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Is acupuncturing effective in controlling the gag reflex during dental procedures? A review of literature

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Abstract

Traditional acupuncture has been introduced more than 2500 years ago which provides an alternative and complementary option during clinical practices. Its main mechanism is based on stimulating the nerves by altering the processes and perception of pain transmitters. It facilitates releasing natural pain relievers such as endorphins and serotonin. Its success for various dental procedures has been proved earlier. However, its effects on controlling the gag reflex seem to be overlooked. The gag reflex is recognized as a protective reaction for stopping the entrance of any foreign bodies into the oropharynx. Pronounced gag reflexes can have negative impacts on the quality of dental procedures. Many techniques have been suggested for managing this reflex and acupuncturing is one of those which seems to be overlooked recently. The aim of this paper is reviewing the published high-quality researches about the efficacy of this technique for eliminating the gag reflex during dental procedures.

Keywords: Acupuncture, clinical trial, dentistry, gag reflex, oral

INTRODUCTION

The gag reflex is mostly produced by the transmission of afferent impulses to the center neural system which ends the efferent impulses to the musculature of the oropharynx.[1,2] These afferent stimuli (such as tactile, gustatory, visual, acoustic, olfactory and etc.,) can transmit impulses to the gag center which is believed to be located at the medulla oblongata. The symptoms of gagging are mostly characterized by a feeling of nausea, violent spasms of the oropharynx muscles accompanied sometimes with simultaneous contraction of the musculature of the abdomen.[3]

The gaging reflex sometimes has a negative impact on the quality of dental procedures such as primary intraoral examination, preparing dental impressions, use of dentures and several other clinical dental procedures. It has been stated that the responsible stimuli for the gaging might differ from patient to patient. In some patients, the gaging is only limited to the stimulation of the surrounding tissues of oropharynx, while others might show the gaging reflex with some other stimuli except physical ones such as the sight, taste, smell of certain objects.[1,4] It has been mentioned that the gag reflex occurs in 44% of individuals who wear dentures which highlights considerable importance compared to other situations.[1]

Some methods are introduced to prevent or reduce the gaging reflex. Tranquilizers, which are mostly

prescribed for patients who suffered from mental strain and tension, have been tried for the elimination of gaging reflex by reducing mental tension and relieve anxiety.[5] Topical application of anesthetic drugs like Lidocaine was used on the sensitive areas for reducing the gaging tendency. However, strong precaution should be taken during applying because the surrounding tissues of pharynx might become abolished to the physiological cough reflex.[5] Although these anesthetic agents block the gaging stimuli impulses transiently, they can suppress the physiological cough reflex and endanger the patient's life. During the cough reflex suppression, the impression materials might be aspirated into airway systems and endanger the patient's life. Infiltration of local anesthesia into the posterior palatine foramen might also bring about the same disadvantages.[6] Using salt stimulates the taste buds in the anterior part of the tongue which subsequently activates the chorda tympani nerve and leads to inactivation of the gag reflex.[7] Some herbal drugs have represented local anesthetic properties. For instance, tannin in herbal drugs has an anesthetic function on the mucosa of the oral cavity.[8]

Acupuncture was introduced by Chinese as an alternative medicine by inserting single nonferromagnetic materials, such as silver or gold, needles at various acupuncture points in the body.[9] The exact mechanism of action and efficacy of acupuncture have not been established,[10] but it seems that the acupuncture activates small myelinated nerve fibers which send impulses to the spinal cord and then activate the midbrain and pituitary hypothalamus. It has been shown that enkephalin, beta-endorphin, serotonin and nor adrenaline are involved in this process.[11] Acupuncture and related methods can be used for curing and prophylaxis of postoperative nausea and vomiting in routine dental procedures in combination with or without other conventional techniques. The aim of this manuscript is to overview the valuable articles, especially randomized clinical trials, which evaluated the efficacy, popularity, and possibility of acupuncture technique used for reducing the gaging reflex during dental procedures.

MATERIALS AND METHODS

A data search was performed using PubMed's electronic database and Google Scholar searching motor for dental reports, based on the following search terms in simple or multiple conjunctions: “Acupuncture,” “Clinical trial,” “Dentistry,” “Gag reflex,” “Oral.” The search was set up from 2000 to 2015 and review articles and references from different studies were used to identify relevant studies. To select the studies all obtained reports were reviewed, so titles and abstracts were screened for relevance. The full text of relevant abstracts was obtained and selected however the case reports and manuscript in other languages were not selected.

The initial literature search yielded 324 different titles. After the first screening based on the title and abstract, 8 studies were found eligible. Full-texts of the all articles were reachable for initiating reviewing process.

RESULTS

From the gathered articles, 8 of them[12,13,14,15,16,17,18,19] met the inclusion criteria in which 6 of them were indexed on PubMed database.[12,13,14,15,16,17] Nevertheless, 2 of mentioned studies were case-series.[16,17] The three of them used the pericardium-6 (PC-6) point and two of them used Conception vessel 24 (CV-24) acupuncturing points. Two studies used other points which were not so much common. The important information of each study is summarized in Table 1.

DISCUSSION

Acupuncture points are the essential components of acupuncture therapy for diagnosis and treatment. Despite numerous studies on defining the significance of acupuncture points from the anatomical or histological perspective, no clear evidence of their existence has been established. Some physiological characteristics of acupuncture points such as tenderness and palpable hardenings are considered as sensitization of nociceptors.[9]

The basic theories of acupuncturing can be summarized in three below mechanisms:

1. Acupuncture needles can stimulate the afferent nerves (Type I and II) or A-delta fibers which send

impulses to the upper centers. At the spinal cord, enkephalin and dynorphin are mostly involved in blockage of pain in the spinothalamic tract

2. Acupuncture stimulates midbrain structures by activating cells in the periaqueductal gray matter and the raphe nucleus. In response, they send descending signals through the dorsolateral tract, causing the release of the monoamines norepinephrine and serotonin in the spinal cord. These neurotransmitters inhibit pain presynaptically and postsynaptically by reducing transmission of signals through the spinothalamic tract
3. Stimulation of pituitary-hypothalamic complex provokes the systemic release of beta-endorphin into the blood which can result is the release of adrenocorticotropic hormone.[20]

Several points are introduced as acupuncturing points for various medical procedures. Different acupuncturing points have been proposed for elimination of gaging. For instance, Lu *et al*. observed the P-6 Neikuan acupuncture point [Figure 1], which is located on the wrist, for anti-gagging reflex. Their result, manifested that the PC-6 point has remarkable anti-gagging effects if stimulation is applied correctly. The also stated that applying thumb pressure on that point might be effective during gaging stimulator dental procedures.[12] On the same acupuncture point, Zotelli *et al*. conducted a study on 33 patients with severe gaging reflex who required alginate impression form maxillary arch. In that study, used visual analog scaling (VAS), gaging severity index (GSI) and gaging prevention index (GPI) were used for qualitative measurements. They stated no significant correlation between the patient's expectation and the actual reductions in gaging. Also, they indicated that PC-6 point was effective for controlling gaging reflex during preparing maxillary impression procedure.[13] The PC-6 point was again observed by Rahshenas *et al*.[19] They examined the acupuncturing of that point for eliminating the induced gaging during stimulation of the soft palate and the sides of the tongue by medical wood sticks. Their results also supported the significant reduction of gag reflex.

In another study, Rosted *et al*. examined acupuncturing of the point CV-24, located at the chin point [Figure 2], during preparing maxillary alginate impression. In that study, the GSI and GPI indexes represented a significant reduction in gaging reflex after acupuncturing, and the author recommended stimulation of point CV-24 during dental procedures.[14]

Sari and Sari designed a comparative evaluation on the role of acupuncturing for preventing gagging reflex during orthodontic treatment. 45 patients were involved and divided into three groups in that study. In one group, the CV-24 point was stimulated by a red-light soft magnetic field laser for 1 min. The second group received a combination of laser stimulation of CV-24 and acupressure PC-6. The last group was considered as the placebo group. The GSI and GPI were recorded during dental impression taking procedure. The average improvement between the GSI and GPI was 58.9% before and after the laser stimulation in the second group, and 37.9% in the first one. They claimed that both acupuncture points CV-24 and PC-6 had a significant role in controlling the gag reflex.[15] In another study by Bilello and Fregapane, both CV-24 and PC-6 were used to control the gag reflex. They enrolled 20 individuals who had sever gag reflex and needed maxillary and mandibular impression taking. The first impressions of both jaws were taken without prior acupuncturing. However the second impressions were prepared after acupuncturing. The VAS revealed that the patients were more relief after acupuncturing.[16]

Ebadi *et al*. tried different acupuncture point for controlling the gag reflex during the preparation of maxillary arch impression on 20 individuals. In that study, Shenmen, stomach and throat points [Figure 3], which are located on the ears, were the targets. The results showed that the case group which was subjected to acupuncturing of mentioned three points showed about 70% decrease in gag reflex during impression taking.[18] In similar observation, Fiske and Dickinson tried to overcome the gaging reflex by stimulating mentioned ear acupuncture point in 10 patients. They evaluated their gaging severity before acupuncturing and stated that 6 patients had sever gaging which made any dental procedures imposable. After acupuncturing, the maxillary impression taking was tried, and the outcome was hopeful in 8 of individuals.[17]

Nevertheless, maybe it is need to give some information about the safety of acupuncturing. Inadequate insertion of acupuncture needle might cause serious adverse events and tissue injury. Furthermore, the cross-infection of the hepatitis B or HIV is the other threatening adverse effect of using unsterilized

needles. However, with increased awareness about the importance using disposable needles, such infections have been mostly eliminated in acupuncture therapy by professional healthcare providers. In a larger-scale in another large-scale survey of 2.2 million consecutive acupuncture treatments, adverse events were detected in two patients (pneumothorax and lower limb nerve injury).[21]

CONCLUSION

Generally, the studies on the efficacy of acupuncture science on controlling gag reflex are not vast enough to provide a reliable and comprehensive conclusion. However, based on published researches, the stimulation of acupuncture points, especially CV-24 and PC-6, seems to provide a remarkable reduction on gag reflex and it might be suggested for practitioner to consider these points during gaging.

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Conflicts of interest

There are no conflicts of interest

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Figures and Tables

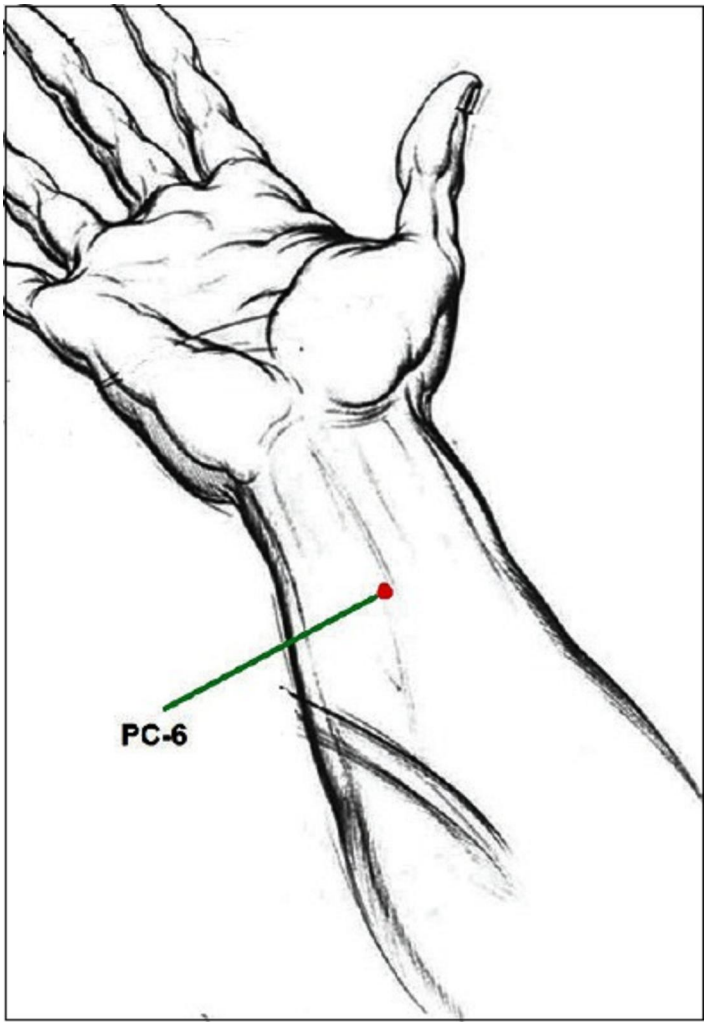
Table 1

Authors	Year	Indexed	Acupuncture point	Number of participants	Groups	Clinical significant
Lu *et al*.[12]	2000	PubMed	PC−6	-	Case Control	Stimulation of that point has positive impact on gaging
Rosted *et al*.[14]	2006	PubMed	CV−24	37	Case Control	acupuncture of point CV−24 is an effective method of controlling severe gaging
Fiske and Dickinson[17]	2001	PubMed	Shenmen, stomach and throat points on ear	10	Taking impression once before acupuncturing and lately with acupuncturing	The gaging control was successful in 8 of 10 individuals
Zotelli *et al*.[13]	2014	PubMed	PC−6	33	Case Control	Acupuncturing PC−6 was effective for controlling gaging during the maxillary impression-taking procedure. Patients' expectation did not influence the results
Bilello and Fregapane[16]	2014	PubMed	CV−24 PC−6	20	Taking impression once before acupuncturing and lately with acupuncturing	Acupuncture might be helpful for preventing gag reflex, and justifies further study
Sari and Sari[15]	2010	PubMed	CV−24 PC−6	45	Laser stimulation of CV−24 Laser stimulation of CV−24+ and acupuncture of PC−6 Control	Both acupuncture sites were effective
Ebadi *et al*.[18]	2014	Google Scholar	Shenmen, stomach and throat points on ear	20	Sham Case Control	Acupuncturing that points resulted in lower gag reflex
Rahshenas *et al*.[17]	2014	Google Scholar	PC−6	75	Control Pulpation Pulpation and pressing	Both groups 2 and 3 showed better effects on controlling gag reflex

PC−6=Pericardium-6, CV−24: Conception vessel 24

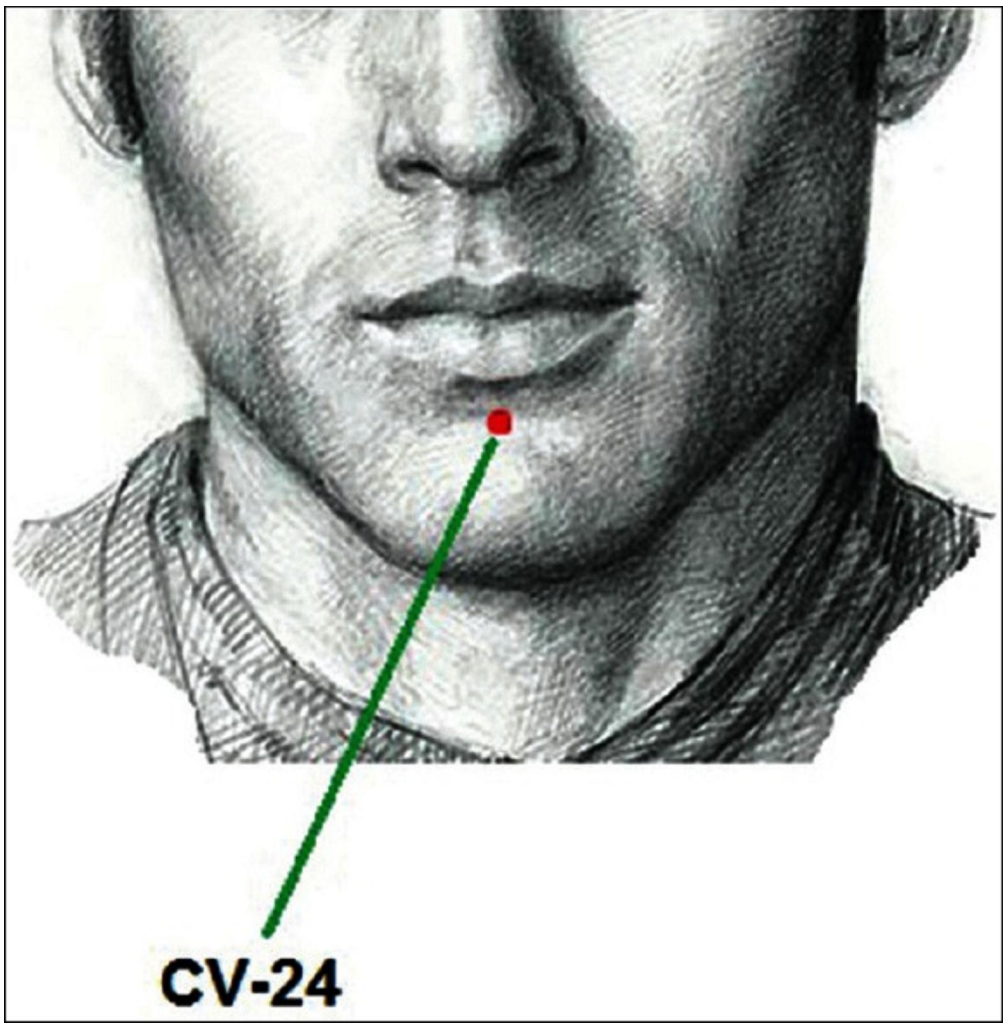
Important information of reviewed articles

Figure 1



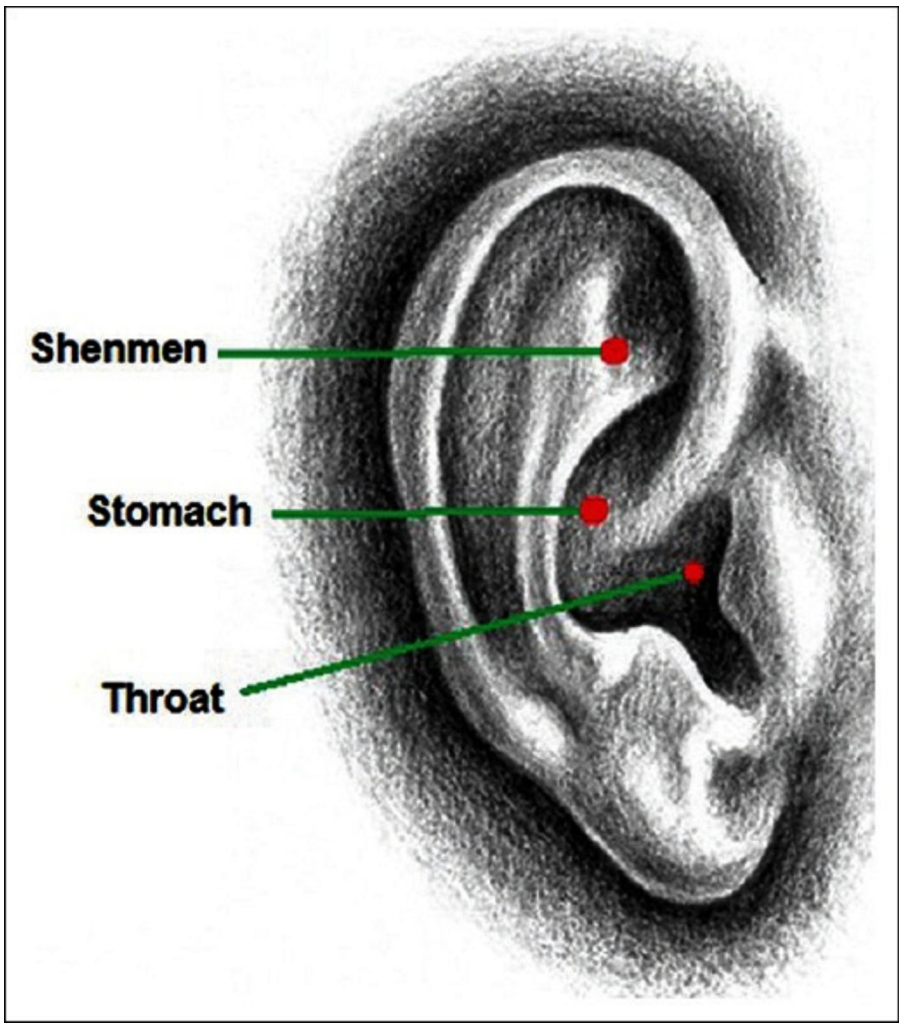
The location of pericardium-6 acupuncture point

Figure 2



The location of CV-24 acupuncture point

Figure 3



The location of the throat, stomach, and Shenmen acupuncture point