

# Sexual correlates of gagging and dental anxiety

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**Objective:** Both oro-related behavioural and sexual dysfunctions are non-life-threatening conditions which can have an impact on individual well-being. Possible common features include intra-body penetration, giving control to another person, and experiencing encounters that can sometimes be subjectively experienced as aggressive and/or abusive. The present study examined possible sexual correlates of dental anxiety and gagging. **Basic research design:** A total of 448 individuals, who applied for sex therapy at the Sexual Medicine Center, Sheba Medical Center, Tel-Hashomer, Israel, completed the following sexual and dental functioning questionnaires: International Index of Erectile Function (men only), Female Sexual Function Index and difficulties with sexual penetration (women only), dental anxiety, gagging reflex and dentist preference (entire population). **Results:** Higher gagging reflex was associated with problems in sexual penetration and history of sexual abuse in women (especially one that included vaginal penetration). It was also associated with dental anxiety and higher preference for dentist of the same gender for both genders. **Conclusions:** The study shows that gagging reflex can bear sexual connotations, especially in women.

**Key words:** gagging, dental anxiety, sexual dysfunctions, psychological, sexual offenses, sexual abuse

## Introduction

The oral cavity and its associated functions share many psycho-social similarities with sexuality and sexual functioning. The oral cavity is the first zone of pleasure and satisfaction to the newborn, not only as a supplier of nutrition, but also as an erogenous zone that provides sexual pleasure. Even in individuals who have successfully passed to the genital stage of development, some sexual activity remains fixed with the oral cavity (Freud, 1999).

The face and mouth play an important role also in sexual attraction, essential for the survival of the species. The mouth is a source of gratification and reinforcement of sexual behaviours, a pleasure that encourages the repetition of sexual acts. Moreover, oral sex has become a normative part of sexual activities contributing to sexual arousal and orgasm in both genders (Shindel *et al.*, 2008).

A possible connection between dental fear and sexual trauma has been suggested. The studies refer mainly to sexual abuse and neglect. A prevalence of high dental anxiety was found in women reporting past experiences of sexual assault (Humphris and King, 2011). When women who had high and low dental fears were compared with respect to trauma history, high levels of dental fear were associated with a higher prevalence of several forms of child maltreatment and adult sexual and physical assault (Walker *et al.*, 1996). Among sexually abused women, most subjects reported experiencing problems related to dental treatment (Willumsen, 2001). Women with dental fear who reported a history of child sexual abuse, scored higher on the Dental Beliefs Scale than women with dental fear with no history of sexual abuse in childhood (Willumsen, 2004). Subjects with self-reported histories of childhood sexual abuse report that some aspects of

dental treatment (certain body positions, need for a sense of control, fear of judgement) can be particularly difficult (Stalker *et al.*, 2005). Many patients with dental anxiety report co-morbid psychosocial dysfunction due to effects of sexual abuse, general anxiety, gagging, fainting or panic attacks (Moore *et al.*, 2004).

While dental anxiety is a prevalent and commonly studied oro-related behavioural dysfunction (a dysfunction related to the oral cavity and its functions) (Berggren and Carlsson, 1985; Eli, 1992; Eli *et al.*, 1997), excessive gagging reflex is another common obstacle to dental care (Bassi *et al.*, 2004). The co-morbidity between excessive gagging and dental anxiety (Moore *et al.*, 2004) may result from gagging serving as an indirect expression of anxiety. Presenting a “somatic” symptom, such as gagging, may serve as an indirect way to avoid the threat involved with dental treatment (Eli, 1992).

Unfortunately, the literature lacks accepted tools to assess gagging. A Gagging Severity Index has been proposed (Rosted *et al.*, 2006), which is a descriptive measure that may be useful in clinical settings but is less appropriate for research because it is based mainly on clinical parameters. More recently, a Gagging Problem Assessment tool (GPA) was presented (van Linden van den Heuvel *et al.*, 2008). However, the GPA has been tested on 25 individuals only and its substantial length makes its use in research problematic. Although the authors suggest a shorter version of the GPA for further research, no data have been published on it, as yet.

The prevalence of both sexual dysfunctions and oro-related behavioural dysfunctions is substantial (Eli, 1992; Laumann *et al.*, 1999). Neither pose immediate health dangers, but they do have major influences on a person’s quality of life (Laumann *et al.*, 1999; Mehrstedt *et al.*,

2007; Rosen *et al.*, 1999; Shifren *et al.*, 2008). To date, there is no comprehensive research regarding possible associations between oro-related behavioural dysfunctions and sexual dysfunctions. The purpose of this study was to examine the possible sexual correlates of dental anxiety and excessive gagging reflex in men and women.

## Materials and Methods

This cross sectional study was conducted at the Sexual Medicine Center, Sheba Medical Center, Tel-Hashomer, Israel and approved by the Committee for Approval of Experiments in Human Subjects under the Helsinki Accord at the Sheba Medical Center. All subjects signed an informed consent form. Some 693 applicants for sex therapy during the years 2005 to 2007 were requested to complete questionnaires referring to sexual and dental functioning and then had a structured interview with a professional sex therapist (GB) leading to decisions regarding sexual diagnosis and treatment. Sexual diagnoses were finalized according to Basson *et al.* (2000) and Hatzimouratidis and Hatzichristou (2007).

The Dental Anxiety Scale (DAS), developed by Corah (1969) as a specific measure of dental anxiety, has been used extensively in research conducted on anxious dental patients (e.g. Berggren and Carlsson, 1985; Eli, 1992; Eli *et al.*, 1997). Subjects' DAS scores were categorised as high dental anxiety or no/moderate dental fear using a cut-off point of 13 as recommended in previous studies (Corah *et al.*, 1978). Regarding excessive gagging reflex however, there is no widely accepted scale or significant body of research. The tool proposed in this study, Gagging Assessment Scale (GAS), was developed by two of the present authors (NU and IE). It was tested for content validity by gathering a group of subject matter experts (SMEs) together to review test items. The group were 6 dentists who worked at the Tel Aviv University School of Dental Medicine's Clinic of Oral Psychophysiology with clinical and academic experience in working with patients unable to undergo routine dental treatment, mostly due to dental anxiety and/or excessive gag reflex. Each SME proposed questions for the questionnaire and following discussion 6 initial questions were agreed and presented to a panel of 20 patients under treatment in the clinic. Their feedback informed agreeing the final 4-question version of the GAS questionnaire: How do you feel when: 1, you brush your back teeth? 2, you are waiting in the dental waiting room and thinking of the upcoming dental treatment? 3, you are sitting in the dental chair and the dentist is checking your teeth with his mirror and other instruments? 4, the dentist is treating your back teeth? Scores for each answer are: 1, I experience no nausea whatsoever; 2, I feel slightly nauseous; 3, I am afraid I will vomit; 4, I can't do it because immediately I feel nauseous and feel like vomiting; 5, I experience actual spasms in my throat, sometimes even vomiting. As with the DAS, the total score ranges from 4-20.

As the SMEs were unanimous in their conviction that a close relation exists between dental anxiety and excessive gagging reflex, a construct validity evaluation was made by calculating correlations between the GAS questionnaire and accepted parameters measuring dental anxiety (DAS). Furthermore, the SMEs observed that patients

suffering from gagging tend to avoid dental treatment. Therefore, in addition to DAS, an additional question was presented to subjects: "How has your dental treatment worked in recent years?" with possible answers being: (a) I have routine dental care, (b) I go to the dentist only occasionally when I need to; and (c) Not in treatment at all. A low (nevertheless highly significant) correlation was found between GAS and DAS ( $r=0.282$ ,  $p<0.0001$ ) as well as between GAS and the above mentioned question ( $r=0.113$ ,  $p<0.05$ ). The correlation between the GAS and DAS was also confirmed among a population of 402 random Israeli adults, in another study performed with the assistance of the developers of the GAS scale ( $r=0.604$ ,  $p<0.001$ ; Winocur *et al.* 2011).

A specific question regarding dentist preference was presented to all subjects as follows: "What kind of dentist do you prefer? Male, Female, Does not matter."

Questionnaires also assessed sexual functioning. A validated questionnaire, the Female Sexual Function Index (FSFI, 6 domains, 19 items, women only) was used to assess six domains of female sexual function (desire, arousal, lubrication, orgasm, satisfaction and pain). The six domains were summed to calculate a total FSFI score (Rosen *et al.*, 2000). Secondly, regarding sexual penetration, a series of questions addressed the following 3 domains: difficulties in penetration (PEN), pain during penetration (Pain), and sexual abuse domain (SAD). In PEN, difficulties in vaginal penetration (VP) were assessed by a 5-item yes/no scale, asking each woman to report if she ever experienced problems in inserting a tampon, participating in a gynaecological examination, inserting self-finger, experiencing insertion of spouse's finger and/or participating in penile-vaginal intercourse. Difficulty with at least one of the PEN stimuli classified subjects as PEN positive. For Pain, woman evaluated the pain experienced during each 5 VP items on a 0-100mm visual analogue scale (VAS). For SAD, each woman reported if she had ever experienced an unpleasant/abusive sexual encounter (yes/no scale) and if positive, if the experience included VP.

For men the International Index of Erectile Function (IIEF), a 15-item validated instrument was used to assess 5 domains of male sexuality: desire, erectile function, intercourse satisfaction, orgasmic function and overall satisfaction (Rosen *et al.*, 1999).

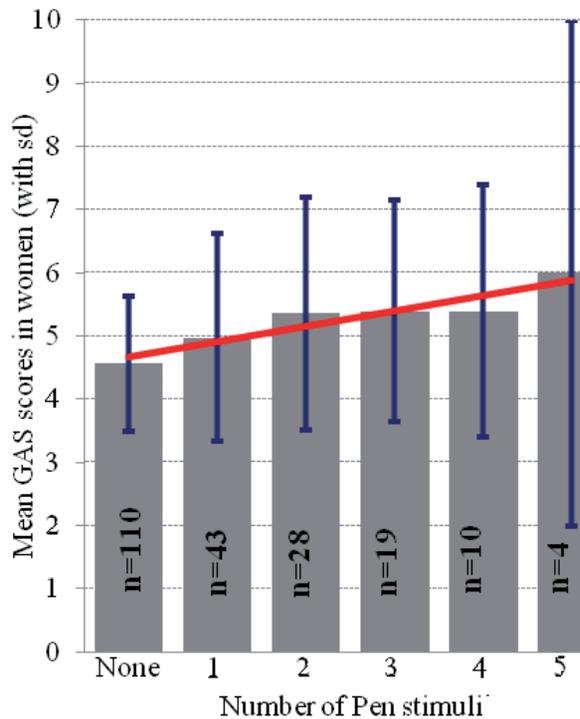
Cronbach  $\alpha$  was used to assess internal consistency. Two-sample t-tests were used to compare between two groups regarding continuous parameters. One-way Analysis of Variance (ANOVA) was used when 3 groups were compared. Distribution of categorical variables was compared between groups by applying the Chi-square test. Relationships between continuous measures were evaluated by Pearson Correlation Coefficients. For multivariate analysis linear regression was used. SAS v9.1.3 was used for all statistical analyses with a significance level of  $p<0.05$ .

## Results

Response rate was 64.6%. The final study population consisted of 236 women (mean age 31.5, sd 9.7y) and 212 men (mean age 36.0, sd 12.3y). The psychometric properties of the scales in the present study (Cronbach

**Table 1.** Mean GAS scores according to gender and dentist preference

	Male respondents			Female respondents		
	GAS	(n)	sd	GAS	(n)	sd
Male dentist preferred	5.40	(20)	2.24	5.00	(20)	0.16
Female dentist preferred	4.40	(5)	0.52	5.92	(12)	2.64
Does not matter	4.48	(183)	0.92	4.80	(192)	1.40



<sup>a</sup> PEN refers to inability to experience vaginal penetration as described in the text

**Figure 1.** Mean GAS scores in women with regard to number of PEN stimuli <sup>a</sup>

$\alpha$ ) were as follows: DAS=0.89; GAS=0.67; FSFI (total score)=0.94; IIEF (total score)=0.88. There were significant differences between women and men in the GAS and DAS scores (4.88 sd 1.52 vs. 4.52 sd 1.16,  $p<0.01$ ; and 9.66 sd 3.19 vs. 7.96 sd 3.02,  $p<0.0001$ , respectively), with women indicating greater anxiety on both scales.

Classified by dental anxiety 69 were anxious (DAS  $\geq 13$ ) and 374, non-anxious. Anxious participants scored significantly higher on GAS than the non-anxious group (5.60 sd 2.00; vs. 4.56 sd 1.16; respectively;  $p<0.0005$ ). There was a positive correlation between the DAS and GAS scores ( $r=0.282$ ,  $p<0.0001$ ).

Most participants (86% of women and 88% of men) showed no preference for the gender of their dentist. Participants who preferred a dentist of their own gender scored higher on GAS than those who showed no such preference ( $p=0.05$ ; Table 1). Significant differences in GAS were observed between PEN positive (114, 50.9% of women) and PEN negative women (5.25 sd 1.85 vs. 4.57 sd 1.07, respectively,  $p<0.005$ ). A correlation was observed between GAS and the number of PEN positive stimuli ( $r=0.237$ ,  $p<0.001$ ; Figure 1), i.e. the more difficulties in vaginal penetration among women, the higher the tendency for gagging. No such differences with regard to DAS could be detected. Pain levels ranged from 1.17

**Table 2.** Percentage dentist preference of women who reported sexual abuse (SAD) compared to women who did not report such experience

	SAD group (%)	
	Negative n=141	Positive n=91
Male dentist preferred	8.5	7.7
Female dentist preferred	2.1	11.0
Does not matter	89.4	81.3

to 3.70 (for PEN negative stimuli). There were no correlations between Pain and DAS or GAS.

Unpleasant/abusive sexual experience was reported by 93 women (SAD positive, 39.7%). SAD positive women scored higher on GAS (5.28 sd 1.92) than women who did not report such an experience (SAD negative, 4.61 sd 1.11;  $p<0.01$ ). No such differences with regard to DAS were detected. Unpleasant/abusive sexual experience which included vaginal penetration was reported by 38 women. The GAS scores from this specific group were higher than those of SAD positives without vaginal penetration and of SAD negative women (5.79 sd 2.40 vs. 4.98 sd 1.40 and 4.61 sd 1.11, respectively,  $p<0.001$ ). Namely, the tendency of women to gag was found to be lowest when no abuse has been experienced, higher among women who had experienced some sexual abuse and highest among women who experienced sexual abuse which included vaginal penetration. No such differences with regard to DAS were detected.

Table 2 presents the relationship between SAD group and preference for a dentist of a particular gender. While 11% of the SAD positive women preferred a woman dentist, the percentage among the SAD negative women was only 2% ( $p<0.05$ ).

Finally, a multivariate analysis of the data was calculated (linear regression) with the dependant variable being GAS and independent variables being: the six domains of FSFI, PEN positive, SAD positive, and SAD positive including vaginal penetration. The two variables best predicting GAS were SAD which included vaginal penetration (Parameter Estimate, PE=0.22,  $p<0.005$ ) and the PEN stimuli (PE=0.17,  $p<0.005$ ).

Although detailed descriptions and analyses of the sexual diagnoses (FSFI and IIEF scales) were beyond the scope of the present paper and will be presented elsewhere, the mean scores of these scales are presented here for the readers' general information: FSFI total score=17.96 sd 7.76 (women only); IIEF total score=46.5 sd 15.83 (men only). No correlations were found between sexual diagnoses, FSFI, IIEF scales, or either of the DAS or GAS scores.

## Discussion

The aim of this study was to examine possible sexual correlates of gagging and dental anxiety. The GAS used in the present study was developed according to the principles of content and construct validity and shows an acceptable internal consistency. The positive association between DAS and GAS indicates that excessive gagging reflex can be an indirect manifestation of dental anxiety as previously proposed (Eli, 1992; Moore *et al.*, 2004; Ramsay *et al.*, 1987). Additional studies are needed to further explore the GAS (and possibly also the GPA) questionnaires in various populations to prove its validity and reliability.

The results also agree with findings that women show higher dental anxiety levels than men (Eli, 1992; Milgrom *et al.*, 1988). Concomitantly, in the present study, women had higher GAS scores than men. One explanation is that women experience more oro-related behavioural dysfunctions. However, another possibility may be that men are more reluctant to report fear in questionnaires (Pierce and Kirkpatrick, 1992), which may be one of the reasons men report lower DAS and GAS scores.

Unlike GAS, in the present study no direct association was found between dental anxiety (measured by DAS) and sexual abuse as measured by SAD. This is in contrast to Humphris and King (2011), Walker *et al.* (1996) and Willumsen, (2001) but in accordance with Oosterink *et al.* (2009) who found that pathological dental anxiety was not associated with sexual assault and other reports of traumatic experiences outside the dental setting. The differences in findings may result from the different questionnaires used, and differences in the studied populations. In one of those studies, Willumsen (2004) found different parameters, like touching the back of the mouth, to be highly associated with dental fear and sexual abuse. This further supports our assumption that gagging (which has been found to correlate well with dental anxiety) may serve as an indirect manifestation of dental anxiety, especially among victims of sexual assault.

In this study, participants suffered from sexual dysfunctions and not necessarily from oro-related behavioural dysfunctions. Therefore, the general level of their dental anxiety was not particularly high: about 15% suffered from high dental anxiety similar in prevalence to the general population (ter Horst and de Wit, 1993; Milgrom *et al.*, 1988)

Gagging reflex was associated with a higher preference for a dentist of the same gender, problems in sexual penetration in women, and a history of sexual abuse in women, especially one that included vaginal penetration.

Furthermore, the two variables best predicting GAS were problems in sexual penetration in women and experience of sexual abuse which included vaginal penetration. Apparently, among this population it is not the mere fact of suffering from a sexual dysfunction, but rather the experience of problems with sexual penetration and/or history of abuse (with vaginal penetration) which serve as predisposing factors for excessive gagging.

Taken together these data suggest that the symptom of excessive gagging during dental treatment may have more complex meanings than merely being an indirect somatic manifestation of dental anxiety. The fact that gagging was not associated with pain during the sexual penetration stimuli (in women) suggests that gagging may represent a woman's reluctant response to the idea of intra-body penetration. Unfortunately, the present study did not investigate men's difficulties in experiencing sexual penetration. Future research in this direction may teach us more about these issues.

In spite of the temptation to declare that gagging has immediate connections to sexual functioning, such a statement needs further investigation. Physiological gagging reflex is generally elicited by immediate noxious stimuli applied to the oropharynx. Nevertheless, gagging is also associated with cognitive aspects which may cause "neutral" stimuli to be recognized as noxious, threatening or unpleasant by the patient, evoking the associated response (Eli, 1992). The present study showed that some of these stimuli may have sexual connotations in their origins.

Sexual abuse survivors show more personal distress concerning their sexuality and less sexual satisfaction (Rellini and Meston, 2007). It is therefore not surprising that among the women seeking sexual therapy in the present study, about 40% reported experiencing some sort of sexual abuse in their past. Among this specific group, a higher percentage of women preferred a female dentist than those who did not report such experience. This was also true for women who experienced difficulties with gynecological examination and/or penile penetration during intercourse. These findings further emphasize the possible sexual connotations of the dental situation.

Although the study did not show significant associations between any of the FSFI or IIEF scales and GAS or DAS, it raises several questions which should be examined in more detail in the future. Possibly, the FSFI and IIEF tools, which were built to achieve specific diagnoses in the field of sexual functioning, are inadequate when dealing with patients who suffer from dental anxiety or excessive gagging reflex. The questions regarding problems in penetration and sexual abuse in women did yield positive associations with GAS possibly due to the more direct approach involved.

Patients with sexual dysfunctions do not necessarily suffer from high dental anxiety or gagging. Unfortunately, when a patient arrives for treatment with high dental anxiety and/or excessive gagging reflex, it is almost impossible to inquire about sexual functioning. Such an attempt would be considered intrusive and inappropriate.

At this stage, further study is recommended to address these intriguing issues and to reach conclusions regarding the psycho-dynamics of the presented findings.

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