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Comparison of Optragate and Conventional Bite Block as Mouth Opening Aids in Children

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Abstract: *Mouth gags are surgical devices placed between the upper and the lower jaw to prevent the mouth from closing during dental procedures. Over the years many innovative techniques for isolating the operative field have been invented and described.Aimof this study was to assess the effectiveness and acceptability of a recent device OptraGate and conventional Bite Block as an aid to assist mouth opening during dental restorative procedures.A total of 30 children were included in the study. OptraGate and Bite Block were used for restorative procedures in all patients using cross over design. An inter operator comparison of patient response to relative comfort of the two devices, was used to rule out operator bias. Chi-square test showed statistically significant association between the responses received and the devices used (P<0.001). Excellent response was received in more than 50% of samples in OptraGate device while fair and poor response was received for Bite Block. Correlation between the data received by the two operators was seen although the results were not statistically significant.The study concluded OptraGate is more acceptable by the patient as well as the operator when compared with Bite Block as mouth opening aid.*

Keywords: *Acceptability, Bite Block, Comfort, Mouth Gag, OptraGate*

I. Introduction

Effective mouth opening is the cornerstone while performing dental procedures and keeping the mouth open for treatment is in itself an effort, especially for children. Possibility of the patient suddenly clamming down while instruments are in use, pose a real danger for the child as well as the operator. The problems associated with pediatric dental practice are mainly concerned with child's cooperation, without which dental treatment becomes difficult if not impossible[1]. Mouth props are often necessary in pediatric practice, acceptability by the patient and ease of handling such devices is of utmost importance. A variety of mouth gags are available for use in pediatric dentistry.

An ideal mouth prop should provide adequate exposure of all parts of the oral cavity to perform treatment procedures. It should be easy to apply and not cause discomfort to the oral musculature.

Successful restorations depend on a number of factors, most important ones being moisture and microbial control. Adhesive techniques are more sensitive than conventional ones and it is mandatory to isolate the operating field. Other than moisture control it facilitates bonding of the restorative material to the tooth and decreases the risk of infection or re-infection. Poor bonding or secondary caries may compromise the success or longevity of the restoration or both. Mouth props which provide better visibility, increased efficiency and reduced possibility of transmission of infectious diseases are frequently demanded.

Problems observed with mouth props include slipping, sliding and dislocation especially with one sided mouth gags. These problems have always been discussed and need for introducing a suitable mouth gag is emphasized. Hence this clinical study was designed to compare the effectiveness of a recent device OptraGate and conventional Bite Blocks as mouth opening aids in children.

II. Aims and Objectives

1. To assess the effectiveness and acceptability of a recent device OptraGate extra soft version and conventional Bite Blocks to keep mouth open in children during dental procedures.

2. To compare OptraGate with conventional Bite Block as an aid to assist mouth opening during dental restorative procedures.

III. Materials and Method

Ethical clearance was obtained from institutional review board, ethics and research committee M.R. Ambedkar Dental College and hospital, Bangalore. After obtaining a written informed consent from the parents, a total of 30 children who needed restorative treatment on lower molar teeth were included.

Inclusion criteria: (1) Healthy patients with no compromising medical or physical conditions. (2) Children aged 6 to 8 years (3) Patients who required restorative treatment on lower primary molars in both the quadrants. (4) Patients who were cooperative.

The exclusion criteria: (1) History of medical illness. (2) Children below 6 years and above 8 years of age. (3) Participants who were not ready to give consent to participate in the study.

Children who reported to the Department of Paediatric and Preventive Dentistry were randomly divided into two groups. Patients in Group- A received Bite Block in the first appointment and Group –B received OptraGate in the first appointment. Using cross over design all the children received both the devices. To eliminate bias two operators were included in the study. Operators performed the treatment without an assistant and used both Bite Block and OptraGate for each patient. After explaining the procedure to the patient Bite Block was placed on the side opposite the working side and restorative procedure was carried out. Placement of OptraGate was done as per manufacturer's guidelines. It consists of two rings a thicker inner ring and a thinner outer ring. Thicker ring is inserted starting with the right corner of the mouth then the left corner of the mouth, followed by placement behind the lower lip and then the upper lip. Once OptraGate was in place the operator performed the restorative treatment.

The operator used high speed Airotor and a bur to remove the carious lesion. Following this, isolation was maintained using suction tips and cotton rolls, GIC restoration was done. After completion of the procedure child was questioned about his/her experience. Experience of the operator was also recorded.

OptraGate

Bite Block

IV. Results

A total of thirty children were included in the study, comprising of 18 girls and 12 boys, with an age range of 6 to 8 years. Two operators were included in the study to rule out operator bias. Participants were randomly divided into 2 groups and assigned to the operators. Experience of patient and clinician were recorded in the form of a questionnaire and results were analyzed using Chi square/Fischer exact test. Test showed statistically significant association between the responses received and the devices used ($P<0.001$). Operators felt placement and removal of Bite Block as well as OptraGate was easy (Fig 1 & 2). Both clinicians agreed that working while OptraGate was in use was more beneficial when compared to Bite Block. Maintaining isolation

was not easy in any of the cases treated while Bite Block was in place. Ease in maintaining isolation was agreed by both the operators.

Data received by operator one suggests ten out of fifteen children were less cooperative during restorative procedure while Bite Block was in use and eleven out of fifteen children were less cooperative when second operator used Bite Block.

Overall ratings for Bite Block suggest it is a good device for mouth opening. Whereas OptraGate is an excellent device for mouth opening in children (66.7%), as observed by both the operators.

Response by the patient (Fig 3, 4)

93.3 % of the participants responded in favor of the comfort while OptraGate was placed, whereas feeling while wearing Bite Block was not good as observed by patients treated by both the operators. None of the children encountered breathing difficulty in case of OptraGate while treatment was carried out by the first operator. Although one case of breathing discomfort was seen with OptraGate during treatment by the second operator.

No case of discomfort to cheek muscles while the mouth open was reported when OptraGate was placed, whereas few cases of uneasiness were reported in case of Bite Block use. All participants agreed that movement of the tongue was easy in case of OptraGate while it was not so in case of Bite Block.

Overall rating by the participants suggest that OptraGate is an excellent device for mouth opening when compared to Bite Block.

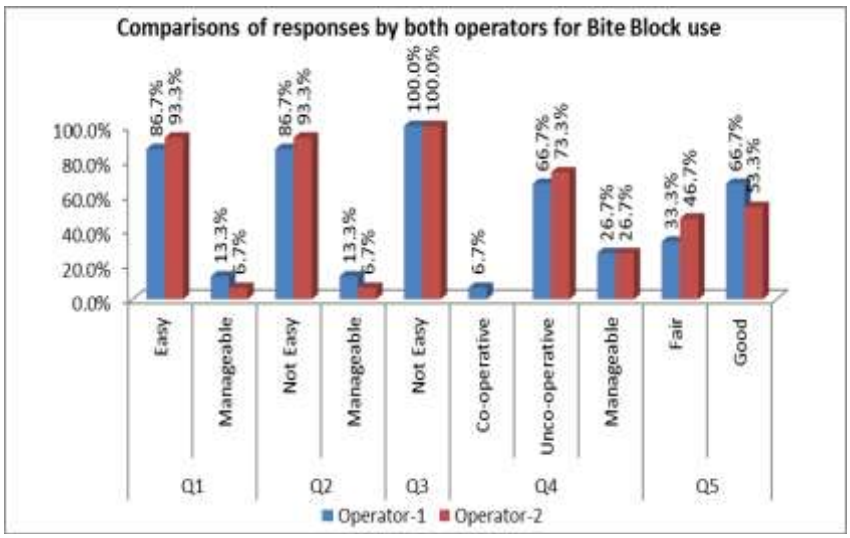

Fig. 1

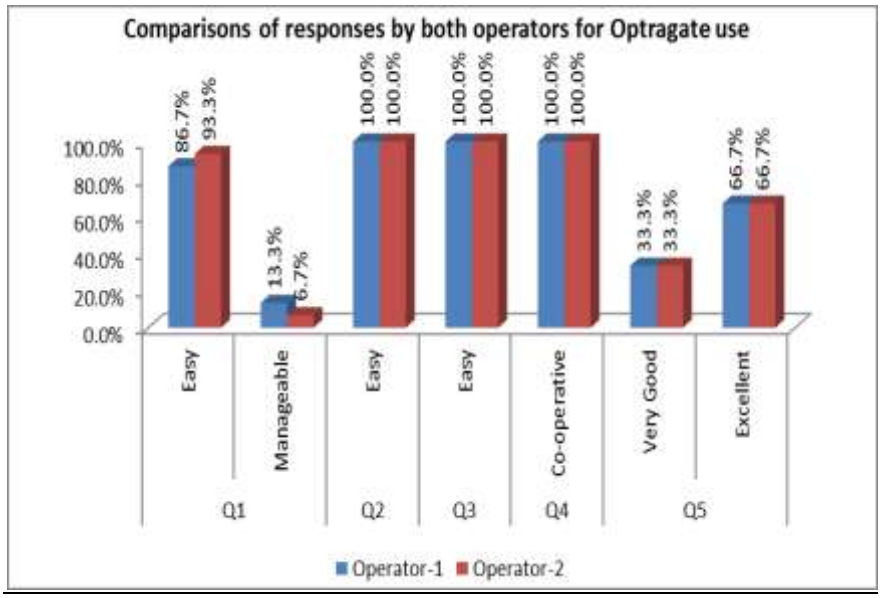

Fig. 2

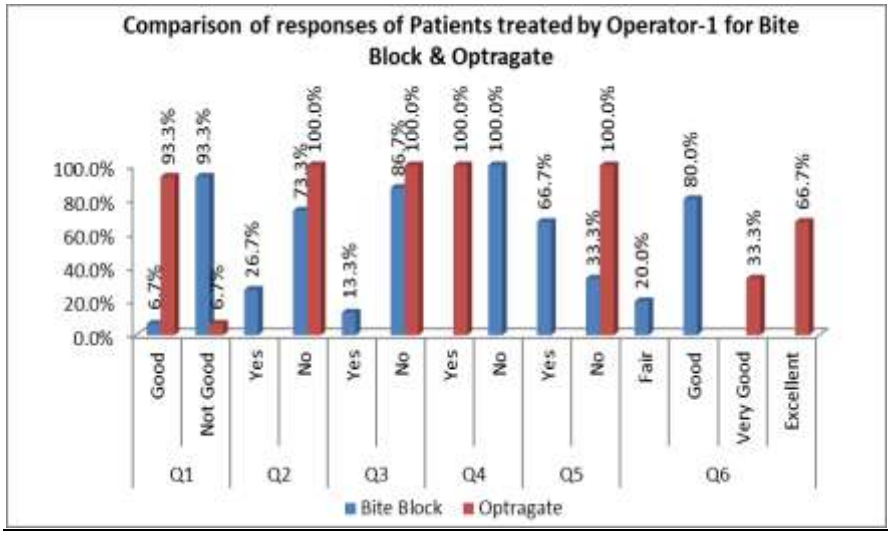

Fig. 3

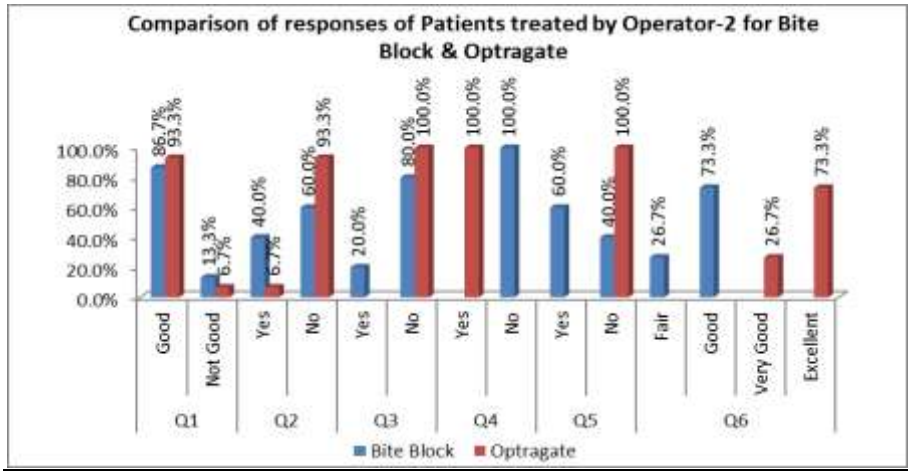

Fig. 4

V. Discussion

During any endodontic or restorative therapy, the accepted focal point of isolation should always be the prevention of aspiration or ingestion of endodontic hand instruments and injury to the adjacent tissue. Effective isolation is compromised by (i) extensive loss of coronal tissue, (ii) poor retentive form, (iii) fragile restorations (iv) fixed partial prostheses, (v) teeth with abnormal axial inclinations, and (vi) orthodontically involved arches[6]. Contamination of the operating field during treatment can occur because of (i) Saliva (ii) blood from inflamed gingival tissue and iatrogenic damage, (iii) the gingival crevicular fluid from the inflamed gingival tissues and (iv) water and dental materials.

An isolated operative field is cardinal during dental procedures because it permits (i) protection from salivary contamination, (ii) channeling buccal cavity from chemical products that may leak into the patient's mouth and (iii) blocking aero digestive paths from inhalation or Swallowing of endodontic instruments, all of these are serious situations that can compromise case success [6].

The earliest known medical use of mouth gags can be dated to the late 1500 A.D, wherein Lorenz Heister a military surgeon used it to treat patients with trismus, this became the classic prototype. 250 years later the same was advertised by Mayer and Philips with minor modifications [2]. Over the years different modified mouth props have been devised to decrease risk of injury while allowing safe completion of treatment. This study was conducted using cross over design, which allowed the participants to compare two devices. Patient and operator preferred the use of OptraGate over conventional Bite Block. Though studies carried out using OptraGate are scarce, a similar study by Smales R. (1993) suggests rubber dam usage is related to increased restorative quality and survival [3]. Another study by Christensen GJ (1994) supports the result [4]. Alhareky et al (2014) suggested Isolite was a viable alternative to the conventional rubber dam isolation. The use of Isolite was associated with reduced chair time and greater patient satisfaction [5].

The present study evaluated one such apparatus for maintaining a dry and open field during dental procedures while holding a standard saliva ejector in perfect position, without requiring assistance of additional persons or instruments, having advantages of reducing the cost and time required for dental procedures. It was concluded that OptraGate had better patient acceptance when compared with conventional Bite Block. "Table"

ExtraSoft Version OptraGate is an auxiliary aid that enables the treatment field to be enlarged easily, effectively and comfortably. It allows lips and cheeks to be retracted completely and ensures relative isolation. The device is comfortable to wear over longer periods of time, as it has three-dimensional flexibility. In addition, the lips are completely covered and therefore protected, it is entirely latex-free hence can be used in patients with latex allergies. It can be simply and quickly inserted and removed by a single person without the need for additional assistance. As the lips and cheeks are completely retracted, the treatment field is more visible and therefore more easily accessible.

Table

Comparison of responses of Patients treated by Operator-1 for Bite Block & Optragate using Chi square / Fischer exact test

Questions	Responses	Bite Block		Optragate		P-value
		n	%	n	%	
Q1	Good	1	6.7%	14	93.3%	1.00
	Not Good	14	93.3%	1	6.7%	
Q2	Yes	4	26.7%	0	0.0%	..
	No	11	73.3%	15	100.0%	
Q3	Yes	2	13.3%	0	0.0%	..
	No	13	86.7%	15	100.0%	
Q4	Yes	0	0.0%	15	100.0%	..
	No	15	100.0%	0	0.0%	
Q5	Yes	10	66.7%	0	0.0%	..
	No	5	33.3%	15	100.0%	
Q6	Fair	3	20.0%	0	0.0%	0.02*
	Good	12	80.0%	0	0.0%	
	Very Good	0	0.0%	5	33.3%	
	Excellent	0	0.0%	10	66.7%	

Table

Comparison of responses of Patients treated by Operator-2 for Bite Block & Optragate using Chi square / Fischer exact test

Questions	Responses	Bite Block		Optragate		P-value
		n	%	n	%	
Q1	Good	13	86.7%	14	93.3%	1.00
	Not Good	2	13.3%	1	6.7%	
Q2	Yes	6	40.0%	1	6.7%	1.00
	No	9	60.0%	14	93.3%	
Q3	Yes	3	20.0%	0	0.0%	..
	No	12	80.0%	15	100.0%	
Q4	Yes	0	0.0%	15	100.0%	..
	No	15	100.0%	0	0.0%	
Q5	Yes	9	60.0%	0	0.0%	..
	No	6	40.0%	15	100.0%	
Q6	Fair	4	26.7%	0	0.0%	1.00
	Good	11	73.3%	0	0.0%	
	Very Good	0	0.0%	4	26.7%	
	Excellent	0	0.0%	11	73.3%	

VI. Conclusion

Based on the study's results, the following conclusions can be made-

1. OptraGate protects the patient and operator from injury that could occur during sudden and unexpected closing of the mouth. It also aids to maintain isolation without hampering patient cooperation.
2. Use of OptraGate is more effective and better accepted by the patient than conventional Bite Block.

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