

Effects of using Stiper® for cervical pain treatment in dentistry students: pilot trial

Efeitos do Stiper® no tratamento de cervicalgia em acadêmicos de odontologia: ensaio piloto

Mara Cristina Ferreira Moreira Brum¹, Livia Crespo Drago², Aline Daiane Schlindwein³, Graciela Mendonça da Silva de Medeiros²

DOI 10.5935/2595-0118.20200023

ABSTRACT

BACKGROUND AND OBJECTIVES: Pain in the cervical region is a major cause of absenteeism, and one of the professions most susceptible to this risk is dental surgeons. The pain usually begins during the period of academic training, and ergonomic and postural factors add up to the emotional ones. The Stiper® silicon oxide tablets are painless, non-invasive and quickly applied, offering prolonged stimulation. This study aimed to verify the possible effects of using Stiper® in cases of nonspecific neck pain in students in their dental clinical practices training in a Dentistry course in Southern Brazil.

METHODS: A pilot clinical trial of a quantitative nature, in a before-and-after setting, almost experimental. The sample consisted of nine dentistry students to whom Stiper® was applied at the acupuncture points Jianjing, Tianliao, Jianyu, and Dazhui, for three consecutive weeks, with a 7-day interval between sessions. The data was collected through a sociodemographic questionnaire, the visual analog scale of pain, before and after the interventions, and the completion of a form. The statistical analysis used the Shapiro Wilk normality test and the Student's t-test.

RESULTS: The Stiper® application provided a significant pain reduction ($p < 0.05$) in the cervical region.

CONCLUSION: The use of Stiper® was effective in reducing the neck pain reported by dentistry students.

Keywords: Dentistry students, Neck pain, Occupational health, Occupational risks.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor na região cervical é uma das maiores causas de afastamento laboral e uma das profissões mais suscetível ao risco é a dos cirurgiões-dentistas. As dores geralmente começam durante o período de formação acadêmica e aos fatores ergonômicos e posturais associam-se também os emocionais. As pastilhas de óxido de silício Stiper® apresentam-se como terapêutica indolor, não invasiva e de rápida aplicação oferecendo estímulo prolongado. O objetivo deste estudo foi verificar os possíveis efeitos do uso do Stiper® em casos de cervicalgia inespecífica em acadêmicos em fases de práticas clínicas de um curso de Odontologia no Sul do Brasil.

MÉTODOS: Ensaio clínico piloto de natureza quantitativa, do tipo antes e depois, quase experimental. A amostra foi constituída por nove acadêmicos do curso de Odontologia, os quais receberam a aplicação de Stiper® nos pontos de acupuntura Jianjing, Tianliao, Jianyu e Dazhui, durante três semanas consecutivas, com intervalo de sete dias entre as sessões. A coleta de dados foi realizada com a aplicação de questionário sociodemográfico, escala analógica visual de dor antes e depois das intervenções e preenchimento de formulário. Análise estatística pelo teste de normalidade de Shapiro Wilk e teste t de Student.

RESULTADOS: A aplicação do Stiper® propiciou redução significativa ($p < 0,05$) da dor na região cervical.

CONCLUSÃO: O uso do Stiper® foi eficaz na redução da cervicalgia referida pelos acadêmicos de Odontologia.

Descritores: Cervicalgia, Estudantes de Odontologia, Riscos ocupacionais, Saúde do trabalhador.

INTRODUCTION

The health problem that caused the highest number of absences from work in 2017 was back pain, within which, according to the International Classification of Diseases (ICD10), includes neck pain, which is characterized by pain or discomfort in the neck region that can radiate to the upper limbs, having a varied etiology^{1,2}.

Although, in most cases, neck pain does not present malignancy, it has a strong impact on the lives of individuals and society. Some professional categories are at higher risk, among which the dental surgeons (DS), who develop temporary, or even permanent disability that can lead to leave of absence³. The problem may still arise during the academic training⁴, because, despite the technological advances in equipment and environmental structures, there are constant postural provo-

Mara Cristina Ferreira Moreira Brum – <https://orcid.org/0000-0002-1328-5709>;
Livia Crespo Drago – <https://orcid.org/0000-0002-6136-0523>;
Aline Daiane Schlindwein – <https://orcid.org/0000-0003-0996-6242>;
Graciela Mendonça da Silva e Medeiros – <https://orcid.org/0000-0001-5438-057X>.

1. Universidade do Sul de Santa Catarina, Naturologia, Palhoça, SC, Brasil.
2. Universidade do Sul de Santa Catarina, Ciências da Saúde e Bem Estar Social, Palhoça, SC, Brasil.
3. Universidade do Sul de Santa Catarina, Programa de Pós-Graduação em Ciências da Saúde, Palhoça, SC, Brasil.

Submitted on November 13, 2019.

Accepted for publication on March 15, 2020.

Conflict of interests: none – Sponsoring sources: none.

Correspondence to:

Avenida Santa Catarina, 1130/302 – Bairro Canto
88070-740 Florianópolis, SC, Brasil.
E-mail: mc-brum@uol.com.br

© Sociedade Brasileira para o Estudo da Dor

cations and repetitive movements that require high precision and synchronicity, with a high number of students ending up neglecting the posture when clinical care starts. Consequently, not acquiring the correct ergonomic habit during training, they will not do it during the professional practice⁵. In addition, vulnerability to stress, anxiety, and depression, use of drugs, alcohol and psychoactive substances can trigger muscle tension, contractions, and pain, as well as the early onset of the Burnout syndrome⁶ (BS).

For the treatment of neck pain, in addition to the conventional ones, several integrative and complementary therapeutic resources can be used, including acupuncture. Traditional Chinese Medicine (TCM) is part of the Unified Health System (SUS) since 2006, through the National Policy of Integrative and Complementary Practices (PNPIC)⁷. Acupuncture is the best-known practice, alone or with adjuvants such as moxibustion, cupping therapy, and electroacupuncture⁸. However, many people have an aversion to needles, thus failing to obtain the benefits that the practice provides. For these cases, the silicon dioxide/Stiper® tablets are an alternative. Besides being painless and non-invasive, they can stay adhered to the skin for up to five days promoting the proposed effects of improving basal metabolism; acceleration of enzymatic reactions; strengthening immunity; elimination of free radicals; relaxation of smooth and striated muscle tissues; increased oxygen production and activation of blood and lymphatic circulation. They also enhance any other therapy that may have been used prior to their use and promote energy modulation⁹. Thus, being a quick, painless, non-pharmacological, and non-invasive therapy, further studies are needed on its effectiveness in relieving neck pain.

The study aimed to verify the effects of Stiper® on unspecific neck pain in students of a Dentistry course.

METHODS

It is a quantitative pilot clinical trial, in a before-and-after setting, almost experimental, which included students from the Dentistry course in Learning Units of clinical practice from the 5th to the 10th semester. The invitation was through direct contact with the students, placement of posters at the university, and an explanatory folder about the Stiper®. The sample was by convenience and not probabilistic. The sample calculation was performed using the Open Source Epidemiologic Statistics for Public Health software (OpenEpi) 3.03a from Emory University, Rollins School of Public Health, Atlanta, USA. It was based on the data obtained in a study⁹ that compared the treatments for low back pain with acupuncture and silicon dioxide tablets and observed an average pain of 6.93±2.40 before the treatment with the silicon dioxide tablets, and 2.93±2.96 at the end of the treatment. Considering a confidence interval of 95% and 80% power, eight students would be necessary. Considering 20% of losses and refusals, the total sample would be of 10 participants. The participant flowchart and the procedures during each stage of the study are described in figure 1. The applications took place in a reserved room at the Dental School Clinic.

The inclusion criteria were to be a student enrolled in the Dentistry course at Unisul, attending the 5th to 10th phases, complain-

ing of neck pain, aged 19 years or older. The exclusion criteria were the presence of injury by trauma or herniated disc in the cervical region; a history of allergy or intolerance to the adhesive tape; presenting a skin lesion on the cervical/scapular region; continued or frequent use of analgesics or muscle relaxants and/or be under physical therapy.

The Stiper® was applied at the acupuncture points IG15 (Jianyu), TA15 (Tianliao), VB21 (Jianjing), bilaterally, and VG14 (Dazhui). For its application, cotton and alcohol at 70% were used to remove creams and oil from the skin to ensure better fixation of the Stiper® silicon dioxide tablets, which were fixed with hypoallergenic tape. All participants were instructed to keep the tablets for five days, drying the area well after bathing or water activities, and were advised to remove the tablets in case of discomfort or irritation. The silicon dioxide tablets/Stiper® remained attached to the participants' body for five days, but there were some exceptions in which they were removed earlier.

The study had four sessions with a 1-week interval between them. Pain assessment was performed using the visual analog scale (VAS) before and after applications. The first session lasted 30 minutes when the Free and Informed Consent Form (FICT), the sociodemographic questionnaire, and the questionnaire on posture and ergonomics were completed. Next, the pain inten-

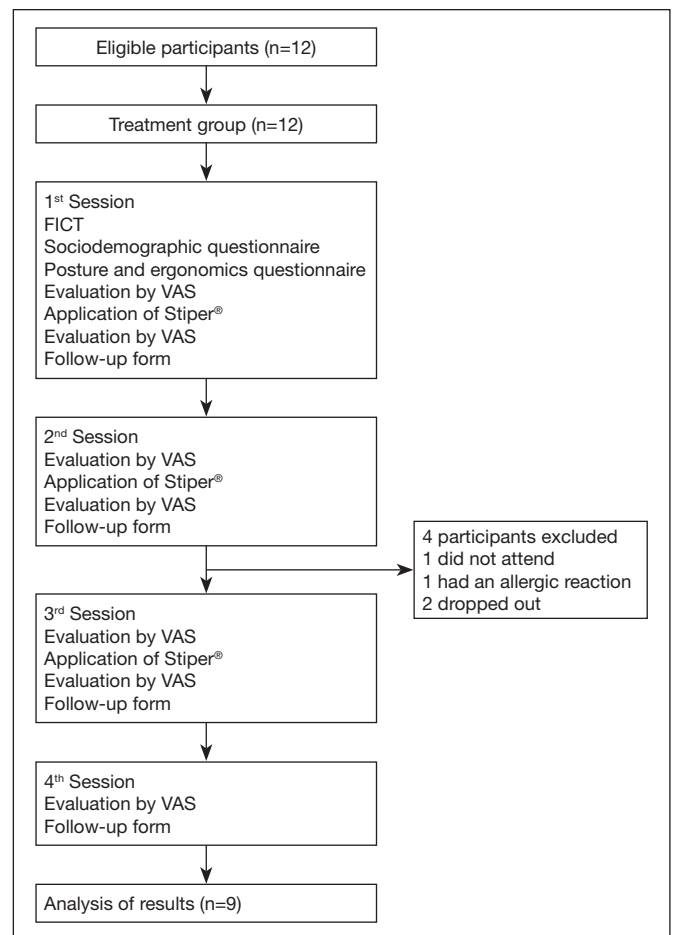


Figure 1. Participants flowchart and the procedures during each stage of the research
FICT = Free and Informed Consent Form; VAS = visual analog scale.

sity was assessed by VAS, the Stiper® was applied, and after 10 minutes, a new pain intensity assessment was made. In the second and third sessions, the pain intensity was assessed, and the application follow-up form was filled out, and after 10 minutes, a new pain intensity assessment was made. In the last session, pain intensity was assessed, and the follow-up form was completed. The duration of the three last sessions was 15 minutes, with a 7-day interval between them.

The posture questionnaire had five categories, namely: strongly disagree, disagree, never thought about it, agree, fully agree. Later, they have been grouped into three categories: disagree, never thought about it, and agree.

This study complied with Resolution 466/12 of the National Health Council¹⁰ and was approved by the Research Ethics Committee of the Universidade do Sul de Santa Catarina (UNISUL) under number CAAE 04847118.4.0000.5369. Brazilian Registry of Clinical Trials RBR-89489x.

Statistical analysis

The database was prepared in a Microsoft Excel spreadsheet and later exported to the IBM SPSS Statistics software, 18.0. The results were summarized as absolute (n) and relative (%) frequencies for nominal variables, mean and standard deviation, and minimum and maximum values for numerical variables. The Shapiro Wilk test was used to test the normality of the sample. As the data showed to be parametric, to compare the VAS before and after the applications, the Student's *t*-test was used. The level of significance adopted was 5%.

RESULTS

Nine students participated in the study, 88.9% female, all single, without children and non-smokers, with an average age of 21.22±1.56 years, ranging from 19 to 24 years. Most did not work, and the moderate use of alcohol was reported by 88.9%, especially on weekends.

Regarding academic life, 77.8% were attending the 5th phase, when the service activities at the school clinic begin. Also, one student from the 7th phase and one from the 10th phase participated. 44.4% of the participants reported dedicating more than two hours a day to the dentistry, surgery, endodontics, periodontics, and aesthetics internships. The average time devoted to studying outside the classroom was from one to two uninterrupted hours to 44.4%, with 55.6% performing clinical visits twice a week.

All students were right-handed, and 88.9% habitually carried bags and objects on the right side of the body, including 55.6% who used a shoulder bag, 66.7% used the cell phone for more than one uninterrupted hour during the day, and 22.2% lateralized or protruded the neck when using the cell phone. Only one student slept 3 to 5 hours per night; four slept 5 to 7 hours, and the others slept 7 to 9 hours per night. There was a predominance of regular sleep (55.6%), and one participant (11.1%) reported using a medication to treat another disease not related to the neck pain.

No physical activity was practiced by 55.6% of the participants, and 77.8% had leisure time. Regarding mood, joy, anxiety, depression, worry, and irritability, 66.7% reported having two or more associa-

ted states. At the time of the assessment, 44.4% said they felt two or more of the following states: excited, tired, unmotivated, discouraged, in good spirit, or with excessive thoughts (Table 1).

The incidence of pain in the neck, shoulders, and above the scapulae was reported by 55.6% of the participants; 11.1% reported pain only in the neck, with 77.8% reporting daily pain. The majority (55.6%) reported onset of pain in the previous year, and all stated that it worsened throughout the day and with the performance of activities. Only 33.3% reported that pain interferes with neck flexion. However, 66.7% needed to use some type of muscle relaxant. Flower therapy, auriculotherapy, hot stone massage, cupping therapy, herbal medicine, meditation, acupuncture, and reiki are among the integrative and complementary practices known and used by 55.5% of the participants (Table 2).

The data on ergonomics and posture are shown in table 3. All participants claimed to have a high level of self-demand. Of these, 66.7% stated that neck pain developed after starting the Dentistry course, and 88.9% felt that the material used in classes was too heavy. Although 55.6% declared to be aware of the symptoms, and 88.9% considered important to take care of the pain as soon as it started, all acknowledged that they adopted the wrong posture when using electronic devices, and 77.8% admitted that they did not keep the correct posture when sitting or walking. Although 55.5% considered the ergonomic conditions offered by the school clinic to be good, 77.8% recognized that the posture they adopted to perform their job was not adequate, and 66.7% admitted doing so because it facilitated the activity. The form applied in the last three weeks showed that the majority (77.8%) kept the Stiper® for five days, and 66.7% of the participants reported the improvement in pain in the cervical spine. Those who removed the Stiper® before the recommended time did so for aesthetic reasons, itching, and skin irritation and one student removed it due to pain in the subscapular region.

Table 1. Sociodemographic characterization and lifestyle

| Variables | n | % |
|--|---|------|
| Phases of the course | | |
| 5 th | 7 | 77.8 |
| 7 th | 1 | 11.1 |
| 10 th | 1 | 11.1 |
| Visits per day at the school clinic | | |
| One | 6 | 66.7 |
| Three | 1 | 11.1 |
| Did not answer | 2 | 22.2 |
| Frequency of visits during the week | | |
| Twice | 5 | 55.6 |
| Three times | 1 | 11.1 |
| Four times | 1 | 11.1 |
| Did not answer | 2 | 22.2 |
| Use of cell phone | | |
| Constant throughout the day for more than one uninterrupted hour | 6 | 66.7 |
| Lateralizes or protrudes the neck when using the device | 1 | 11.1 |
| Have the two behaviors associated | 2 | 22.2 |
| Sleep hours per night | | |
| 3 to 5 | 1 | 11.1 |
| 5 to 7 | 4 | 44.4 |
| 7 to 9 | 4 | 44.4 |

Source: Elaborated by the authors, 2019.

At the end of the study, two students remained with the level of pain reported on the first day, and one reported increased pain, while the others showed a reduction in the level of pain, including two students who reported absence of pain. There was a significant reduction in pain intensity ($p < 0.05$) when comparing pain intensity before and at the end of the treatment (Figure 2).

Table 2. Characterization of pain and therapeutic resources used

| | n | % |
|---|---|------|
| Pain location | | |
| Neck | 1 | 11.1 |
| Bilateral neck and shoulders | 1 | 11.1 |
| Shoulders and above shoulder blades | 1 | 11.1 |
| Neck, shoulders and above shoulder blades | 5 | 55.6 |
| Neck and shoulders alternating sides | 1 | 11.1 |
| Pain frequency | | |
| Sporadic | 2 | 22.2 |
| Daily | 7 | 77.8 |
| The pain started | | |
| One year ago | 5 | 55.6 |
| Do not remember | 4 | 44.4 |
| Pain interferes | | |
| In neck flexion | 3 | 33.3 |
| Does not interfere | 6 | 66.7 |
| Have used ICP for pain relief | | |
| Yes | 5 | 55.6 |
| No | 4 | 44.4 |
| Which CIPs | | |
| None | 4 | 44.4 |
| Auriculotherapy | 1 | 11.1 |
| Two or more | 4 | 44.4 |
| Have you ever needed to use muscle relaxants | | |
| Yes | 6 | 66.7 |
| No | 3 | 33.3 |

ICP = Integrative and Complementary Practices.
Source: Elaborated by the authors, 2019

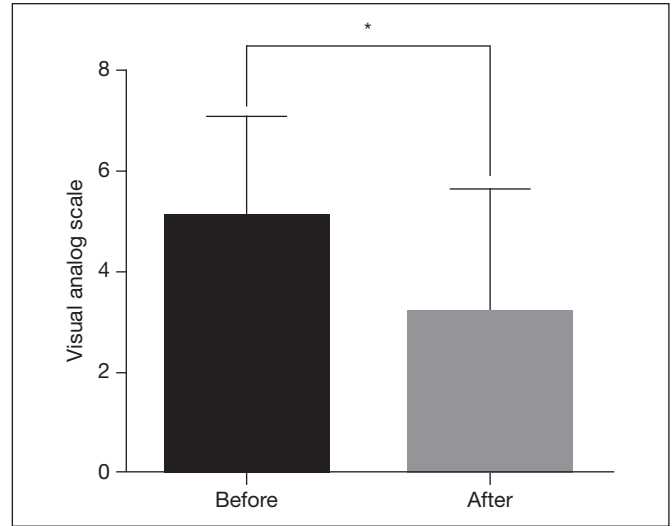


Figure 2. Average of pain intensity before and after the applications of Stiper®

* $p = 0.0175$.

Source: Elaborated by the authors, 2019

DISCUSSION

The presence of pain in the regions of the neck, shoulders, and above the scapulae, where the selected meridians pass for the application of Stiper® is compatible with some studies¹¹⁻¹³ that indicate these same anatomical segments as susceptible to musculoskeletal pain in dental surgeons still in the graduation period. Likewise, they point to the prevalence of symptoms in women within the same age group, identifying the presence of pain in the cervical spine and shoulders in the last 12 months. The students' knowledge about ergonomics, and the acceptance that they adopt wrong postures during their practices are not sufficient to prevent the pain. There is still the need for regu-

Table 3. Likert scale for ergonomics and posture

| | Disagree | Never thought of | Agree |
|--|-----------|------------------|-----------|
| | n (%) | n (%) | n (%) |
| The clinic's ergonomic conditions are adequate | 4 (44.4) | - | 5 (55.5) |
| My posture in clinical activities is adequate | 7 (77.8) | - | 2 (22.2) |
| Stretching is important before/after the activities | - | 3 (33.3) | 6 (66.7) |
| It is important to pay attention to the pain as soon as it appears | - | 1 (11.1) | 8 (88.9) |
| I keep the wrong posture because it facilitates the activity | 3 (33.3) | - | 6 (66.7) |
| I am always aware of the warning signs in my body | 2 (22.2) | 22.2 | 5 (55.6) |
| My posture is correct when I sit and walk | 7 (77.8) | - | 2 (22.2) |
| My posture is correct when using a cell phone, notebook, etc. | 9 (100.0) | - | - |
| The materials I carry are too heavy | 1 (11.1) | - | 8 (88.9) |
| My personal/academic level of self-demand is high | - | - | 9 (100.0) |
| The pain in the neck region started after starting college | 3 (33.3) | - | 6 (66.7) |

Source: Elaborated by the authors, 2019

lar breaks or micro-breaks between visits, as well as the practice of stretching and physical activity for muscle strengthening¹⁴. A survey that included 155 students who were photographed while performing their clinical activities showed a high rate of pain in the neck, shoulders, and upper back, and 77.8% of inadequate postures. 89.4% of the students answered that they needed more training on posture that respects the principles of ergonomics¹². Another study in which six students from the last period of the course were filmed during the performance of their practices identified inadequate postures on flexion, inclination, and rotation of the head and trunk, which could trigger musculoskeletal disorders in the cervical spine¹⁵.

The way the materials required for academic practice are carried, as well as their weight, can overload musculoskeletal structures. This points up the importance of having lockers where students can keep their materials, which was observed in the school clinic where the study was conducted because this alternative can reduce the incidence of pain¹⁶. In addition to the issues intrinsic to the clinical practice, the influence of the excessive use of electronic devices in general, whether for leisure or research, causes neck and upper limb pain due to the repetitive movements and incorrect posture^{16,17}.

The present study showed changes in mood with anxiety, worry, irritability, excessive thoughts, and a high degree of self-demand, both on a personal and academic level. The incidence of anxiety among students in the health area is high¹⁸, and the cause is not exclusively restricted to the demands of the courses. It can also have their origin from family or social problems. Dentistry students are subjected to many stressing conditions that can trigger early BS, which appears when they start their clinical practices⁶. Although BS is characterized by psychological depletion and exhaustion, which in the case of students can lead to dropping out the course¹⁹, physical symptoms, such as musculoskeletal pain, can be added. Finally, dentistry students have limitations on cognitive, motor, and social skills that they need to develop for safe clinical practice, and the accumulation of unfavorable psychological conditions is a predisposing factor to the onset of musculoskeletal pain, including neck pain^{13,16}.

The Naturopathy approach starts from a multidimensional view, considering all aspects of the person's life. It expands this look beyond what is presented objectively and to the integrative and complementary practices that are based on traditional medicines²⁰. Among them, TCM, according to which^{8,21,22} factors such as physical and mental overwork, physical inactivity, poor diet, inadequate sleep, and emotional stress directly affect the Qi (energy) and Xue (blood), which, prevented from flowing freely and stagnating in the musculature, cause pain. If there is a stimulus that deactivates the trigger points, this flow is released, and it is possible to prevent the pain from becoming chronic²¹. This stimulus should be given at acupoints, most commonly by acupuncture. Still, other resources that promote the mobilization of Qi and Xue and release the meridians can be used to provide pain relief²².

Studies with the Stiper® are incipient but have demonstrated good results. A survey on auriculotherapy with silicon dioxide

tablets for the treatment of tension neck pain applied for four weeks in 18 volunteers of both genders, with an average age of 27.3 years that evaluated the intensity of pain before each application, showed that 85% of the participants had an average pain reduction of 28.3%²³. A study that included 43 people with low back pain, with an average age of 38.6 years, in which Stiper® was applied for six weeks in points of foot reflexology, showed a 55% improvement in the disability caused by low back pain²⁴. A clinical trial that included 30 volunteers with an average age of 44.6 years divided into two groups that compared acupuncture needles and Stiper® for the treatment of chronic mechanical low back pain during eight sessions showed a significant improvement, similar in both groups¹⁰.

Several studies address musculoskeletal disorders during the academic education of DS, so the application of Stiper® is a non-pharmacological and non-invasive alternative to minimize this problem that can harm the quality of life and even shorten the DS career. It is important to highlight that in this study, Stiper® was used alone, with no other associated therapeutic practice. Since this is an unprecedented study, there are no parameters to compare the results. Although the relief of nonspecific neck pain was significant, and the number of subjects included was small, we achieved what was stipulated by the sample calculation. This is a limiting factor, which is why new studies with a larger number of participants should be conducted.

CONCLUSION

The use of silicon dioxide tablets/Stiper® at the acupuncture points Jianjing, Tianliao, Jianyu, and Dazhui, for three consecutive weeks, with a seven-day interval between the sessions, was effective in reducing the neck pain reported by dentistry students.

REFERENCES

1. Brasil. Ministério da Fazenda. Secretaria da Previdência. Auxílios-doença acidentários e previdenciários concedidos segundo os códigos da Classificação Internacional de Doenças – CID-10. Brasília, 2018.
2. Organização Mundial da Saúde. Classificação Estatística Internacional de Doenças e Problemas Relacionados à Saúde - CID10.
3. Mazzucco A, Souza LA, Longen WC, Tuon T. Posturas adotadas durante os procedimentos odontológicos e os seus impactos biomecânicos. *Rev Inova Saúde*, 2017;6(1):226-43.
4. Silva AF, Costa MAL, Soutinho RSR, Pedrosa AS. Prevalência de cervicalgia em acadêmicos de odontologia de um centro universitário. *Revist Port Saúde e Sociedade*. 2017;2(2):422-34.
5. Oliveira LQ, Ferreira MBCF. Ergonomia na prática odontológica. *J Oral Invest*. 2017;6(1):15-28.
6. Pinto PS, Nunes FMR, Campos DS, Freitas RHB, Bonan PRF, Batista AUD. Síndrome de Burnout em estudantes de odontologia, medicina e enfermagem: uma revisão da literatura. *REFACS*. 2018;6(2):238-48.
7. Brasil. Ministério da Saúde. Gabinete do Ministro. Portaria Nº 971, de 03 de maio de 2006.
8. Santos LF, Morete M, Cordon F, Malezan WR. Acupuntura no tratamento das cervicalgias: estudo de revisão integrativa. *Cad Naturol Terap Complem*. 2015;4(7):49-57.
9. Burigo FL, Silvério-Lopes S. Lombalgia crônica mecânica: estudo comparativo entre acupuntura sistêmica e pastilhas de óxido de silício (stimulation and permanency - stiper). *Rev Bras Terap Saúde*. 2010;1(1):27-36.
10. Brasil. Ministério da Saúde, Conselho Nacional de Saúde. Resolução n. 466, de 12 de dezembro de 2012. Aprova diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Brasília. Diário Oficial da União, 13 de junho de 2013.
11. Sanchez HM, Sanchez EGM, Filgueira NP, Barbosa MA, Porto CC. Dor musculoesquelética em acadêmicos de odontologia. *Rev Bras Med Trab*. 2015;13(1):23-30.
12. Oliveira LQ, Ferreira MBCF. Desordens musculares entre um grupo de estudantes de odontologia. Ed IMED. 2016;123-50.

13. Santos RR, Garbin CAS, Saliba TA, Gatto RCJ, Garbin AJI. Incapacidade gerada pela dor osteomuscular em aluno de odontologia. *Arch Health Invest.* 2018;7(9):369-74.
14. Garbin AJ, Garbin CA, Arcieri RM, Rovida TA, Freire AC. Dores osteomusculares e aspectos ergonômicos na prática odontológica. *Rev Dor.* 2015;16(2):90-5.
15. Saliba TA, Machado ACB, Garbin AJI, Peruchini LFD, Garbin CAS. Análise ergonômica do atendimento clínico odontológico. *Rev Abeno.* 2016;16(3):96-105.
16. Morais BX, Dalmolin GL, Andolhe R, Dullius AIS, Rocha LP. Musculoskeletal pain in undergraduate health students: prevalence and associated factors. *Rev Esc Enferm USP.* 2019;53:e03444.
17. Guterres JL, Schmitt FS, Oliveira LC, Simon CDS, Lopes AR. Principais queixas relacionadas ao uso excessivo de dispositivos móveis. *Rev Pleiade.* 2017;11(21):39-45.
18. Rovida TAS, Sumida DH, Santos AS, Moimaz SAS, Garbin CAS. Estresse e o estilo de vida dos acadêmicos ingressantes em um curso de graduação em Odontologia. *Rev Abeno.* 2015;15(3):26-34.
19. Magri LV, Melchior MO, Jarina L, Simonaggio FF, Bataglioni C. Relação entre sinais e sintomas de disfunção temporomandibular e de síndrome de Burnout em estudantes de odontologia. *Rev Dor.* 2016;17(3):171-7.
20. Sabbag SHF, Nogueira BMR, De Callis ALL, Leite-Mor ACMB, Portella CFS, Antonio RL, et al. A naturologia no Brasil: avanços e desafios. *Cad Naturol Terap Complem.* 2013;2(2):11-31.
21. Toledo KC, Veríssimo TCA. Neurofisiologia da dor e sua relação com analgesia por acupuntura. *RESC.* 2015;5(2):48-59.
22. Lim TK, Ma Y, Berger F, Litscher G. Acupuncture and neural mechanism in the management of low back pain-an update. *Medicines.* 2018;5(3): pii: E63.
23. Kredens LR, Silvério-Lopes S, Carneiro-Suliano L. Tratamento de cervicálgia tensional com auriculoterapia utilizando pastilhas de óxido de silício. *Rev Bras Terap e Saúde.* 2016;6(2):1-6.
24. Avelino CP, Medeiros GMS. A aplicação do Stiper em pontos da reflexologia podal em casos de dor lombar. *Cad Naturol Terap Complem.* 2013;2(3):13-20.