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AWARENESS OF GUMMY SMILE AND ITS TREATMENT BY LIP REPOSITIONING TECHNIQUE AMONG DENTAL INTERNS AND POSTGRADUATES: A QUESTIONNAIRE STUDY

Periodontology

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ABSTRACT

Aim: The purpose behind this study is to explore the awareness and knowledge about aesthetic smile, excessive gingival display and its treatment by lip repositioning technique among dental interns and post graduate students. **Method:** This is a survey utilizing a self administered, close-ended questionnaire consisting of 10 questions undertaken for 200 dental professionals randomly selected from two dental colleges under People's University, Bhopal. The questions were divided under 4 domains assessing the knowledge about gummy smile and its etiology, concepts about its treatment and awareness about its treatment in contrast to lip repositioning technique. Based on their knowledge, the survey population was divided under two groups; dental interns (n=100) and dental postgraduates (n=100). **Result:** Statistical analysis was made using chi-square test. Positive attitude towards gummy smile and its correction by lip repositioning technique was observed. Response to Q.no. 4, 9 and 10 were statistically significant ($p = < 0.005$) among two groups. **Conclusion:** The level of awareness was marginally higher with postgraduates regarding basic concepts, etiology and perception about newer treatment modality i.e lip repositioning.

KEYWORDS

Gummy smile, Excessive gingival display, Lip repositioning, Orthognathic surgery.

1. INTRODUCTION

A smile is the most ravishing expression among humans. It determines your personality, attitude, self confidence and nature, all together your first impression. People smile to show pleasure, happiness, amusement and joy. An expression which has got such a huge significance, one would always desire it to be aesthetically pleasing. Hence, it has been given a prime importance in the domain of periodontics, which was previously restricted to health service, now has brought smile designing to the forefront, with the advent of soft tissue periodontal plastic procedures. The beauty of smile mainly depends upon 3 components: the teeth, lip framework and the gingival scaffold. Among these, within the confines of lipline, the remaining two components need to be arranged in such a way, so that harmony and balance is restored.

From an aesthetic perspective, maintenance of oral health and periodontal attachment status is not sufficient. Proper assessment of the smile should be done with major stress on dynamic evaluation. In the anterior region, incompetence of lips, increased incisal show and gummy smile have become major concerns of the patient. [1]

1.1 BACKGROUND

"Gummy smile" or "high smile line" or "excessive gingival display" (EGD), is a state featured by overexposure of maxillary gingiva during smiling. Recent studies have indicated that the measure of gingival show on smiling is very important to smile attractiveness. According to Kokich et.al, 1mm of visible gingiva is considered as normal, although 2 to 3 mm of gingival visibility may be esthetically acceptable. [2] These calculations may vary from person to person, but can be used as a starting point for determining proper position of gingival showcase. While the acceptable scope of gingival exposure has been talked about, an abundance of 3 mm or above of gingival display on smiling is considered as unaesthetic. [3]

'Lipline' or smile line is the position of upper lip relative to maxillary incisors and gingiva during a natural full smile. It is 'average' or 'medium' when 75%-100% of clinical crown height of upper central incisors and interproximal gingiva are displayed. 'Low' or 'mild' is when less than 75% of maxillary anterior teeth are displayed and 'high' or 'severe' when full cervicoincisal length of maxillary central incisors along with a continuous band of gingiva are exposed during normal smile. [4] Along with this, Peck et al. found correlation between gender and the type of smile, with predominance of gummy smiles in females (2:1) and low liplines in males (2.5:1). [5]

EGD is the term that itself indicates the excessive visibility of the gingiva when an individual smiles. It is the interplay of various etiologies that are responsible for its cause. For these reasons, it is essential that a differential diagnosis should be formulated. Dentoalveolar discrepancies such as altered passive eruption, short clinical crown, dentoalveolar extrusion, hypertrophy/hyperplasia of gingival and non dentoalveolar discrepancies such as hyperactive/incompetent upper lip and vertical maxillary excess (VME), are some of the factors accountable for EGD. [6]

Both surgical and non-surgical techniques can be used for the management of EGD. Such techniques include crown lengthening procedures, orthodontic levelling of the gingival margins of maxillary teeth, maxillary teeth intrusion, lip repositioning, orthognathic surgery and non-surgical procedures like the use of the botulinum toxin. [7] Plaque- or drug-induced gingival enlargement and altered or delayed passive eruption are treated with periodontal surgery. [8]

Since 1970s, the management of pain and excessive muscle contraction has been done by botulinum toxin. It is observed that, there is decrease in the activity of muscles of lips and reduction in its upward pull by injecting measured quantities of botulinum toxin into hyperactive muscles. The improvement achieved is almost immediate but lasts only for a period of 3–6 months, before slowly fading. [9]

In the year 1973, Rubinstein and Kostianovsky described lip repositioning technique as a conservative surgical technique while performing a medical plastic surgery.[10] Later in the year, 2006, Rosenbaltt and Simon, introduced it as dental procedure with few

modifications.[3] Lip repositioning technique has been proposed as less invasive approach to EGD. [11]

The present study is aimed at the determination of knowledge, perception and awareness of gummy smile among young adults studying in dental colleges. Through this study, an assessment of treatment needs to improve aesthetic smile could be made in the near future.

Table 1: Questionnaire Form

Awareness Of Gummy Smile And Its Treatment By Lip Repositioning Technique Among Dental Interns And Postgraduates - A Questionnaire Study		
Postgraduate		Intern
S. NO.	**Questions**	**Responses**
1.	An esthetic smile is influenced by	A. Lips B. Teeth C. Gums D. Combination of these
2.	Does gummy smile has esthetic concern	A. Yes B. No
3.	Gummy smile is more predicted in	A. Males B. Females
	ETIOLOGY	
4.	What do you think is the possible etiology of gummy smile? A. Vertical maxillary excess B. Short hyperactive lip C. Altered passive eruption D. Anterior dentoalveolar extrusion	 Yes/No Yes/No Yes/No Yes/No
	CONCEPTS ABOUT TREATMENT	
5.	Gummy smile, can it be treated?	Yes/No
6.	How much do you think should be the exposure of gingiva, for considering it as a gummy smile?	A. 2mm B. 2.5mm C. 3mm D. More than 3mm
7.	Which degree of gummy smile can be treated by lip repositioning technique?	A. Low B. Medium C. High
	AWARENESS ABOUT VARIOUS TREATMENT MODALITIES	
8.	Which treatment modality are you aware of, A. Crown lengthening procedure B. Orthodontic leveling of gingival margins of maxillary teeth C. Lip repositioning D. Orthognathic surgery	 Yes/No Yes/No Yes/No Yes/No
9.	What should be the possible etiology to go for lip repositioning surgery? A. Vertical maxillary excess B. Short hyperactive lip C. Delayed eruption D. Anterior dentoalveolar extrusion	 Yes/No Yes/No Yes/No Yes/No
10.	Which technique would you prefer for treatment of gummy smile?	A. Lip repositioning B. Orthognatic surgery

2. MATERIAL AND METHOD

2.1 Study design and source of data: This questionnaire study is conducted on 200 dental professionals randomly selected from the two dental institutes of Peoples University (Bhopal) which are People's College of Dental Sciences and Research Centre and People's Dental Academy. Those interviewed included an equal number of dental interns (n=100) and dental postgraduates (PG) (n=100).

Each participant is given a self-administered, pretested, multiple choice questionnaire to solve on the spot. The questionnaire form (Table 1) consists of 10 questions which are divided under headings:

(1) knowledge about gummy smile,
(2) knowledge about its association and etiology,
(3) concepts about its treatment,
(4) awareness about its various treatment available specially in contrast to lip repositioning technique.

2.2 Statistical analysis: Data were described using frequency counts and percentages, and comparisons were made using the chi-square analysis for different independent samples. The obtained data were analyzed using SPSS version 15 for Window (SPSS Inc., Chicago, USA)

Table 2: Comparison of responses – Category-wise

S. No.	Response	Category (%)		X^2 value	p - value
		Intern	PG		
1. A	Lips	0	0	2.4	0.301
B	Teeth	4	6		
C	Gums	2	0		
D	Combination of these	94	94		
2. A	Yes	91	92	0.064	1.000
B	No	9	8		
3. A	Female	78	86	2.168	0.197
B	Male	22	14		
4. A	Yes	83	81	0.136	0.854
	No	17	19		
B	Yes	69	83	**5.37**	**0.031***
	No	31	17		
C	Yes	65	53	2.97	0.084
	No	35	47		
D	Yes	61	55	0.739	0.474
	No	39	45		
5. A	Yes	91	96	2.05	0.152
B	No	9	4		
6. A	2mm	7	6	0.214	0.975
B	2.5mm	16	17		
C	3mm	31	33		
D	>3mm	46	44		
7. A	Low	21	23	2.256	0.324
B	Medium	56	46		
C	High	23	31		
8. A	Yes	88	81	1.871	0.171
	No	12	19		
B	Yes	56	57	0.02	0.887
	No	44	43		

C	Yes	69	74	0.613	0.434
	No	31	26		
D	Yes	66	71	0.579	0.447
	No	34	29		
9. A	Yes	84	63	**11.32**	**0.001***
	No	16	37		
B	Yes	59	68	1.747	0.186
	No	41	32		
C	Yes	35	17	**8.42**	**0.004***
	No	65	83		
D	Yes	44	30	**4.8**	**0.028***
	No	55	70		
10.A	Lip repositioning	53	71	**6.87**	**0.009***
B	Orthognathic surgery	47	29		

3. RESULTS

To see the difference in proportion of responses for different questions by dental interns & postgraduates, chi square test was used and it was seen that there were no significant difference in the responses of interns and postgraduates for most of the questions (p= > 0.05)

Only for question no. 4(b) (when asked whether short & hyperactive lip was considered as etiology for gummy smile) 83% of postgraduates considered it as a cause whereas only 69% interns considered it as a cause for gummy smile. This difference was statistically significant. (p = < 0.05). (Table 2)

When asked about possible etiology to go for lip repositioning surgery (Q.no. 9), 84% interns opted VME, whereas 63% postgraduates opted this as a reason. This was statistically significant (p = <0.05). Similarly delayed/passive eruption was also considered by (65%) interns & (83%) postgraduates as an etiology (p= <0.05). Anterior dentoalveolar extrusion was significantly higher considered cause by postgraduates (70%) as compared to interns (55%). (Table 2)

About Q.no. 10, lip repositioning was considered as more preferred technique for gummy smile treatment by postgraduates (71%) as compared to interns (53%). But almost twice the number of interns (47%) preferred orthognathic surgery in comparison to postgraduates (29%). These differences were again statistically significant (p = < 0.05). (Table 2)

4. DISCUSSION

The original intention behind the present study was to explore the awareness of upcoming dental professionals about EGD while smiling, various etiological factors responsible for it, different treatment procedures available and emerging newer treatment modalities. Starting with the importance of an aesthetic smile, most of the interns (94%) and postgraduates (94%) agree about the fact that all the three factors i.e. lips, teeth and gums play their role in making a smile beautiful. Disturbance in the alignment of these factors will ultimately result in an unpleasant smile. The clinician must consider the dynamic relationship between the patient's dentition, gingiva and lips while treating the patient. [12] They also think that an overexposed gingiva has an aesthetic concern (91% interns and 92% postgraduates) and it is not acceptable by many. These basic questions are not statistically significant as no matter what should be the experience or knowledge, concern for an alluring smile is same for everyone.

As we all know, women seem to find it easier to flash a big smile than men. There is slight higher prediction for gummy smile in females (2.5:1). [13] Here, (86%) of postgraduates and (76%) of dental interns are aware of this fact. We can see a slight difference in their awareness but the data is still insignificant. One should be more conscious in dealing with their female patients as they are more concerned about their looks. When the participants were asked about how much extent of gingival display should be considered as unaesthetic, they chose more than 3mm which is nearly half of the total number of participants i.e 46% of interns and 44% of postgraduates. Generally, it depends on the choice of the patient that when he/she should go for the treatment of gummy smile, but according to Vicente Faus-Matoses et al. more than 3mm of gingival showcase is accepted world wide as gummy smile. [3,6,14]

When there is a problem, there is a reason behind it. Excessive gingival display may be the result of one or the combination of several etiological factors. [15] When there is an overgrowth of the upper jaw along with incompetent lips, the diagnosis is VME. 83% of interns and 81% of postgraduates consider it as a cause of gummy smile which indicates their perception about VME. [16] Again, when a patient smiles, if there is upward migration of upper lip in apical direction displaying excessive gingiva, the condition is referred as short or hyperactive lip. [17] This data is statistically significant (p = < 0.05). The percentage value is higher for postgraduates (83%) than interns (69%). As the awareness among postgraduates are higher, chances of providing better and newer treatment facilities increases with the postgraduates. In some conditions, there is coronal migration of the attachment apparatus along with the maxillary teeth due to over-eruption. This results in the movement of gingival margins coronally and the condition is known as anterior dentoalveolar extrusion. [18] On the other hand, delayed or altered passive eruption is a condition in which gingival margins recede apically to the level of CEJ (cement enamel junction) after the tooth has erupted completely. [19] In both the situations, there is increase in gingival showcase and it is essential to be aware of these etiological conditions while attending a patient with gummy smile. Ironically in this case, the percentage about the awareness is slightly higher with the interns (65% and 61%) than postgraduates (53% and 55%).

Now if you have made a correct diagnosis, the treatment part becomes much easier to choose. As the underlying cause for EGD can be many at a time, one can go for multiple treatment protocols for its resolution. If the reason behind EGD is due to VME, it can be treated by orthognathic surgery to minimize gingival display and to restore normal inter-jaw relationship. [16] Orthodontic leveling of gingival margins of maxillary teeth is the treatment of choice in the cases of anterior dentoalveolar extrusion. [18] About this treatment procedure, participants are least aware (56% interns and 57% postgraduates). The most popular and well documented dental procedure is the crown lengthening in which gingival margins are shifted apically through soft and possibly hard tissue resection. [19] This procedure is generally employed for the delayed or altered passive eruption cases. 88% of interns and 81% of postgraduates are well aware of this dental procedure.

A newer emerging technique which is gaining popularity in this field is the lip repositioning technique. If short and hyperactive maxillary lip is the cause of EGD, this surgery followed by orthodontic treatment can be a good alternative to orthognathic surgery. [17] By lip repositioning technique one can achieve reduction upto 3.4 mm (3.0-3.8 mm). [6,20] 74% of postgraduates are familiar with this surgery and 68% of them consider short or hyperactive lip cases are best to be treated by this treatment modality. As far as awareness of the interns are concerned, they are less familiar with this technique (69%) and their knowledge about the etiological factors treated by lip repositioning technique is statistically significant (p = < 0.05)

Normally when a patient walks into dental clinic with the desire of getting a perfect smile, he/she thinks of less invasive procedure with quick and good results. Ones the clinician explains the procedure of orthognathic surgery, they usually hesitate to go for such aggressive procedure. It's a normal human tendency to achieve good outcome in lesser time, investment and less intensive approach with minimum post operative complications. [7,8] So when the gingival display is mild to moderate with not much skeletal deformity, one can manage the issue by performing lip repositioning surgery with good knowledge and expert skill. According to Tasdemir et al., the objective of lip repositioning surgery is limiting the retraction of the elevator smile muscles (zygomaticus minor, levator anguli, orbicularis oris and levator labii superioris) resulting in a narrow vestibule and restricted muscle pull thereby reducing gingival display during smiling. [21] According to Abdullah et al., this approach is considered reliable as a minimally invasive procedure in managing gummy smile. Although relapse and scar contraction are considered critical and frequent issues in surgical procedures. [22]

As response to Q.no. 10, 71% postgraduates opted lip repositioning over orthognathic surgery (29%), as a correction for gummy smile. Form this, we can draw the conclusion that, postgraduates are aware of advantages of lip repositioning technique over classical orthognathic surgery than interns, who opted othognathic surgery (53%). This data is again statistically significant (p= < 0.005).

5. CONCLUSION

Now-a-days, people are becoming more and more aware of dental treatment procedures. They prefer economical, less time consuming

and less invasive procedures as a remedy for their problems. Being dental professionals, its our duty to provide our patient their lost confidence and satisfaction by performing our job in the best way as possible. For this, one should have through knowledge and understanding about the underlying cause of patient's chief complain. Through this survey, we came to conclusion that the awareness about the diagnosis of the underlying etiology for EGD and there management by lip repositioning surgery is slightly higher among postgraduates. But the dental interns are also not completely unaware of the drawbacks of gummy smile and its resolution by varying methods available. With further more learning, understanding and experience, one can be able to provide major contribution to cosmetic dentistry in near future.

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