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REVIEW ARTICLE

GAGGING: GIVE THE MESS A MISS! PART II - MANAGEMENT

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ABSTRACT

Very often we come across patients who have an excessive gag reflex. Gagging in dental patients can lead to avoidance of dental treatment and hence hinder the patient care. It can compromise the treatment at every stage, starting from diagnosis to rendering active treatment to the patient. This series of articles will outline the etiology and management of gagging. A literature search of PubMed, Cochrane and Wiley using keywords like 'gagging', 'retching', 'dental' was performed and all the articles till date were included. Additional articles were selected from hand searches of the reference articles of the articles got by the electronic search. The language was restricted to English.

INTRODUCTION

Clinicians have been successfully treating many patients with mild gagging problems using only minor procedural modifications or behavior techniques. Generally, the ultimate goal for patients is to make routine dental care possible by helping them 'unlearn' the behavior that leads to gagging. (Malkoc *et al.*, 2013; Wilks and Marks, 1983) Therefore, strategies to overcome the gag reflex in treatment have focused on behavior modification using systemic desensitization and distraction methods (Malkoc *et al.*, 2013; Robb and Crothers, 1996). Some patients suffered from such severe gagging that behavior techniques did not sufficiently reduce gagging in dentistry. In these patients pharmacological management (sedatives, antihistamine, or parasympathetic depressants) was thought to be the last alternative to eliminate the reflex (Malkoc *et al.*, 2013; Yoshida *et al.*, 2007; Council on Dental Therapeutics of the American Dental Association, 1985; Hattab *et al.*, 1999)

Management of a Sensitive Gag Reflex

1. Procedural Modification Techniques
2. Behavioral Management
3. Psychological Management
4. Desensitization Techniques
5. Pharmacological Management

- a. Local
- b. Systemic
6. Complementary Therapies

1. Procedural Modification Techniques

- a. Tell Show Do. This can help by considerably reducing the patient's anxiety which may be the reason for the gagging.
- b. Scheduling appointments in later half of the day. Some people report that they're more likely to gag earlier in the day. So the gag-inducing procedures may be scheduled for the late afternoon or evening instead.
- c. Sitting up straighter seems to help some people.
- d. Using super-fast setting impression material and letting the patient walk around while the material sets may also help.
- e. A complete case history including the details of the procedures or situations which have triggered gagging in the past may be noted and employ alternative procedures whenever possible. For example, placing the instruments at different angles in the mouth to avoid gagging. The assistants may also be instructed to be careful while placing the suction tips. Also, putting too many instruments at the same time may be avoided.
- f. Make the patient take a sip of very cold water prior to making impressions.
- g. If a patient cannot tolerate intra-oral X-rays, a panoramic x-ray which keeps the film outside the mouth can be used.
- h. Providing treatment in short increments wherever possible.

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- i. Also, make sure the patient has not eaten right before the activity that tends to trigger the gag reflex, to minimize the chances of vomiting.
- j. Reduction of the palatal coverage of the removable orthodontic appliances and further reduction in the thickness of the maxillary plate to avoid reduction in the tongue space which may lead to the tongue being displaced posteriorly into the pharynx and a gag reflex.
- k. The appliance or prosthesis given to the patient should not be too polished as it may give a slimy feeling. It is advisable to give a dull finish by sandblasting to prevent gagging. Jordan in 1954 suggested a matt finish to the denture is more readily accepted to overcome the problem. (Jordan, 1954)

2. Behavioral Management

1. Let the patient relax: The gag reflex is triggered by a combination of psychology and physiology. For some people, the psychological aspect will play a larger role. Maybe the patient has had a traumatizing experience at a doctor or dentist's office in the past. Communicate with the patient and assure that the procedure will be stopped if the patient asks the doctor to. Empathetic but a firm approach by the dentist often helps the patient to relax. A patient practicing some form of meditation may also help.
2. Keeping calm: The most important factor in dealing with gagging problems is a calm manner. If you get stressed by not being able to make an impression or do a certain procedure, your patient is only going to gag more.
3. Making a fist: Tell the patient to make a fist by closing the left thumb in left left hand and squeeze tight. Studies have shown that folding your left thumb into the palm of your hand, then making a fist and squeezing your left thumb helps some people with their gag reflex.
4. Encourage the patient to hum: It is found that it's difficult to gag and hum at the same time.
5. Listening to music: It can help the patient to relax and redirect his/ her focus.
6. Breathe: Asking the patient to focus on breathing can not only help physically, but it may also focus the mind away from what's happening in the mouth. Ask the patient to take deep breaths through the nose. Sometimes a nasal decongestant helps make it easier.
7. Divert the mind: Tell the patient to lift one foot up in the air to have them concentrate on that.

3. Psychological Management

Confidence building and Ego Enhancement

It has been observed that dental care related fear and fear of pain are associated with more frequent gagging. Hence by targeting dental care related fear, fear of pain and negative beliefs about dental care in patients who often gag when receiving dental care, clinicians may be able to help reduce gagging in frequency or intensity, potentially making treatment more comfortable for patients and easier for dental care providers. (Randall *et al.*, 2014)

4. Desensitization Techniques

By gradually getting the patient's soft palate accustomed to being touched, the gag reflex can be minimized, or perhaps

even get rid of it completely. Find out where your gag reflex starts. This can be done by simply using your toothbrush to brush your tongue. The point nearest the front of your tongue that makes you gag is where you want to concentrate.

- Let the patient find out where the gag reflex starts. This can be done by asking him/her to use the toothbrush to brush their tongue. The point closest to the front of the tongue that makes him/her gag is where the patient has to concentrate.
- Let the patient brush his/ her tongue right where the gag begins. The patient will gag, and it will be unpleasant—but not for long. Tell him/her to spend about ten seconds brushing that area (and gagging), the first time.
- Let him repeat the process over the next few days in the exact same spot. It will be noticed that gagging will keep getting lesser each time.
- Increase the brushing area. Once the patient is able to touch the toothbrush on that spot without gagging, it's time to move the toothbrush further back and repeat the same procedure with this as a new starting point.
- Continue moving the brush farther back till the whole tongue has been desensitized.
- If the patient religiously does this, this whole process should take approximately a month to complete. Advise the patient to redo the process from time to time, as the reflex may return if he doesn't. In fact, the patient should be told to brush the tongue regularly. This will not only keep the gag reflex at bay, but also give a fresher breath.
- Appleby and Bay's finger massage technique of the soft palate and Singer's marble technique (1975) (Singer, 1973; Goyal, 2014) are some methods by which the gag reflex can be exhausted before a patient is given an appliance.

5. Pharmacological Management

a. Local

- **Local anesthetic application:** When an object touches the soft palate, it can trigger a gag reflex. So, a numbing throat spray, to desensitize the soft palate, or an anesthetic gel such as lidocaine can be applied locally. The effects should last for about an hour, and the dental procedure completed as the patient's soft palate will be less reactive.

However, it is seen that anesthetic sprays are difficult to control and their use may result in increased risk of toxicity.

- **Tetracaine lollipops:** These may be used for the suppression of extreme gag reflex in dental patients. Commercially available oral spray and lozenge anesthetics have an unpleasant taste. Compounded flavored tetracaine lollipops can be an alternative and enable treatment of patients who have an aversion to dental care because of gagging. (Muller *et al.*, 2010)
- **Nasal Decongestant:** If the patient's nose is congested, taking a nasal decongestant before the dental appointment helps by clearing the nasal passages and facilitating breathing through the nose and hence may prevent the gag reflex. Though this method may not be a very good idea if it's a foul smell which is triggering the patient's gag reflex.

- **Table salt:** The patient may be asked to dip his moistened finger into some salt and dab the tip of his tongue with that. The patient may also be asked to rinse with saline water.
- Very recently, glossopharyngeal nerve block technique has been applied to control gag reflex. It has been found to be relatively safe, simple and easy to master as compared with general anesthesia for treating a patient with an exaggerated gag reflex. (Garg *et al.*, 2014)

b. Systemic

Medications such as sedative antihistamine, parasympathetic inhibitors and analgesics have been used with some success. (Goyal, 2014)

General Anesthesia

GA is also conducted in a patient with extremely problematic gagging who is intolerable to dental therapy under intravenous sedation. The advantage of GA is complete elimination of the reflex, but cost and risk should be considered in comparison to the benefit of dental care. (Malkoc *et al.*, 2013; Yagiela, 2001)

Nitrous Oxide inhalation anesthesia

Nitrous oxide (laughing gas) is very effective in reducing the gag reflex. IV sedation is even more effective and almost always eliminates the gagging. Inhalation sedation using nitrous oxide is the most common method of delivery of conscious sedation in dentistry. Nitrous oxide inhalation sedation was shown to be useful for control of the gagging reflex. (Malkoc *et al.*, 2013; Chidiac *et al.*, 2001) Nitrous oxide is a commonly used pharmacologic agent but has the main disadvantage in especially children of being a nasal inhalation agent. (Malkoc *et al.*, 2013; Varas, 2003)

Intranasal Midazolam

Midazolam is a short-acting benzodiazepine with a short half-life, in children, of two hours compared to 18 hours for diazepam. Midazolam has been used for preoperative sedation by the intramuscular, rectal, oral and nasal routes. (Malkoc *et al.*, 2013; Fuks *et al.*, 1994) Besides the sedative effect of midazolam, the intranasal midazolam is found to be very useful for taking impressions probably effecting on the depression of upper airway reflex sensitivity. It has been seen to inhibit gagging very effectively. Children are prone to vomit or spit out the anesthetics given orally. (Malkoc *et al.*, 2013; Haas, 1999; Kain *et al.*, 1998) This technique has advantages when compared with oral administration as the bioavailability of intranasal administered midazolam is approximately 55%, compared with 15% when administered orally. (Malkoc *et al.*, 2013; Veerkamp *et al.*, 1995; Primosch and Guelmann, 2005)

The rate of onset and recovery are more rapid, but intranasal burning is the main disadvantage of the nasal application of midazolam. (Malkoc *et al.*, 2013; Yealy *et al.*, 1992) The beneficial effects of midazolam include sedation, anxiolysis, and reduction of postoperative vomiting. (Malkoc *et al.*, 2013; Kain *et al.*, 1998; Knoester *et al.*, 2002; Kain *et al.*, 2000) Further investigations by using quantitative methods are needed to be done to clearly prove the effect of midazolam in inhibiting gagging.

6. Complementary Therapies

Acupuncture

Traditional Chinese acupuncture has a history of more than 2500 years and is one of the best known complementary and alternative therapies. Acupuncture stimulates the nervous system and alters the processing and perception of pain signals and also releases natural painkillers, such as endorphins and serotonin in the nervous system. Acupuncture's successful use for various dental conditions has been proven. (Naik *et al.*, 2014) Acupuncture technique is simple, quick, inexpensive and effective with very few contraindications. Bilello G *et al* found a significant reduction in the gag reflex scores after acupuncture, hence suggested that acupuncture may be useful for preventing and treating gag reflex. (Bilello and Fregapane, 2014) Studies show that acupuncture of point CV-24 is an effective method of controlling severe gag reflex during dental treatment including impression taking. (Rosted *et al.*, 2006) Acupoint PC6 (NeiGuan) when stimulated was effective in controlling nausea during the maxillary impression taking procedure. (Zotelli *et al.*, 2014) This point located on the wrist can either be stimulated with thumb pressure or with needles to control gagging in dental patients. (Lu *et al.*, 2000) Apart from various points on the face, head, back and hand, ear acupuncture can also be highly effective, even for people who usually need IV sedation. (Gabriel Stux Bruce Pomeranz) In ear acupuncture needles can be inserted into specific anti gagging points on each ear and left in situ while the dental treatment is carried out.

It has been seen that the additional clinical time required is only 2-3 minutes. No adverse reactions are seen to this technique and the patients are fit to leave and travel home unaccompanied. (Fiske and Dickinson, 2001)

Hypnosis

According to the British Psychological Society, "The term 'hypnosis' denotes an interaction between one person, the 'hypnotist', and another person or people, the 'subjects'. In this interaction the hypnotist attempts to influence the subjects' perceptions, feeling, thinking and behavior by asking them to concentrate on ideas and images that may evoke the intended effects. Hypnosis is a still underused but powerful non pharmacological tool in dentistry. While pharmacological sedation affords a temporary respite and helps the patient to cope with a single procedure, hypnosis can effectively allow for both an excellent sedation in a physiological way and the treatment of patient's anxiety, or substantially decrease the doses used for sedative and analgesic drugs when these are needed. (Facco *et al.*, 2014) Hypnosis can also be used to control the gag reflex. However, it is not regarded as a treatment in its own right, but should be seen as an adjunct to treatment methods that practitioners use already.

Hypnopuncture

It is a therapy which combines hypnosis and acupuncture. It is helpful in providing a therapeutic treatment plan for long term therapy for patients with a distinctive gag reflex. It's simple, fast and effective application independent of the cause makes it a valuable tool for dental emergency treatment procedures. Physiologic and psychological causes of gagging are dealt with at the same time. (Eitner *et al.*, 2005)

Acupressure

It has been suggested that applying pressure to a specific point on the palm alters the gag reflex trigger and hence decrease the likelihood of gagging. (Scarborough *et al.*, 2008)

Laser Therapy

The current literature suggests that low level laser stimulation of the PC 6 acupuncture points may prevent gagging. A recent study done by Elbay M *et al* suggested that low level laser therapy of the PC 6 acupuncture points appears to be a useful technique for controlling the gag reflex in children during maxillary radiography. A laser probe was placed on the Pericardium 6 (PC6) acupuncture point on the wrist, and laser energy was delivered. Following this, significant reduction in gagging was observed in the patients when measured using the Gagging Severity Index. (Elbay *et al.*, 2016)

Homoeopathic Medications: (Boericke and Murphy Repertory)

Various homoeopathic medicines can be used to control gagging in dental patients, though there is not much evidence in the dental literature. Wherever indicated, the homoeopathic medicines could be tried specially because the specialty boasts of having minimal side effects. The medicines and their indications are:

Cina - Recurring paroxysms, as of down in throat. Cough ends in a spasm. Cough so violent as to bring tears and sternal pains; feels as if something had been torn off. Gurgling from throat to stomach after coughing. Child is afraid to speak or move for fear of bringing on paroxysm of coughing. After coughing, moaning, anxious, gasps for air and turns pale.

Ipecac - Cough incessant and violent, with every breath. Chest seems full of phlegm, but does not yield to coughing. Suffocative cough; child becomes stiff, and blue in the face, feeling of constriction.

Lach – cough with much hawking; mucus sticks, and cannot be forced up or down. Very painful; worse slightest pressure, touch is even more annoying.

Carbo veg - Cough with itching in larynx; spasmodic with gagging and vomiting of mucus. Worse while talking; Spasmodic cough, bluish face, offensive expectoration

China - constant choking. Suffocative catarrh; rattling in chest

Lyco- Dryness of throat, without thirst. Food and drink regurgitates through nose. Tickling cough, dyspnoea tensiva, constrictive, burning pain in chest.

Kali carb - Hoarseness and loss of voice. Dryness of pharynx. Leaning forward relieves. Cough with relaxed uvula. Better in warm climate.

Most of the cases can be successfully managed by one or combination of the above discussed techniques. Dickinson in the year 2000 gave another index to describe the gagging control and hence the feasibility of rendering treatment to the patients.

Gagging Prevention Index (GPI) by Dickinson (Dickinson, 2000; Dickinson and Fiske, 2005)

GPI Grade

I Obtunded Gag Reflex: Treatment Successful

II Partially Controlled Gag Reflex: All Treatment Possible

III Partially Controlled Gag Reflex: Some simple treatments possible with frequent gagging

IV Inadequately Controlled Gag Reflex: Simple treatment unable to be completed

V Gag Reflex Severe/ No Control: No treatment possible

DISCUSSION

A lot of times, a removable orthodontic appliance is needed to correct minor malocclusions. In fact a removable appliance maybe an appliance of choice where mild tipping movements are required to close down the spaces in the arch, minor proclination corrections, single tooth crossbites, myofunctional appliance therapy to correct the skeletal malocclusion and so on. Removable appliance wear becomes extremely difficult in patients who have an excessive gag reflex. Not only this, fixed orthodontic appliance treatment also requires the patient to undergo procedures like intra oral examinations, impression making, intra oral photographs, a lot of times using photographic mirror for an indirect view. All these procedures are almost impossible to carry out until the gag reflex is controlled. A few procedural or behavior modification techniques, psychological or pharmacological management or complementary techniques can be utilized to carry out dental procedures. But when it comes to wearing the appliance for a considerable period of time to achieve dental correction or prosthesis for that matter, then these techniques may not work. Desensitization methods could be tried in patients who are compliant. Otherwise the only option left with an orthodontist or a prosthodontist is to modify the appliance or the prosthesis respectively.

Summary and Conclusion

Though a wide variety of management techniques are available, no one technique can solve all the gagging problems. Hence, it is advised to fully assess the severity of the gag reflex and decide on the management technique depending on the etiology and the nature of the gag reflex. It is wise to be flexible and try a combination of techniques and see which works best for the patient and the treatment type. Randomized clinical trials and more studies and case series using treatment approaches which are not commonly used should be carried out to increase the evidence base for the treatment of patients with hypersensitive gag reflex.

REFERENCES

- Bilello G. and Fregapane A. 2014. Gag reflex control through acupuncture: A case series. *Acupunct Med.*, 32(1):24-7.]
- Boericke and Murphy Repertory
- Chidiac JJ, Chamseddine L, Bellos G. 2001. Gagging prevention using nitrous oxide or table salt: a comparative pilot study. *Int J Prosthodont.*, Jul-Aug;14(4):364-6.
- Council on Dental Therapeutics of the American Dental Association: Accepted Dental Therapeutics 40th ed. Chicago: American Dental Association; 1985.

- Dickinson C. 2000. Gagging Problems in dental patients: Literature review for the diploma in dental sedation. GKT Dental Institute of King's College London.
- Dickinson CM. and Fiske J. 2005. A review of gagging problems in dentistry: 1. Aetiology and Classification. *Dent Update*, 32:26-28, 31-32.
- Eitner S, Wichmann M, Holst S. 2005. A long term therapeutic treatment for patients with a severe gag reflex. *Int J Clin Exp Hypn.*, 53(1):74-86.
- Eitner S, Wichmann M, Holst S. 2005. Hypnopuncture- a dental emergency treatment concept for patients with a distinctive gag reflex. *Int J Clin Exp Hypn.*, 53(1):60-73.
- Elbay M, Tak O, Sermet EU, Kaya C, Eryilmaz K. 2016. The use of low-level laser therapy for controlling the gag reflex in children during intraoral radiography. *Lasers Med Sci.*, 31(2):355-61.
- Facco E, Zanette G, Casiglia E. 2014. The role of hypnotherapy in dentistry. *SAAD Dig.*, 30:3-6.
- Fiske J, Dickinson C. 2001. The role of acupuncture in controlling the gagging reflex using a review of ten cases. *Br Dent J.*, 190(11):611-3.
- Fuks AB, Kaufman E, Ram D, Hovav S, Shapira J. 1994. Assessment of two doses of intranasal midazolam for sedation of young pediatric dental patients. *Pediatr Dent*, Jul-Aug;16(4):301-5.5.
- Gabriel Stux Bruce Pomeranz, textbook and atlas on acupuncture.
- Garg R, Singhal A, Agrawal K, Agrawal N. 2014. *J Endod.*, 40(9):1498-500.
- Goyal G. 2014. Gag reflex: Causes and Management. *Int J Dent Med Res.*, 1(3):163-166.
- Haas DA. 1999. Oral and inhalation conscious sedation. *Dent Clin North Am.*, Apr;43(2):341-59. Review.
- Hattab FN, Al-Omari MA, Al-Dwairi ZN. Management of a patient's gag reflex in making an irreversible hydrocolloid impression. *J Prosthet Dent*. 1999 Mar;81(3):369. Erratum in: *J Prosthet Dent*. 2005 May;93(5):499. Al-Duwayri, ZN [corrected to Al-Dwairi ZN].
- Jordan LG. 1954. Are prominent rugae and glossy tongue surfaces on artificial dentures to be desired? *J Prosthet Dent*, 4:52-3.
- Kain ZN, Hofstadter MB, Mayes LC, Krivutza DM, Alexander G, Wang SM, Reznick JS. 2000. Midazolam: effects on amnesia and anxiety in children. *Anesthesiology*, Sep;93(3):676-84.
- Kain ZN, Mayes LC, Wang SM, Caramico LA, Hofstadter MB. 1998. Parental presence during induction of anesthesia versus sedative premedication: which intervention is more effective? *Anesthesiology*, Nov;89(5):1147-56; discussion 9A-10A.
- Knoester PD, Jonker DM, Van Der Hoeven RT, Vermeij TA, Edelbroek PM, Brekelmans GJ, de Haan GJ. 2002. Pharmacokinetics and pharmacodynamics of midazolam administered as a concentrated intranasal spray. A study in healthy volunteers. *Br J Clin Pharmacol.*, May; 53(5): 501-7.
- Lu DP, Lu GP, Reed JF 3rd. 2000. Acupuncture/ acupressure to treat gagging dental patients: a clinical study of anti gagging effects. *Gen Dent.*, 48(4):446-52.
- Malkoc MA, Demir N, Ileri Z, Erdur A, Apiliogullari S. 2013. Intranasal Midazolam May Prevent Gagging Reflex: A Case Report. *J Oral Maxillofac Res.*, 4(3):e5
- Muller G, Case T, Deen GL. 2010. Tetracaine lollipops for the suppression of extreme gag reflex in dental patients. *Int J Pharm Comp.*, 14(5):395-9.
- Naik PN, Kiran RA, Yalamanchal S, Kumar VA, Goli S, Vashist N. 2014. Acupuncture: An alternative Therapy in Dentistry and its Possible Applications. *Med Acupunct*, 26(6):308-314.
- Primosch RE, Guelmann M. 2005. Comparison of drops versus spray administration of intranasal midazolam in two- and three-year-old children for dental sedation. *Pediatr Dent.*, Sep-Oct;27(5):401-8.
- Randall CL, Shulman GP, Crout RJ, McNeil DW. 2014. Gagging and its associations with dental care related fear, fear of pain and beliefs about treatment. *J Am Dent Assoc.*, 145(5):452-8.
- Robb ND, Crothers AJ. 1996. Sedation in dentistry. Part 2: Management of the gagging patient. *Dent Update*. Jun;23(5): 182-6.
- Rosted P, Bundgaard M, Fiske J, Pedersen AM. 2006. The use of acupuncture in controlling the gag reflex in patients requiring an upper alginate impression. *Br Dent J.*, 201(11):721-5.
- Scarborough D, Bailey-Van Kuren M, Hughes M. 2008. Altering the gag reflex via a palm pressure point. *J Am Dent Assoc.*, 139(10):1365-72.
- Singer JL. 1973. The Marble Technique: Method for treating the hopeless gagger for complete dentures. *J Prosthet Dent*, 29:149.
- Varas KG. 2003. Pharmacological management of the healthy but uncooperative pre-school child. *J Pediatr Dent Care*, 9(2):14.
- Veerkamp JS, Gruythuysen RJ, Hoogstraten J, van Amerongen WE. 1995. Anxiety reduction with nitrous oxide: a permanent solution? *ASDC J Dent Child*, Jan-Feb; 62(1):44-8.
- Wilks CG. and Marks IM. 1983. Reducing hypersensitive gagging. *Br Dent J.*, 155:263-5.
- Yagiela JA. 2001. Making patients safe and comfortable for a lifetime of dentistry: frontiers in office-based sedation. *J Dent Educ.*, Dec;65(12):1348-56.
- Yealy DM, Ellis JH, Hobbs GD, Moscati RM. 1992. Intranasal midazolam as a sedative for children during laceration repair. *Am J Emerg Med.*, Nov;10(6):584-7.
- Yoshida H, Ayuse T, Ishizaka S, Ishitobi S, Nogami T, Oi K. 2007. Management of exaggerated gag reflex using intravenous sedation in prosthodontic treatment. *Tohoku J Exp Med.*, Aug;212(4):373-8.
- Zotelli VL, Grillo CM, de Sousa Mda L. 2014. Nausea control by needling at acupuncture point Neiguan (PC 6) during an intraoral impression taking procedure. *J Acupunct Meridian Stud.*, 7(6):318-23.
