

The role of acupuncture in the treatment of prosthodontic patients with a gagging reflex

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ABSTRACT

Aim and Objectives: Hyperactive gag reflex (GR) can be a big obstacle in certain dental procedures especially in making an upper arch impression. Treating those might be a challenge for both the dentist and the patient. Many patients withdraw from treatment because of their inability to cope with the procedure. One of the effective modalities in controlling this phenomenon is the use of Acupuncture. In this trial, Ear acupuncture was used aiming to control hyperactive GR during upper alginate impression. **Methods:** A total of ten patients aged between 20 and 60 years, with a history of GR on taking dental impressions were selected to be part of this clinical trial. All patients fulfilled the inclusion criteria had an upper dental alginate impression taken (or an attempt made at it) before acupuncture and a second upper alginate impression taken immediately after acupuncture based on traditional Chinese medicine. The gagging severity index used to assess GR before insertion of the acupuncture needle while gagging prevention index was used after the acupuncture and impression taking. **Results:** Seven patients scored I with the reflex obtunded and the impression taking carried out successfully, one patient scored II with the reflex partially controlled and impression taking still possible, two patients scored III with the reflex partially controlled but with frequent gagging and impression taking still possible. No adverse effects were observed, and patients were fit to leave unescorted. **Conclusions:** Ear acupuncture was found to be effective in controlling GR in all ten participants in different levels.

Key words

Anti-gagging point, ear acupuncture, impression

INTRODUCTION

Acupuncture has been practiced as a healing art for around 5000 years. It is a Traditional Chinese Medicine (TCM) that has been revitalized in the west over the last 20 years. Acupuncture is defined as the stimulation of specific acupuncture points along the skin of the body using thin needles.^[1] The insertion of those needles into any part of the human body can aid in disease prevention, therapy or maintenance of health.^[2] Acupuncture is suggested in the treatment of TMJ clicking and locking, facial pain, trigeminal

neuralgia, dental anxiety, xerostomia, postoperative pain, burning mouth syndrome and as adjunct to local anesthesia.^[3] Probably, the most important application of acupuncture in dentistry is in the control of gag reflex (GR).^[4]

Ear acupuncture is an important part of the TCM based on ancient concepts that consider that the activity of all organs, as well as their diseases, is manifested in the ear, as a reflex.^[5] Therefore, it is possible to analyze, evaluate, and treat morbid states by ear

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stimuli.^[6] According to Eitner *et al.*,^[7] stimulation of an acupuncture point on the ear before undergoing treatment effectively controls the GR, allowing dentist to perform a variety of procedure without compromising the patient's safety and comfort.

The GR is considered a normal, protective, physiological mechanism that occurs to prevent foreign objects from entering the pharynx, larynx, or trachea.^[8] The GR has profound impact on the provision of dental care for patients who are affected. The reflex interferes with the ability of the dental practitioner to provide treatment for dental patients, which in return it will lead to increased levels of stress suffered by patients during treatment sessions.^[9] Treatment plans may well be compromised by the need to limit the impact of the reflex, and in some cases, unnecessary levels of intervention may be required, for example, general anesthesia. In addition, the reflex can be so troublesome that it inhibits patient attendance for treatment, and induces anxiety related to dental treatment in certain patients. In severe cases, patients actively avoid dental treatment. Therefore, any appropriate method of controlling the reflex is welcomed.

A number of strategies have been used in an effort to control the profound GR and allow the provision and acceptance of dental care. They include relaxation, distraction, and desensitization techniques; psychological and behavioral therapies; local anesthesia, conscious sedation and general anesthesia techniques; and complementary medicine therapies such as hypnosis and acupuncture.^[10] Acupuncture has been used successfully to control the gag reflex.^[11]

METHODS

This was a nonrandomized clinical study carried out among patients from the department of prosthodontics in Ajman University of Science and Technology (AUST), United Arab Emirates, from February 2015 to April 2015, in accordance with the ethical standards of the Helsinki Declaration and was approved by the ethics committee of Ajman University. All participants received oral and written information regarding the study purpose and a written informed consent were obtained before being included in the study.

All patients were evaluated for inclusion when the history and examination were being taken. The inclusion criteria for acupuncture were: volunteer patients, adults of both sexes, had a history of severe GR in taking dental impression; current dental treatment requires an upper alginate impression to be taken; the individual can give informed consent. Pregnant patients and patients who had been taking antiemetic drugs or medications that could produce nausea were excluded from the study.

The group included 10 participants with an age range of 20–60 years. They were instructed not to eat within 2 h before the appointment. The participants were submitted to a single session of treatment, in which two maxillary impressions (or attempts to take them) were performed; the first one was performed before acupuncture and the second after acupuncture. The acupuncture involved insertion of one, fine, single-use disposable needle (0.35 mm × 40 mm) into the anti-gagging point of each ear to a depth of 3 mm just above the tragus after disinfection of the skin with 70% alcohol at the site of the needle penetration [Figure 1]. The needles were rotated clockwise and anticlockwise for 30 s before carrying out dental treatment. The needles remain *in situ* throughout the procedure of impression taking and are removed after removal of the impression tray from the patient's mouth. All acupuncture treatments were carried out by certified TCM specialist. The impression-taking procedures were performed in all patients by the same professional. For molding, stainless-steel trays were used. These were sterilized and filled with regular setting alginate. The alginate was manipulated in accordance with the manufacturer's instructions.

The magnitude of the GR was assessed by the researcher using the gagging severity index (GSI)^[12] to evaluate the severity of the GR before acupuncture [Table 1]. While, after the acupuncture and dental impression taking; the gagging prevention index (GPI) was used to assess the effectiveness of ear acupuncture [Table 2] as described by Dickinson.^[12] It worth noting that both indices are based on a descriptive scale related to the severity of the GR and the ability to carry out dental treatment. To the best of our knowledge, this is the only scales which assess the magnitude of gagging reflex and the effectiveness of a given treatment. The Wilcoxon signed rank test was used to compare the GSI and GPI scores before and after the acupuncture treatment. $P < 0.05$ was considered statistically significant.



Figure 1: A diagrammatic representation of pressure point

Table 1: Gagging Severity Index

The gagging reflex is
Very mild, occasional and controlled by the patient
Mild, and control is required by the patient with reassurance from the dental team
Moderate consisted and limits treatment options
Severe and treatment is impossible
Very severe; affecting patient behavior and dental attendance making treatment impossible

Adopted from Dickinson, 2000

Table 2: Gagging Prevention Index

Treatment management method employed
Obtunded gag reflex; treatment successful
Partially controlled gag reflex; all treatment possible
Partially controlled gag reflex but frequent gagging; simple treatment possible
Inadequately controlled gag reflex; simple treatment unable to be completed
Gag reflex severe; no treatment possible

Adopted from Dickinson, 2000

RESULTS

In this study, four men and six women were subjected to ear acupuncture at AUST. Clinical examination was done before proceeding with needle acupuncture. This examination included: Pulse rate registration, tongue examination, and neck massaging as anxiety reduction method. The trial started by insertion of impression tray with alginate material and registration of the patient reaction was assessed by GSI prior to acupuncture. The median GSI value of the 10 patients was 4 (mean value 3.721) indicating a severe GR that limited dental treatment in some cases made it impossible. After acupuncture, the median GPI value was 2 (mean value 2.231) for all the patients included, indicating a mild to moderate GR only, that enabled the examination and in most cases treatment to be carried out. For the score data collected, Wilcoxon signed ranks test was used to evaluate patient's response with and without acupuncture. A $P = 0.004$ was attained showing a significant difference in the gagging response after needle insertion.

DISCUSSION

There are few references in the scientific literature related to the implication of acupuncture in dentistry; therefore, studies related to this field are needed. This study showed that acupuncture provided partial relief of nausea in the maxillary impression-taking procedure. The etiology of gagging is complex and not fully understood. Whether its etiology is somatic, psychogenic or a combination of both, the outcome of it makes the acceptance of dental treatment impossible. With a long history in the treatment of diseases, acupuncture is currently being

used as a safe and easy technique for different medical and psychological purposes.

Participants in this study have been subjected to different techniques to overcome their problem before being referred to join this study, these techniques involved distraction methods, anesthetizing the palate, reducing the amount of alginate material, choosing a smaller tray size, as well as increasing the mixing time for a faster setting; however, none of these modalities have been successful. Many studies have compared techniques to combat GR; among these, acupuncture appears the most valid. The study of Rosted *et al.*^[11] has shown that GR improved after acupuncture and the patients better accepted dental treatment. In the other study, ear acupuncture was used for a case reported series of 10 patients where dental treatment was impossible due to a severe GR, in eight out of ten cases it was possible to control the GR completely, and the reflex was partly controlled in the remaining two cases.^[12] Our results were consistent with these studies.

Ear acupuncture has facilitated the impression taking procedure for all ten patients comfortably. Although some of the patients had doubt regarding the success of this trial, their desperation for a successful, smooth and comfortable impression taking procedure for the continuation of the treatment had encouraged them to be part of this research. The technique of ear acupuncture was relatively noninvasive; it is cheap and requires little additional clinical time, the patient does not require an escort and can return to normal daily activities after treatment. No other complications have been reported.

The mode of action in controlling GR through acupuncture is not fully understood. The possible explanation to the mechanism of action of this technique is that one of the main nerves involved in swallowing, the vagus nerve, also supplies the part of the ear that contains the anti-gagging acupuncture point. The point is also adjacent to a branch of the trigeminal nerve. Together, the trigeminal and vagus nerves are responsible for much of the sensory and motor functions of the larynx, pharynx, and palate. Therefore, stimulating these anti-gagging points activates mechanisms that inhibit the muscle activity of the GR.^[13] In all of the ten participants once the needle was in place impression tray was easily inserted for the proper setting time of the alginate with no or minimal discomfort for the participants.

Controlled trials have shown that ear acupuncture is as effective as intranasal midazolam in reducing dental anxiety^[14] and that acupuncture is more effective than placebo in the prevention of postoperative dental pain^[15] and in reducing the gagging reflex.^[2] The ear sites have the advantage that they lie out of the area of work, and are unaffected by local anesthesia used for treatment. One study reported by Rosted *et al.* demonstrated that

the effect is typically evident within 60 s, although may take a little longer in some cases, and has a reliability of around 80%.^[11]

Acupuncture has a definitive role to play in dental care but not as an alternative to conventional therapies. The control of this exaggerated reflex will facilitate in the delivery of care. Gagging may impair a simple examination or even other major procedures such as impressions for crowns and bridges; which render the patient unable to accept complex treatment options. The overall benefits of an approach using acupuncture include reduction of emetic reflex,^[16] greater patients comfort during dental treatment and reduce patient/doctor stress.^[17]

In this study, there were no reports of adverse effects. However, the limitation of this study design might include that the improvement noted in gagging reflex due at least in part to other factors, such as familiarity with taking repeated impression and lacking a control group. Still many studies and randomized controlled trials are encouraged to improve the evidence bases.

CONCLUSION

It can be therefore concluded that ear acupuncture is effective in controlling GR in all 10 participants in variable levels during impression taking with no significant side-effects similar to the findings of Grillo *et al.*^[18] The technique is safe, quick, cost-effective, inexpensive, and relatively noninvasive. Hence, it emerges as a new modality to control GR to those patients who are unresponsive to the conventional mode of treatment.

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Conflicts of interest

There are no conflicts of interest.

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