



Overlap between dental anxiety, gagging and Blood-Injection-Injury related fears – A spectrum of one multidimensional phenomenon

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HIGHLIGHTS

- Co-morbidity between GAG, DA and B-I-I fears suggest these entities are linked.
- These entities differed in anxiety levels, physical expressions and triggers for fear.
- Fear of medical/dental situations has variable clinical expressions.
- Gagging may be an expression of DA, similar to fainting in B-I-I phobia.

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ABSTRACT

Background and objectives: Dental anxiety (DA) and gagging (GAG) are prevalent problems that severely impact social behavior and quality of life. Furthermore, because dental phobia is considered a Blood-Injection-Injury (B-I-I) phobia, the present study contrasted DA, GAG and control subjects regarding the severity of dental anxiety and investigated the comorbidity of GAG, DA and B-I-I fears.

Methods: Demographics, Verbal Pain Scale (VPS), Oral Health Impact Profile-14 (OHIP-14), Decay, Missing and Filled Teeth (DMFT), Dental Anxiety Scale (DAS) and response to phobic stimuli were collected from 53 GAG, 68 DA and 80 control subjects.

Results: GAGs exhibited results between DA and controls regarding the likelihood to have high-anxiety/phobia (DA group: OR = 55.56; GAG group: OR = 17.24), self-assessed dental anxiety (OR = 29.14; OR = 17.48), fear of dental injections (OR = 8.51; OR = 2.91) and dental drills (OR = 12.02; OR = 5.82). DA and GAG had similar results regarding: DAS score ($p = 0.13$), fear of blood tests (OR = 4.68; OR = 4.09) and blood donations (OR = 3.13; OR = 3.10). Overlap between GAG, DA and a B-I-I fear was observed. GAG and DA patients and worse maximal VPS and OHIP-14 scores retained their significant positive association with the DAS score in the multivariate analysis.

Conclusions: The co-occurrence of DA, GAG and B-I-I-related fears suggests these entities are linked. However, different anxiety levels, symptoms and triggers, reflect the broad spectrum of fear of medical/dental situations.

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1. Introduction

The gag reflex is a somatic protective response that prevents foreign bodies entering the trachea, pharynx or larynx [1–3]. For some patients increased gag reflex (GAG) can be induced during dental treatments by tactile or non-tactile stimuli such as visual, olfactory, auditory or psychic

stimuli, a phenomenon known as “psychogenic gag reflex” [1,4]. This can restrict performance of dental procedures [3,5,6]. The estimated prevalence of gagging during dental treatment is 8.2% [7] and gagging-related problems account for approximately 20% of dental avoidance cases [8]. Yet, gagging is a relatively unexplored area in dental and psychiatric research [7] and current evidence is insufficient to conclude whether pharmacological and non-pharmacological interventions reduce gagging during dental treatment [3].

Dental anxiety (DA) is defined as an unreasonable fear of going to the dentist, dental procedures and objects used in the context of treatment, usually associated with a strong emotional experience and physiological arousal [9,10]. The prevalence of DA has been found to be 20%

Abbreviations: DA, dental anxiety; GAG, gagging; B-I-I, Blood-Injection-Injury; DSM, Diagnostic and Statistical Manual of Mental Disorders; DAS, Dental Anxiety Scale.

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in several population-based studies [11–13]. Its severe form, dental phobia, has been reported in approximately 5% of the general population [12,14]. Although modern dentistry has improved, DA scores have not changed since the mid-1900's [15].

Few studies have shown a positive association between DA and GAG [7,16–18]. Both DA and GAG can be the result of operant, classical and other conditioning [19,20]. They can both lead to a vicious circle as proposed by Berggren [21], in which anxiety/gagging leads to avoidance of dental treatment which can lead to a deterioration of dental health status, in turn causing feelings of guilt and shame, social isolation, depression, lower general well-being, vitality, contentment and a lower quality of life [18,22–25]. Therefore, these populations are important from a public health perspective for clinicians and health-care authorities, in medical and dental fields.

Despite the similarities, DA and GAG are not under the same classification in the DSM 5 (26). Dental phobia is classified as a Blood-Injection-Injury (B-I-I) phobia in the DSM 5, although accumulating evidence suggests that these conditions may be two distinct syndromes in terms of frequency of fainting, gender distribution, etiology and phobic stimuli [27,28]. Gagging shares some features of emetophobia, a specific phobia of vomiting [29,30], yet it is restricted to the dental setting.

In light of the similarities between DA and GAG, and based on published findings from studies presented above, the first aim of the present study was to contrast these entities regarding: [1] the severity of DA and [2] self-assessment of patients as suffering from DA. We included a non-patient control group, as well as an appropriate clinical control group, to assess the specificity of the effect. To that end, these variables were compared in patients with gagging problems and patients with DA without gagging problems, as well as to a control group of patients without DA and without gagging problems. Despite the fact that DA has been studied extensively since the late 1960's, to the best of our knowledge, a comparison between GAG, DA and control patients regarding these variables has not yet been published in the English language literature. Our aim was to employ an exploratory analysis protocol adjusting for important confounding factors such as demographics, tobacco use, pain scores, caries experience and Oral health-related quality of life (OHRQoL). For example, specific phobias tend to co-occur with medical concerns in older individuals, and the symptoms of anxiety may be attributed to these medical conditions, or the anxiety may manifest in an atypical manner (Diagnostic and Statistical Manual of Mental Disorders 2013). Therefore, only young and middle-aged individuals without significant medical conditions or disabilities with DA, GAG and controls were included in the current study, in order to eliminate the confounders of aging and illness.

Moreover, based on the current classification of dental phobia as a B-I-I phobia [26] and on studies that describe the similarities between GAG and DA, our second hypothesis was that co-morbidity of GAG, DA and B-I-I related fears exists. Specifically, we assessed if DA, GAG and control patients would rate common medical B-I-I-related situations associated with seeing blood and venipuncture (i.e. blood tests and blood donations) as equally anxiety provoking as dental B-I-I-related situations (i.e. dental injections), as gag related phobic stimuli (feel of foreign object in the mouth) and as other common dental phobic stimuli (noise of the dental drill). The co-occurrence of dental and medical B-I-I-related phobic stimuli among these patients was also examined.

2. Subjects and methods

2.1. Ethical approval

The study was carried out in accordance with the ethical standards of the Helsinki Declaration. Utilization of human subject data followed the approved protocol and requirements of the Institutional Review Board. All participants received oral and written information regarding the aims of the study and the study protocol and provided written informed consent before enrolment in the study.

2.2. Study groups

This is part of a series of papers focusing on the demographic, clinical and behavioral aspects of patients with DA and GAG [31–33]. The study included consecutive patients with DA (70 patients) and GAG (60 patients) referred to the Department of Oral Medicine, Oral and Maxillofacial center, Tel-Hashomer Medical center, Israel, between May 1st, 2011 and January 31st, 2013. This Department is a secondary Oral Medicine referral center which manages the dental treatment of patients with DA or GAG referred by dentists from dozens of primary clinics throughout the country. Patients are managed using various behavioral techniques, anti-anxiety medications and Nitrous Oxide inhalation sedation.

Sample size calculation using WINPEPI software [34] determined that at least 96 participants in three groups with 1:1 ratio were needed to provide 90% statistical power to identify a 3.19 point difference in DAS global score, with alpha set at 0.05, and an estimated standard deviation (SD) of 4.74 for the group with largest SD and 2.67 for the group with smallest SD, based on previous reports analyzing DAS scores [35].

The control group included 80 age and gender-matched consecutive individuals attending the Department of conservative dentistry located within the Oral and Maxillofacial center for elective conservative dental screenings with no history of DA or GAG.

2.3. Inclusion and exclusion criteria

2.3.1. Inclusion criteria

Age 18–50 years attending the dental clinic for new patient screening.

2.3.2. Exclusion criteria

Patients seeking care for a dental emergency; mental, psychiatric or physical disabilities; a comorbid malignant disease or significant medical condition; presence of drug abuse; for women, being pregnant or lactating.

Inclusion criteria for the DA group: referred by a dental practitioner from a primary dental clinic to the Department of Oral Medicine due to dental anxiety during a previous dental treatment, preventing further treatment without conscious sedation/behavioral techniques/anti-anxiety medication, and without gagging problems.

2.3.3. Inclusion criteria for the GAG group

Referral by a general dental practitioner from a primary dental clinic to the Department of Oral Medicine, due to gagging, or almost vomiting during dental treatment. The exclusion criteria for the GAG group were other conditions that may engage the gag reflex such as anatomic and iatrogenic factors, local and systemic disorders (e.g. sinusitis, gastrointestinal diseases, nasal polyps, mucous in the upper respiratory tract), use of medications that may cause nausea and patients who had undergone surgery which may have altered the anatomy permanently.

Inclusion criteria for the control group were age- and gender-matched consecutive dental patients with no history of DA or GAG.

2.4. Data collection

Patients were evaluated at the beginning of the first meeting when a thorough history was taken and an examination performed prior to treatment, and before any medications were prescribed. All questionnaires were filled out in a uniform manner during a face-to-face patient interview by one of the two investigators (G.A.; A.L.). All subjects were scheduled for a single session between 9:00 am and 3:00 pm to minimize diurnal effects that may influence the gag reflex [1].

The questionnaire included: (1) Demographic details, (2) severity of dental anxiety assessed using the Dental Anxiety Scale (DAS), (3) self-assessment as suffering from DA (yes or no), (4) B-I-I and other phobic stimuli (5) current and maximal verbal pain scale (VPS) for assessment of dental pain (6) Oral Health Impact Profile 14 (OHIP-14).

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