking

(a) Not at all (b) a little (c) a lot

Soft Tissue soreness

(a) Not at all (b) a little (c) a lot

Please circle that fits your experience regarding having appliance in the mouth 30 days after its insertion:

(A) Pain/discomfort/soreness

Teeth

(a) Not at all (b) a little (c) a lot

Jaws

(a) Not at all (b) a little (c) a lot

Muscles

(a) Not at all (b) a little (c) a lot

Headache

(a) Not at all (b) a little (c) a lot

(a) No difference (b) Slightly worse (c) Much worse

(B) Your ability to sleep properly:

(a) No difference (b) Slightly worse (c) Much worse

(C) Discomfort with functional activities

While eating

(a) Not at all (b) a little (c) a lot

While speaking

(a) Not at all (b) a little (c) a lot

Soft Tissue soreness

(a) Not at all (b) a little (c) a lot

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