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CASE STUDY

GAGGING: A REVIEW OF THE LITERATURE

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ABSTRACT

Gagging commonly occurs during dental procedures, such as making a maxillary impression. Clinicians successfully treat many patients with mild gagging problems using only minor procedural modifications. For some patients, however, severe gagging can be elicited by the dentist's fingers or instruments contacting the oral mucosa or even by nontactile stimuli, for example, patients seeing the dentist or remembering a previous dental experience. Providing dental treatment for this challenging group can be a stressful experience for both patients and clinicians. Anticipation of the distress induced by dentistry can often dissuade a patient with a gagging problem from seeking regular oral care. As a consequence, the severely affected patient tends not to seek routine dental treatment, presenting only when in pain, and may request treatment under general anesthesia. Patients with a longstanding history of problematic gagging may therefore have poor dental health, and require extensive treatment. The clinician may believe that the difficulties encountered in restoring dental health are insurmountable, and treatment planning therefore tends to be more radical, commonly resulting in exodontia. However, this may merely compound the problem if the patient is unable to tolerate a removable prosthesis. Edentulousness, the final outcome, may profoundly affect a patient's social status, reducing self-esteem and quality of life. The purpose of this article is to outline the etiology of problematic gagging and review the management of patients with an exaggerated gag reflex.

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INTRODUCTION

The gag reflex is a normal defense mechanism that prevents foreign bodies from entering the trachea, pharynx, or larynx. Unwanted, irritating, or toxic material is ejected from the upper respiratory tract by the contraction of the oropharyngeal muscles. In retching, peristalsis becomes spasmodic, uncoordinated, and the direction is reversed (Meeker, 1986). Air is forced over the closed glottis producing a characteristic retching sound. The patient who gags may present with a range of disruptive reactions; from simple contraction of palatal or circumoral musculature to spasm of the pharyngeal structures, accompanied by vomiting (Logemann, 1988). Gagging may be accompanied by excessive salivation, lacrimation, sweating, fainting, or, in a minority of patients, a panic attack (Conny, 1983). When stimulation occurs intraorally, afferent fibers of the trigeminal, glossopharyngeal, and vagus nerves pass to the medulla oblongata (Conny, 1983and Wright, 1979).

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From here, efferent impulses give rise to the spasmodic and uncoordinated muscle movement characteristic of gagging (Andrews, 1993). The center in the medulla oblongata is close to the vomiting, salivating, and cardiac centers, and these structures may be stimulated during gagging (Davenport, 1982). Gagging is a natural reaction to tactile stimulation of certain intraoral structures. There is a wide variation in the sensitivity of the oral cavity and the ability of patients to withstand intraoral stimuli (Leslie, 1940 and Landa, 1954). Five intraoral areas are known to be ''trigger zones'': palatoglossal and palatopharyngeal folds, base of tongue, palate, uvulaand posterior pharyngeal wall (Meeker, 1986). Interestingly, the passage of food across these areas does not usually incite retching. Gagging may also be elicited by nontactile sensations such as visual, auditory, or olfactory stimuli (Murphy, 1979 and Wilks, 1983). The sight of the dentist or dental equipment may provoke some patients to gag. The sound of the dental handpiece or a person retching may initiate the gag reflex in other patients.

Etiology

The four factors that are believed to be important in the etiology of gagging include local and systemic disorders, anatomic factors, psychological factors and iatrogenic factors.

Local factors

- Nasal obstruction
- Post nasal drip
- Caterrah(throat infection)
- Sinusitis
- Nasal polyps
- Congestion of the oral ,nasal and pharyngeal mucosa

Systemic factors

Systemic stimuli are those arising from the use of various drugs or from excessive consumption of alcohol which stimulates the gag reflex. The recognition of the type of gagging is most important before any attempt is made to treat the patient.

Anatomic factors

Physical factors such as anatomic abnormalities and oropharyngeal sensitivities have been suggested as predisposing factors to gagging .In a study of denture wearers that compared the radiologic anatomy of gaggers and nongaggers, no anatomic abnormalities were observed. There were, however, fewer adaptive changes in the posture of the tongue, hyoid bone, and soft palate in the gagging group. Wright suggested that the distribution of the afferent neural pathway, particularly the vagus nerve, may be more extensive in gagging patients compared with non gagging patients. Enlarged areas of sensory innervation cannot, however, explain why patients gag with auditory, olfactory, or visual stimuli.

Psychological factors

- Eating disorders
- Fear
- Stress
- Neuroticism
- Learned responses

Iatrogenic factors

- Water & suction tubes
- Instruments
- Local anaesthesia
- Radiography
- Inadequate posterior palatal seal
- Restricted tongue space
- Loss of normal palatal contour
- Poor retention
- Surface finish of dentures
- Over extended and under extended denture
- Disharmonious occlusion
- Impression making procedure

Management

Table I. Summary of management of gagging patient

Individual assessment
Assess patient's attitude and motivation to treatment
Willingness to:
-try treatment and invest timein treatment
-commit to ''homework''
-accept that treatment may be prolonged
-Patient's ultimate goal for treatment?
-Does patient believe it is achievable?
Techniques common to all patients:-
-Sympathetic approach
-Positive attitude
-Thorough history
-Reassure patient Gagging is a normal response
-Many patients have very sensitive gag reflex
-The majority of patients can learn to control gagging, but it takes time
-Gagging is nothing to be embarrassed about
-Build patient's self-confidence
Explain and demonstrate stop signal (for example,raising hand)
-Allow patient to feel some control
Careful intraoral examination
- Obtain patient feedback and continually re-negotiate consent
-Avoid trigger zones
-Praise patient
Specific treatment modalities
-Behavioral Relaxation techniques
-Distraction
-Suggestion/hypnosis
-Systematic desensitization
-Cognitive behavioral therapy
Pharmacological
-Oral
-Inhalation
-Intravenous
-Combined Several techniques may be used together or in succession
Simple measures for all patients (reduce iatrogenic factors)
-Do not overload impression tray
-Use quick-setting impression materials
-Ensure efficient aspiration
Miscellaneous
- Akinosi closed-mouth technique for local analgesia of inferior dental nerve
-Treat patient in an upright position
-Frequent cessation of treatment

Table 2. Suggested treatment strategies for patient with disruptive gag reflex

Treatment problem Management options
Prosthodontic
Unable to tolerate impressions
- Distraction techniques
-Relaxation
-Systemic desensitization
-Hypnosis
-Sedation
Unable to wear denture(s)
Satisfactory dentures available –
-'errorless' learning
No satisfactory dentures –
-systematic desensitization, for example, training base and 'errorless' learning.
-Acrylic discs may be helpful prior to provision of training base.
Restorative
Unable to tolerate instrumentation, for example, examination, scaling, tooth preparation
-No short-term treatment requirements:
-hypnosis
-systematic desensitization for oral hygiene measure, scaling, polishing
-encourage regular reviews
-sedation
In urgent need of treatment:
-hypnosis
-sedation

Assessment

The management of the gagging patient may be influenced by the severity and etiology of the problem. It is important that the clinician obtains a detailed history in an unhurried, sympathetic manner, and the environment should be calm and reassuring. The attitude of the clinician towards the patient may influence the outcome of treatment. If the dentist attempts to identify the situations that trigger disruptive gagging, this may optimize patient care and operative success. It is helpful if the clinician can ascertain if there was a precipitating event responsible for initiating gagging, although this may not always be possible. The patient should be informed of what the intraoral examination involves, and the inspection should only proceed when consent has been given.

Behavioral Techniques

Behavior modification: It has been recommended that all disruptive gagging should be viewed and presented to the patient as a behavioral response and, therefore, amenable to behavior modification (Ramsay, 1987). An exaggerated or extended period of gagging in the absence of a normal stimulus is usually a learned response (Ramsay, 1987). Theoretically, this response can be unlearned or extinguished. Behavioral modification is the most successful long-term method of managing the gagging patient (Altamura, 1974). Generally, the objectives are to reduce anxiety and ‘‘unlearn’’ the behaviors that provoke gagging. Relaxation, distraction, suggestion, and systematic desensitization are all methods that can be employed, singly or in combination (Zach, 1989 and Neumann, 2001). Cognitive behavioral therapy and sensory flooding are additional techniques that are available.

Relaxation

The gag reflex may be a manifestation of an anxiety state. Relaxation techniques may be helpful in reducing or abolishing the gag reflex. Relaxation can help ameliorate or override unhelpful thought processes. An example of this is to ask the patient to tense and relax certain muscle groups, starting with the legs and working upwards, while continually providing reassurance in a calm atmosphere.

Distraction

Distraction techniques can be useful to temporarily divert a patient’s attention and may allow a short dentalprocedure to be performed while the mind is dissociated from a potentially distressing situation. Conversation can be useful, or the patient may be instructed to concentrate on breathing, for example, inhaling through the nose and exhaling through the mouth. It is often helpful to ask the patient, prior to commencing treatment, to think of and visualize a safe, comfortable, relaxing place and then to describe it briefly to the dentist. The clinician may then help reinforce this image by verbally describing obvious features of this scene accompanied by feelings of well-being. This is termed ‘‘distraction imagery.’’(Saunders, 1997 and Mariano, 1989). The role of distraction can be further emphasised by asking a patient to participate in activities that cause muscle fatigue, such as asking a patient to raise a leg off the dental chair and hold the position (Krol, 1936). As the patient’s muscles become increasingly fatigued, more conscious effort is required to hold the leg in an elevated position, thus diverting attention away from any intraoral procedure.

Suggestion

Distraction techniques can be refined by incorporating an element of suggestion (Zach, 1989). Patients can be informed that retching will not occur during the distracting activity. Visual imagery may be used to enhance suggestion. Hypnosis may help to relax a patient and so temporarily remove or ameliorate the gag reflex to allow dental treatment to be performed (Barsby, 1994). There are few contraindications to hypnosis, but it should only be used after the clinician has received appropriate training (Meeker, 1986; Robb, 1996). An experienced hypnotherapist may use a sophisticated suggestion approach to help abolish the gag reflex (Noble, 2002).

Systematic desensitization

The maladaptive thoughts and expectations of patients can be altered by positive experience and this forms the basis of re-education techniques such as systematic desensitization (Wilks, 1983; Ramsay, 1987 and Krol, 1963). Behavior that has been learned by classical conditioning can be unlearned by essentially reversing the conditioning process. The technique consists of incremental exposure of the patient to the feared stimulus. The patient, under conditions of relaxation and reassurance, is exposed to a mildly aversive stimulus and learns to cope with this. The patient is then gradually exposed to increasingly aversive stimuli. In other words, the intensity, duration, and frequency of the noxious stimuli is slowly increased, thereby allowing the patient to gently habituate by developing coping strategies to deal with the feelings of discomfort or panic experienced. This may often involve behavioral techniques such as deep breathing and muscle relaxation. It is important to use a controlled step-wise approach to prevent or minimize the patient’s gagging. The use of reassurance and praise is strongly recommended. Many re-education techniques have been described in which the patient is given an object to place in the mouth for a period of time (Wilks, 1983; Ramsay, 1987 and Jordan, 1954). The size of the object and the length of time for which it is held in the mouth gradually increases until the patient is able to tolerate dental procedures. A toothbrush, radiograph, impression tray, marbles, acrylic discs, buttons, dentures, and training devices have all been used to help patients overcome the gagging problem (Ramsay, 1987; Conny, 1983; Singer, 1973). For example, the hard palate is gently brushed with a toothbrush without inducing the gag reflex. The patient marks the position of the maxillary incisors on the toothbrush handle. The aim is to move the brush more posteriorly and the patient is encouraged as the mark on the toothbrush moves progressively down the handle (Robb, 1996; Singer, 1973), described a technique where ordinary glass marbles were used to re-educate the patient prior to denture fabrication. Essentially, for 1 week marbles are sucked in the patient’s mouth for increasing periods of time while awake. Once these are tolerated, maxillary and mandibular denture record bases are made, and later converted to conventional dentures. Alternatively, acrylic balls or discs may be used.

Training bases

This is a further desensitization technique, whereby a patient is progressively supplied with a series of small to full-sized denture bases. It is useful for patients who are to become denture wearers. A thin acrylic denture base, without teeth (Fig. 1), is fabricated and the patient is asked to wear it at home,

gradually increasing the length of time the training base is worn. A suitable regime may be 5 minutes once each day, then twice each day and so on. After 1 week the patient is asked to increase this to 10 minutes 3 times each day, then 15 minutes, 30 minutes, and 1 hour. Eventually the patient is able to tolerate the training base for most of the day. The timing and rate of progress will vary between patients, depending upon individual needs and expectations. If problems are encountered it may be necessary to reduce the extension of the posterior border of the denture. The placement of 2 posterior palatal seals during fabrication is helpful as this allows the postpalatal seal to be maintained even if the extension of the posterior aspect of the training base is subsequently reduced. It can be advantageous to use distraction techniques with this approach. The patient is asked to initially wear the training base when busy or concentrating on a nonstressful task such as watching a favorite television program. Relaxation techniques can also be combined with the initial wearing of the training base. Anterior teeth are added to the original or an extended training base (Fig. 2) and, when the patient is able to tolerate this, posterior teeth are added (Fig. 3). Compromising the standards of denture production is counterproductive, and retention and stability of the prosthesis should be optimized. Palateless dentures have been shown to be effective in some patients (Farmer, 1984), and loss of retention is not always significantly affected (Akeel, 2000 and Floystrand, 1986). Some authors, however, would still only recommend this option as a last resort (Ramsay, 1987).

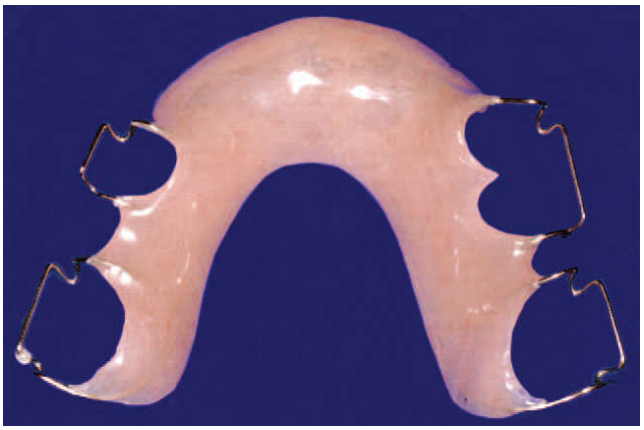

Fig. 1. Training denture without teeth Improved esthetics may be motivating factor

Fig. 2. Training denture with anterior teeth only

Fig. 3. Training denture with posterior teeth

Errorless learning

This desensitization technique is an effective simple method that can be used by all clinicians, and is helpful for patients who have dentures but do not wear them because the dentures evoke gagging (Foster, 1985). The disadvantage is that it can be a very slow technique. However, once a motivated patient understands the procedure and rationale, the interval between clinic appointments can be extended while the patient continues to practice the exercises. The patient is instructed to set aside time to position the denture closer each day and eventually into the mouth in ‘‘successive approximations.’’ That is, the denture is placed perhaps millimeters at a time closer to the final position. In situations where retching is induced simply by looking at the denture, then the patient is merely requested to look at or hold the denture and to stop before symptoms of retching develop. The process is repeated, with a small increase in time spent undertaking this task, until eventually the patient can wear the denture.

Cognitive behavioral therapy

This method focuses on changing irrational thought processes. Alteration or elimination of unhelpful cognitions may lead to a change of behavior. Cognitive behavioral therapy (CBT) invites patients to challenge strongly held beliefs about the consequences of gagging by asking the patient to confront these beliefs with evidence collected from life experience (Humphris, 2000). For example, some patients retch when water from the high-speed handpiece is felt.When questioned, it is not unusual for an individual to admit to a fear of choking, believing that breathing will stop, resulting in death. Some patients may believe that the fear of dentistry will cause a fatal heart attack. A cognitive behavioral psychotherapist will attempt to rationalize these thought patterns in patients with persistent psychogenic gagging.

Sensory flooding

A technique known as sensory flooding has been advocated by some to be effective (Saunders, 1997). It relies on a rapid extinction of the link between the stimulus (for example a denture) and gagging. It is accomplished by encouraging the patient to retain the denture in the mouth for as long as possible with the reassurance that the aversive reactions encountered will diminish. The basis of this method is to inform the patient that the physiological system cannot maintain the strength of the initial response and that habituation will occur within 30

minutes or so. This method would not be appropriate with severe gagging problems, and compliance would be unlikely. This approach is in direct opposition to the errorless learning approach.

Teaching patients to swallow with their mouth open

It has been suggested that all patients who gag characteristically swallow with their teeth clenched, using the teeth, lips and cheeks as a buttress for the tongue to push against (Wilks, 1983). Teaching the patient to swallow with the teeth apart, the tip of the tongue placed anteriorly on the hard palate, and the orbicularis oris muscles relaxed, has been advocated (Wilks, 1983).

Pharmacological Techniques

Local anesthesia: The use of local anesthesia for gagging has been criticized by some authors, (Faigenblum, 1968; Ramsay, 1987; Krol, 1963; Schole, 1959), but proponents suggest that if the mucosal surfaces are desensitized, the patient is less likely to gag.(43)The agents may be applied in the form of sprays, gels, lozenges, mouth rinses, or injection. While topical anesthetics may work for some patients, in others it may increase nausea and vomiting and may fail to suppress the gag reflex (Schole, 1959 and Kramer, 1977). The deposition of local anesthetic around the posterior palatine foramen has been used for patients who gag when the posterior palate is touched (Conny, 1983). However, the administration of a local injection may not be possible and may in itself provoke gagging (Landa, 1954). Furthermore, injection of local anesthetic solution may distend the soft tissues resulting in an inaccurate impression, which may compromise retention of the prosthesis (Conny, 1983). From a behavioral viewpoint, the use of anesthetics serves to focus the patient's thoughts on the impending stimulus (Krol, 1963), or possibly act as a direct antecedent without requiring an intervening conscious thought process.

Conscious sedation

When a disruptive gag reflex is thought to be a manifestation of anxiety, removal of the anxiety may prevent gagging. The use of conscious sedation with inhalational, oral, or intravenous agents may temporarily eliminate gagging during dental treatment while maintaining reflexes that protect the patient's airway (Yagiela, 2001), Psychological approaches such as distraction or relaxation techniques may be enhanced when used in conjunction with sedation (Barber, 1979). Clinicians should consider this increased suggestibility when treating the retching patient. Often, the use of sedation does not obviate the need for other treatment modalities (Robb, 1996). Sedation may be used initially to allow urgent dental treatment to be completed after which a behavioural approach is used to affect a long-term solution. A small number of patients will become dependent on sedation for dental treatment to be successfully completed. However, while sedation may allow adequate treatment to be performed, it will not help the patient overcome retching if, for example, a prosthesis must be worn. Nitrous oxide alters the perception of external stimuli and it is suggested that this altered perception depresses the gag reflex (Langa, 1976). The patient's tolerance to the placement of intraoral objects is increased and the anxiolytic properties of nitrous oxide can reduce or abolish the negative cognitions associated with gagging (Langa, 1976). The use of oral sedatives may be unpredictable and is usually only useful in the mild gagging patient with an underlying anxiety state. Intravenous sedation is often much more predictable than oral sedation, and can be of use in patients where inhalation sedation is ineffective.

General anesthesia

A minority of patients do not respond to any form of sedation or behavioral therapy and dental treatment under general anesthesia may be appropriate as a last resort. It is the authors' opinion that the limited resources available for the provision of restorative dentistry under general anesthesia and the inherent risks associated with a general anesthetic miligate against the routine provision of dental treatment using general anesthesia in patients with a disruptive gag reflex.

Summary

Overt gagging can be distressing for both the patient and clinician. There appears to be no universal remedy for the successful management of the gagging patient. The most serious problem associated with the strong potential with an overactive gag reflex is the strong potential for compromised treatment and it presents as a challenge to the capability of a dentist. Many techniques are available for controlling the exaggerated gag reflex and no single technique will solve each patient's problem. The conscious mind of the patient must be regarded .by the dentist as the primary factors for the inhibition of gagging. Building a relation based on confidence is more valuable than applying most medicaments.

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