

Acupuncture therapy in orthodontics - a review

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ABSTRACT

Acupuncture is a technique which has originated in China, in which different health issues are treated by inserting specially designed needles at various points on the body - acupuncture points. Acupuncture stimulates the nervous system and alters the perception and processing of pain signals and also releases natural painkillers. These painkillers (endorphins and serotonin) are present in the nervous system. These points serve as a tunnel to deeper circulating channels and stimulation of these points activates the body's natural healing ability. The most common use of acupuncture is in the management of pain, for which a number of studies have shown it to be effective, particularly in the treatment of temporomandibular pain. It is intended that acupuncture may play a promising role in certain dental conditions like temporomandibular joint (TMJ) dysfunction, facial pain, decreasing the level of anxiety and reducing gag reflex. Aim of this article was to review acupuncture techniques and related articles in the literature that have focused on its applications in preventing gag reflex and TMJ pain.

Keywords: Acupuncture; Temporomandibular joint pain; Gag reflex.

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INTRODUCTION

Acupuncture first originated in china 3000 years ago [1]. It involves the insertion of needles into various parts of the body aiming to cure diseases. Still it is being relied as an alternative or adjunct during various medical therapies and also in dentistry [2]. Early studies state that acupuncture play role in treatment of several disorders with pain as the primary symptom such as in psychiatric disorders, sensor-neural deafness, hypertension, asthma, tinnitus, smoking addictions and obesity [3]. The use of acupuncture in dentistry has been mentioned by many authors and they have concluded that acupuncture is effective in various conditions like TMD, pain management and clinical conditions like Sjogren's syndrome [4-6]. As research works on Acupuncture have

started only few decades back, there lies a hint of skepticism among the dental professionals for its use in various treatment procedures. Acupuncture literally means to puncture with a needle (Figure 1).

However, the needles are often used in combination with moxibustion - the burning on or over the skin of selected herbs - and involve the application of other kinds of stimulation to certain points [7, 8]. The purpose of this article was to review the various uses of acupuncture in orthodontics and in management of temporomandibular joint pain.

VARIOUS TECHNIQUES USED IN ACUPUNCTURE [9]:

- 1) Traditional body acupuncture (Body needling)
- 2) Microsystems acupuncture

- 3) Electro-acupuncture (electric acupuncture)
- 4) Laser treatment (photo treatment)
- 5) Trigger point acupuncture
- 6) Moxibustion
- 7) Acupressure
- 8) Okibari - Japanese style.



Figure 1. Acupuncture technique.

MECHANISM OF ACTION

Acupuncture stimulates myelinated nerve fibres present in muscle, which send impulses to the spinal cord and then activate the midbrain along with pituitary-hypothalamus. It has been proved that enkephalin, beta endorphin, serotonin, dynorphin, and noradrenalin are involved in the process [10]. It is known that a painful stimulation activates two types of nerve fibres in the peripheral nervous system: A-Delta and C-fibres which will terminate at the second layer of the black horn. From the second layer of the black horn, the pain sensation is via inter-neurons transmitted to the cortex and we will experience a pain [11]. It is accepted that the insertion of a needle in an acupuncture point will create a small inflammatory process which releases neurotransmitters such as histamine bradykinin, etc. and subsequent stimulate A-Delta fibres located in the skin and muscle. These fibres terminate into the second layer of the black horn and inhibit the incoming painful sensations by release of enkephaline [12]. This segmental model is the simplest mode of action and accounts probably for the pain relieving effect of acupuncture in most cases [13-15]. From the second layer of the black horn, the A-Delta fibres continues to its fifth layer, cross over to the opposite side and ascend via the spinothalamic tract to

the mid brain where the raphe magnus nucleus is stimulated [16]. Raphe magnus nucleus produces serotonin in the brain and is believed to play a key role in acupuncture's mode of action. Thus, it showed that serotonin is a pro-drug for endorphin which probably accounts for the central (extra-segmental) effect of acupuncture [17]. Moreover, it has been shown that serotonin is a pro-drug for ACTH, which acts via pituitary gland and is responsible for the increase of cortisol which has been shown after acupuncture and thus improves the immune system [18]. Finally, Serotonin has a direct effect on the cortex and it is likely that the beneficial effect of acupuncture on anxiety and stress is because of this direct effect [19]. It has been suggested that the pituitary gland plays role in the production of endorphin.

USES IN DENTISTRY

Acupuncture has been widely used in dentistry in different parts of the world. There have been reports of randomized controlled trials on the analgesic effect of acupuncture for postoperative pain from various dental procedures which include extractions, pulp devitalization, and acute apical periodontitis [20-23]. Systematic review of papers on the use of acupuncture in dentistry which had been published between 1966 and 1996 were assessed. It was found that 11 out of 15 randomized controlled studies with blind controls had appropriate statistics and sufficient follow-ups. This showed that standard acupuncture was more effective than a placebo or sham acupuncture [24-25]. It was concluded that acupuncture should be considered a reasonable alternative to current dental practice as an analgesic [26]. Its use in the treatment of temporomandibular joint dysfunction was also supported in these studies.

USES IN ORTHODONTICS

Gag reflex

Gagging has been defined as an ejector contraction of the muscles of the pharyngeal sphincter. It is a normal protective reflex which is designed to protect the airway and remove irritant material from the posterior oropharynx and the upper gastrointestinal tract [27]. Its causes can be somatic, brought about by stimulating certain trigger areas in the oral cavity or psychogenic, which is induced by thought stimulus modulated by higher brain centres. Hyperactive gag reflex can be a hindrance to dental procedures, such as taking of alginate impression for diagnostic and record keeping procedures. The use of acupuncture points like PC6 Neiguan and

CV24 Chengjiang (Figure 2) have been reported to significantly reduce gag reflex [28].



Figure 2. Acupuncture points to prevent gag reflex.

Auricular acupuncture is used for treating severe gag reflex and the role of acupuncture as a method of controlling the gag reflex is safe and quick [29]. The antigagging point located on the ear corresponds with the skin of the external acoustic meatus which is innervated by the auricular branch of the vagus nerve and that adjacent to the auricle (innervated by the auriculo-temporal which is a branch of the mandibular division of the trigeminal nerve). The branches of both vagus and trigeminal nerves are responsible for the sensory and motor function of the larynx, pharynx, and palatal region. It can be suggested that stimulation of the antigagging auricular acupuncture point may inhibit the muscular activity, thus reducing the gag reflex [30-31]. Reports suggest that auricular acupuncture is helpful in treating severe gag reflex [32]. The acupuncture point PC6 Neiguan, located on the palmar side of the forearm - two inches above the transverse crease of the wrist, belongs to the pericardium meridian, which has the effect of “calming the heart which houses the spirit”. It was proposed that acupuncture may trigger an increase in circulating β -endorphine, which binds to the opioid receptor, creating an anti-emetic effect [33]. More studies to verify the effectiveness of acupuncture in controlling gag reflex should be carried out. Various controlled trials have postulated that ear acupuncture is as effective as intranasal midazolam for reducing dental anxiety and reducing the gag reflex [34-35]. Rosted et al. [36] examined the effect of acupuncture administered prior to dental treatment on patients’ level of anxiety. 21 case reports were submitted eight dentists submitted regarding their treatments for dental anxiety. Beck Anxiety Inventory (BAI) assessed the anxiety levels before and

after acupuncture treatment. All patients received an acupuncture treatment for 5 minutes before the planned dental treatment. There was a significant reduction in median value of BAI scores just after treatment (26.5 reduced to 11.5; $P < 0.01$), and it was possible to perform the treatment in all 20 cases after acupuncture treatment.

A clinical study by Sari and Sari [37] assessed the role of acupuncture for treating orthodontic patients with gag reflex. The study also investigated two acupuncture approaches for orthodontic patients with the gag reflex. Each patient had an maxillary alginate impression taken and that patient’s gag reflex was evaluated using the Gagging Severity Index (GSI). After applying acupuncture, a second impression was taken, and the Gagging Prevention Index (GPI) was then used to evaluate the patient’s gag reflex. There was a significant decrease in GPI values, compared to GSI values, was observed in the treatment groups, compared with a placebo group. The researchers concluded that acupuncture points used were successful in controlling the gag reflex in orthodontic patients.

Management of temporomandibular disorders and pain

Temporomandibular Disorders (TMDs) involves a group of conditions that affect the temporomandibular joint (TMJ) and the associated head and neck musculoskeletal structures and muscles of mastication [38]. Acupuncture therapy is not helpful in treating TMD caused by structural anomalies like disc displacement and degenerative changes, it may aid in relieving pain and discomfort associated with the conditions, especially of muscular origin [39]. As documented, acupuncture helps in muscle relaxation and reduces muscle spasms. Relaxing the lateral Pterygoid muscles minimizes the anterior displacing force on the meniscus of TMJ and help in alleviate TMJ clicking [40]. The efficacy of acupuncture in symptomatic curing of TMDs was conducted from a systematic review of randomised controlled trials for assessing [41]. Nineteen reports were included and the review suggests moderate evidence for acupuncture to be effective intervention to reduce TMDs symptoms, though more studies of larger sample sizes are needed to investigate the long-term efficacy of acupuncture.

Raustia et al. [42] compared the efficacy of acupuncture with conventional treatment modalities in the management of TMD. It was found that both the methods had similar effect on a number of subjective and objective variables. List et al in 1992 compared occlusal splint and acupuncture with a control group [43]. It was found that both occlusal splint and acupuncture reduced symptoms compared with the control group. Acupuncture

gave a better subjective result than the occlusal splint. List et al. treated patients with facial pain with acupuncture [44]. It was found that acupuncture may be a realistic alternative to conventional treatment.

DISCUSSION

From various clinical trials it was tested and concluded that acupuncture could play a promising role in complementing conventional treatment modalities as acupuncture is generally safe and nontoxic it produces very negligible adverse reactions. After performing various research of acupuncture's therapeutic effects has been recognised, even though the mechanisms are still not understood properly. A better understanding of the underlying mechanisms for how acupuncture works would help future researchers to perform large-scale experimental studies with better experimental prototype to confirm acupuncture's applications in dentistry and other areas. As believed that conventional medicine is with side effect and that 'alternative' techniques are totally safe; numerous reports of adverse effects after acupuncture are present. These are (to mention a few) Endocarditis and hepatitis Pneumothorax some resulting in fatalities [45]. However, it must be appreciated that most of these result are from ignorance of basic human anatomy or because of non applying aseptic procedures carried out by non-medical/dental qualified practitioners. When these are figured out of analysis, acupuncture proves to be a very safe technique in the hands of a properly trained practitioner.

CONCLUSION

The application of acupuncture has a long history and proves to be an effective treatment modality. Be it in control of post-operative pain or in the management of TMD and facial pain it may be a useful alternative to the conventional armamentarium of the general dental practitioner. Although the mechanism of action and positive clinical trials lag much behind the widespread use, physicians should know its potential applications for better treatment of their patients. Some physicians must take training to administer acupuncture. Acupuncture is not a miracle cure which is going to replace the drill. However, the technique can be an adjunct to conventional treatments in facial pain, TMDs, pain management Sjögrens syndrome, and in anxiety and phobias. Acupuncture have a scientific background and the efficiency has been tested in a number of clinical trials including pain management, TMD, facial pain, and increasing of the pain threshold. Proper training is essential because acupuncture has adverse effect. The

technique can be mastered by any dentist after a short training programme.

AUTHORS' CONTRIBUTION

AR and RK carried out the research work in gathering the articles for the review, thought of the concept and drafted the manuscript. KS participated in the design of the review, defined the intellectual content and helped in arranging the flow of the article. AJ conceived participated in its design, coordination and helped to draft the manuscript. All authors were part of the manuscript preparation, editing and reviewing. The final manuscript has been read and approved by all authors.

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