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ERGONOMIC ASPECTS RELATED TO SADDLE OWLS: AN INTEGRATIVE LITERATURE REVIEW

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Abstract

Inappropriate postures in the workplace are often associated with occupational disorders. In this context, the aim of this study was to investigate the influence of saddle-type dental stools on operator posture maintenance. An integrative literature review was conducted, consulting the Medline (N=539) and SCOPUS (N=175) databases. After excluding duplicates and studies that did not meet the inclusion criteria, 13 articles were selected for analysis. Despite technological and ergonomic advancements, it is worth noting that prolonged working hours, improper postures, and ergonomic risk factors can lead to irreversible musculoskeletal disorders. In the dental context, professionals are frequently exposed to dynamic and detrimental postures in their daily routines. Saddle-type stools have been designed considering the postural needs of operators. Studies have shown that dynamic seats, such as saddle-type stools, promote a neutral posture of the lumbar spine and provide better levels of muscular activation in the lower trunk muscles, contributing to area stabilization and reducing strain on the upper muscles. Therefore, the use of saddle-type stools can promote a more favorable and neutral posture for dental professionals.

Keywords: Ergonomics, Occupational Risks, Dentist, Saddle dental Stool.

1. INTRODUCTION

Ergonomics (or Human Factors) is the scientific discipline that deals with understanding the interactions between humans and other elements of a system and the profession that applies theories, principles, data and methods, to projects that aim to optimize human well-being and the overall performance of systems (International Ergonomics Association, 2008).

Ergonomics can be categorized into four distinct types: participation, correction, conception and awareness. The participatory approach aims to engage the worker in solving challenges intrinsic to the work environment, while the correction is aimed at solving concrete

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obstacles in the work process. Conception, on the other hand, focuses on supervising the development of work instruments, in order to ensure that they can be used by the worker with maximum comfort and safety, preventing possible accidents, injuries or discomfort during their use. Finally, awareness assumes the role of promoting the training of professionals, exposing the importance of the principles that govern their relationship with the work environment, encouraging them to perform their functions diligently, guided by such principles (Rovida et al., 2015). Although ergonomics is recognized as a scientific discipline and profession of extreme importance to optimize human well-being and the overall performance of systems, dental professionals still show little familiarity with the knowledge of the sciences of rationalization of work and ergonomics (Naressi et al., 2013).

Within the ergonomic context, non-recommended work postures are one of the main causes of the development of Work-Related Musculoskeletal Disorders, the role played by dentists leads them to adopt vicious attitudes, such as leaning laterally, performing flexion and extension movements of the spine during the workday and remaining seated for long periods (Garbin et al., 2009). Work-related musculoskeletal disorders (WMSD) can cause pain in various regions of the body, such as the neck, shoulder, arm, wrist, hands, upper and lower back, hips, knees and feet (Graham, 2002). These musculoskeletal pains represent an occupational health problem for dental professionals, especially dentists and dental hygienists, who adopt static postures and perform precise movements of the hands and wrists (Graham, 2002; Lindfors et al., 2006). In two recent reviews of the literature on the general health of dentists and occupational health in dentistry, WMSDs were identified as a significant problem for this profession (Leggat et al., 2007; Puriene et al., 2007). As found by YI et al. (2013), there is a prevalence of WMSDs in the neck, trunk and lumbar region among dental surgeons, especially among professionals who work in the specialty of periodontics. In another study, professionals had the greatest complaints in most of the body, with the exception of the wrist and knees, as pointed out by Hokwerda, Ruijter and Shaw (2006). A recent systematic review revealed that the prevalence of musculoskeletal pain in dental workers ranges between 64% and 93%. Among dentists, the regions most affected by pain are the back, with an incidence of 36.3% to 60.1%, and the neck, with an incidence of 19.8% to 85%. Among dental assistants, the hands and wrists are the most prevalent regions, with an incidence of 60% to 69.5% (Hayes, Cockrell and Smith, 2009). It is noteworthy that Work-Related Musculoskeletal Disorders (WMSDs) are influenced by multiple factors; static and uncomfortable postures, excessive repetition and strength, inadequate lighting, incorrect positioning of both the patient and the dental professional, lack of dental assistant, individual characteristics such as physical fitness,

height, weight, general health, gender and age, in addition to stress, play a significant role in the development of WMSDs (Plessas and Delgado, 2018; Sakzewski and Naser, 2014).

When analyzing the available studies, it is possible to observe that saddle-type anatomical dental owls have the best levels of muscle activation in the lower trunk muscles, responsible for better stabilization of the region and decompression of the upper muscles, as evidenced in the studies by De Bruyne et al. (2016) and Tran et al. (2016). It is observed that, despite technological and ergonomic advances in the area, inadequate postures, excessive working hours, and exposure to ergonomic risk factors can still cause irreversible musculoskeletal disorders or disorders (Garbin et al., 2011; Pîrvu et al., 2014., Gupta et al., 2014). Previous studies also indicate that the use of saddle seating can reduce postural risk and prevent musculoskeletal injuries when compared to conventional seating (Gandavadi, Ramsay, & Burke, 2007; Dable et al., 2014).

The high prevalence of pain and musculoskeletal disorders in dentists is a widely recognized fact. However, it is important to emphasize that the proportion of studies that address new ergonomic seat designs and their implementation in the dental field is considerably low. Several studies (Gandavadi et al., 2007; Haddad et al., 2012; Custódio et al., 2012; Dable et al., 2014; Tran et al., 2016; De Bruyne et al., 2016) corroborate this finding.

2. GOALS

In this study, the objective was to review the literature in an integrative way in order to investigate the impact of the use of dental stools, especially saddle owls, focused on optimizing posture during dental care.

3. METHODOLOGICAL PROCEDURES

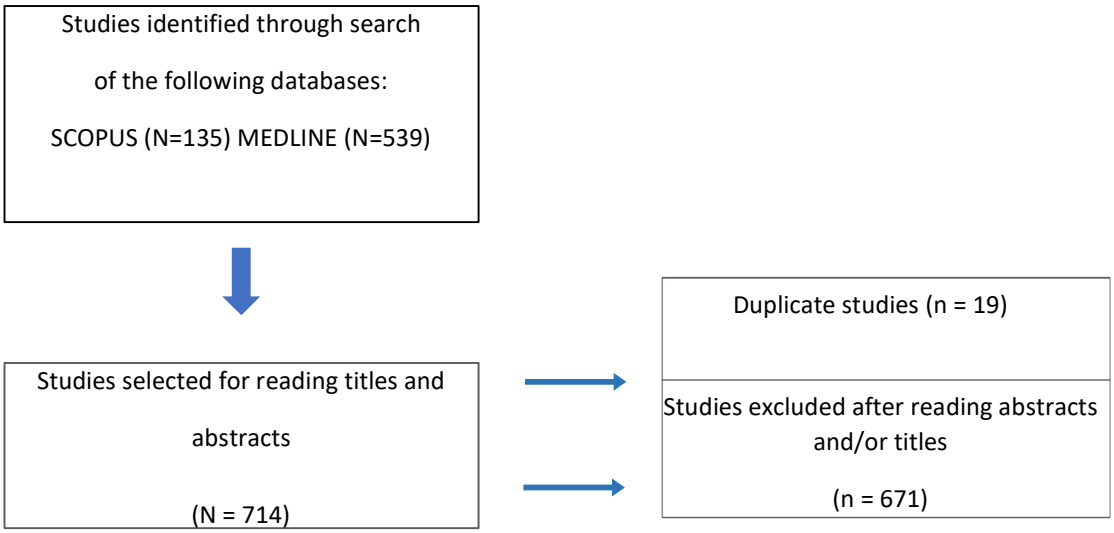
This research adopted an integrative literature review approach; integrative review is a specialized method that seeks to synthesize the existing empirical or theoretical literature, with the aim of offering a comprehensive understanding of a specific phenomenon (BROOME, 2006).

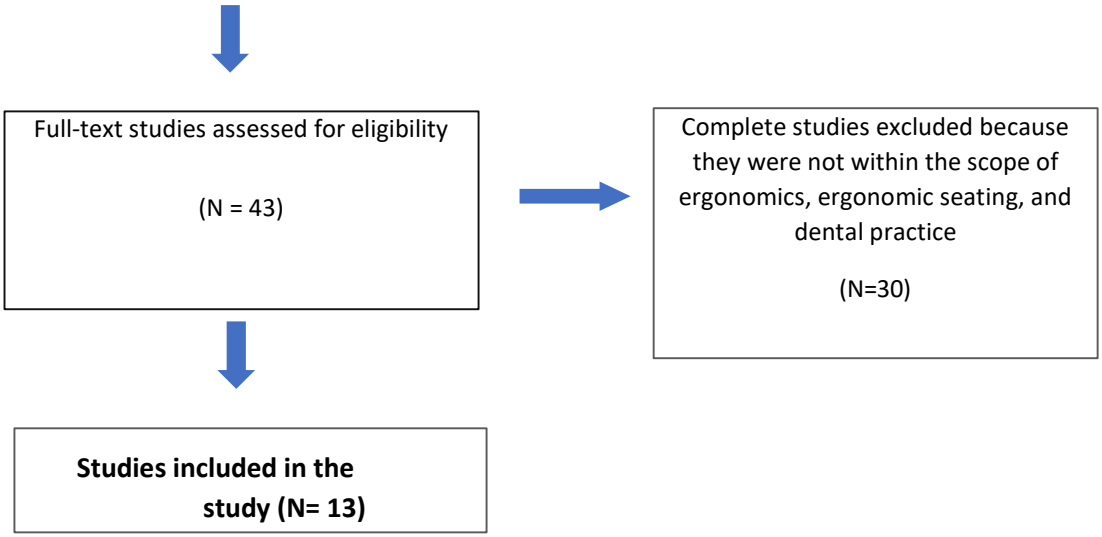
The methodology involved searching for studies in the Medline and Scopus databases. The choice of these databases is due to the fact that they are widely recognized as comprehensive sources of scientific literature in the areas of health, dentistry and ergonomics. The searches in the databases were carried out between June and September 2022, aiming to

cover the scientific literature available up to that date. The search was carried out using keywords and using appropriate truncation characters and Boolean operators, such as AND and OR, to maximize the scope of the search, the following terms were used: "saddle chair" OR "saddle seat" OR "dentist's chair" OR "traditional dental chair" OR "conventional seats" AND "ergonomics" OR "Sitting Position" OR "Posture" OR "DORTS" AND "dental office" OR "dentist". Initially, an analysis of the titles of the identified studies was carried out to exclude duplicate articles and to assess the preliminary relevance of the studies in relation to the research objectives. The inclusion criteria for this review were established based on the type of study, searching for experimental and observational studies that analyze the relationship between dental seating, biomechanics, and ergonomics. The target population was composed of dental students and dental surgeons. The intervention of interest was the use of one or more types of seats during clinical or preclinical dental procedures. Outcomes assessed include musculoskeletal comfort and/or postural alignment. Exclusion criteria were established for this review, which excluded publications that addressed standing posture, as well as theses, dissertations, books, book chapters, manuals, reviews, criticisms, comments, editorials, annals of events, and scientific reports. In this integrative review process, no specific tools were used. The review was conducted manually, through the reading of the selected articles and extraction of the relevant data, presented in Chart 1.

4. Results and Discussions

FIGURE 1 - Flowchart of the integrative literature review





The present integrative literature review sought to investigate the impact of the use of dental stool on improving posture, promoting ergonomic work positions and preventing musculoskeletal injuries among dental professionals. Initially, a total of 714 studies were identified in the databases, of which 539 were found in Medline and 175 in SCOPUS. Of these studies, 19 were excluded because they were duplicates. After the analysis of titles and/or abstracts, 671 studies that did not meet the inclusion criteria or that were not within the scope of this review were excluded. After the initial screening, 43 articles remained that were selected for full reading. During this stage, 30 articles were excluded because they were not within the scope of ergonomics, ergonomic seating, and dental practice, thus leaving 13 articles that were considered relevant and included in this review. The selection of articles took into account their contribution to the analysis of the impact of the dental owl on the posture of professionals and on the prevention of musculoskeletal injuries. The selected articles were submitted to analysis, where aspects such as the influence of the owl on the posture of professionals, the ergonomic benefits provided by the intervention of the saddle owl and its role in the prevention of musculoskeletal injuries were discussed, as can be seen in Chart 1. Among the limitations of the study, the scarce number of articles available stands out.

Chart 1 - Articles analyzed and that were considered adequate for the research, thus composing the study sample;

Author/year	Magazine	Local	Type of study	Objectives and Methods	Main results

Huppert., et al 2021	BMC Musculoskeletal Disorders	Germany	Randomized Clinical Trial	Evaluate the effect of different Ergonomic Owls in postural maintenance, comparing the usual sitting posture with the working posture. Participated in the study 59 individuals divided into two groups.	The intra-chair comparison showed changes related to position in the sagittal plane, but not in the transverse plane. These changes were only observed in the forward-leaning working position and were not influenced by ergonomic design Of Matching chair. No differences were found between the groups in the evaluation of each chair.
Bruyne., et al 2021	Applied Ergonomics	Belgium	Transverse	Investigate the effect of different Types of ergonomic owls in the activity cervicothoracic muscle and in posture during In order to analyze a dental procedure, the study used a sample of 25 dentists and three types of seats (Ghopec, Salli and Adec) for data collection, recorded through of the BodyGuard™ device and measurements EMG.	There were no significant differences between the Ghopec, the Salli MultiAdjuster adjustable seat, and the A-dec owl with respect to posture or muscle activity in the cervicothoracic spine during dental work. These results contrast with a previous study that focused on the lumbar spine, showing lower lumbar flexion and lower muscle activity when sitting in the Ghopec.
RamanV, Ramlog S, Sweet, J., & Sweet, D 2020	British Dental Journal	England	Transverse	Determine or Ergonomic risk in conventional dental owl among 28 students from Using digital photographs of the operator, the study sought to identify the risk of developing dental work-related injuries through the scale REBA.	High scores provided by REBA identified specific locations of risk behavior, with 64% of assessments indicating moderate risk according to the REBA scale. These results suggest that the use of static digital photographs as a REBA tool can be a useful and reliable option to assess ergonomic risk in this context.
Garcia-vidal Et al., 2019	Journal of clinical medicine	Spain	Transverse	Evaluate different ergonomic supports in 36 students, using EMG to measure muscle activity during three restoration tasks	The use of ergonomic owls is effective in reducing muscle activity compared to the service in the standard owl. Suggesting that these seats can contribute to a more effective posture
				without ergonomic support and then with each of the three ergonomic supports, with an interval of 15 minutes between them.	s adequate and less muscle overload during clinical activities.

Labbafinejad, Y.,et al 2019	International Journal of Occupational Safety and Ergonomics	Iran	Transverse	Assess musculoskeletal discomfort while working with a seating in the form of Saddle compared to conventional seats in 73 dental professionals. For data collection, we used the Body Parts Discomfort Scale of Corlett and Bishop (BPD).	The saddle-shaped seat demonstrated better results in postural maintenance and muscle activation. There was a significant reduction in levels of discomfort in several areas of the body, including the neck, shoulder, arm, back, elbow, and forearm, as well as an overall reduction in body discomfort ($p < 0.05$). More than 89% of participants reported an increase in comfort during the service when using this seat.
Lopéz- Nicolás et al., 2019	The journal of life and environmental science	Spain	Transverse	To evaluate the effect of different ergonomic supports on the muscle activity of the middle trapezius and erector lumbar spine in 36 dentists during a dental procedure. Using a portable surface electromyography device, the intraclass correlation coefficients (CI C) and the absolute standard error of measurement (SE M) were analyzed to establish the reliability of the measurements of the Of.	The use of the ergonomic saddle-type stool resulted in a significant reduction in activity middle trapezius and lumbar spine erectors.
Bruyne et al., 2016	Applied ergonomics	England	Clinical trial	To investigate the influence of different types of moc hos on the activation of the muscles and maintenance of the lumbar posture. 25 participants performed a dental practice or simulated in a standard cage, a saddle and the Ghopec cage.	The lumbar posture was closer to neutral in the Ghopec chair, while sitting in a standard/saddle chair resulted in more fl exioned/extended postures, respectively. Sitting at a 90-degree angle (standard chair) resulted in greater activation of the bone muscles, while sitting at a 125-degree angle (saddle and Ghopec) attested more to the abdominal muscles , although to a lesser extent in the presence of backrest (Ghopec). To maintain a neutral posture during dental procedures, the Ghopec armchair is considered the most suitable design.

Turner et. Al, 2016	International j ournal of occu pational safety and ergonomi cs	Canada	Experimental research	To compare the degree of activity of the back muscles in 30 students from the dontology, in order to record muscular activity in two muscles of the costas, the longissimus thoracic and the iliocostalis lumbar. A two-channel surface-to-nalogic EMG system (Bagnoli2, Delsys, USA) was used together with the softw are EMGworks, to tell me muscle activation.	The use of a thoracic support in dental stools demonstrates a significant reduction in muscle activity of the ombar and dorsal muscles during the simulation of a working position, compared to the use of a standard dental mask.
Dable., et al 2014	The journal of Indian prosthodontic society	India	transverse	In the study, the participants 90 Undergraduates in dentistry, the which were evaluated for the risk ergonomic while performing dental procedures using the scale RULA. The objective of the study was to warn upon The importance of ergonomic posture since The beginning Of profession, aiming to prevent musculoskeletal injuries and ensure a environment of safe work.	Conventional seats had high scores on the RULA scale, indicating a high ergonomic risk, unlike saddle seating (Salli). It has been observed that the lack of adoption of an ergonomic posture can increase the risk of musculoskeletal injuries in dental students.
Custódio et al. 2012	Ios press	Brazil	Transverse	To evaluate the influence of abdominal support attached to the traditional owl in 10 female dental students during the performance of a clinical procedure.	The support applied to the dentist's abdomen increased the muscle activity of some muscles, but did not affect the weight distribution in the back. However, it can be used to promote a more powerful position for the lumbar spine.
Haddad et al. 2012	The International Journal of Occupational and Environmental Medicine	Iran	Experimental research	Evaluate a chair with a new ergonomic design that incorporated a forward tilt of the owl, with support and arms, in 12 Cir dental surgeons.	When incorporated a chest and arm rest into the convention chair can reduce shoulder problems, reducing muscle activity in the area.

Gandavadi et al. 2007	British dental journal	England	Pilot study	To evaluate the work posture of 70 dental students with different types of dental owls, in order to determine whether a seat predisposes to a difference in dental stool .	Based on the scores obtained in the RULA method, it is possible to observe that students who use the closed saddle seat can maintain an acceptable working posture, with a lower risk rating compared to those who use the conventional seat, whose posture presents a high risk score.

Source: Authors (2022)

4.1. Types of Seats Used and Their Interference with Postural Maintenance

The heterogeneity of the studies included in this review, which covers clinical trials, cross-sectional studies and experimental studies, makes a comparative analysis unfeasible. However, eight of the studies analyzed revealed an improvement in postural alignment after the intervention (Gandavadi et al., 2007; Custódio et al., 2012; Haddad et al., 2012; Dable et al., 2014; Bruyne et al., 2016; Garcia-vidal et al., 2019; Labbafinejad, Y.,et al 2019; Lopéz- Nicolás et al., 2019), the authors used saddle seats of different brands: the Salli saddle chair - open saddle, Bambach Saddle Seat - closed saddle, Salli MultiAdjuster, A-dec and the Ghopec, the studies that used saddle seats, both open saddle and closed saddle, suggested a lower postural risk compared to conventional seats, allowing for a more ergonomic working posture and potentially preventing musculoskeletal injuries.

De Bruyne et al., 2021, suggest that there are no significant differences between the types of saddle-type ergonomic seats, the results obtained by the authors indicated that there was no difference in relation to posture or muscle activity in the cervicothoracic spine between the seats of the brands: Ghopec, Salli Multi Adjuster adjustable seat and the A-dec owl, during the performance of dental procedures. The same authors conducted an experimental study in 2016, where the lumbar posture was closer to the neutral position in the Ghopec chair, while sitting in a conventional chair resulted in more flexed/extended postures at a 90-degree angle, with greater activation of the back muscles, while sitting at a 125-degree angle (saddle and Ghopec) activated the abdominal muscles more, although to a lesser extent in the presence of a backrest (Ghopec). Other ergonomic devices coupled to the dental owl also suggest a reduction in muscle activity as found by Custódio et al. (2012), where a conventional seat of the Dabi Atlante model, Ergo Relaxe, was used with abdominal support in the experimental group, while the control group used the same seat without abdominal support, the statistical analysis revealed an increase in the electrical activity of the right trapezius muscles, left

trapezius and very right length of the chest when a support was applied to the dentist's abdomen. This indicates that the application of a support to the trunk could interfere with the electrical activity of most of the muscles studied, promoting a position more aligned with the central axis of the body and, thus, protecting the passive elements of the lumbar spine. In the study by Haddad et al., (2012), the experimental group used a seat with a new ergonomic design that incorporated forward tilting of the seat and chest and arm supports, while the control group used a conventional seat, the authors found that the incorporation of a chest and arm rest in a conventional dental chair can reduce shoulder problems associated with prolonged trunk flexion posture with adduction of the shoulders commonly observed in dentists.

4.2. Ergonomics and its contributions to technological advances

Ergonomics plays a prominent role in being concerned with maintaining the capacity and effectiveness of healthcare professionals, which in turn results in higher quality care for patients (Gupta, Bhat, Gupta, Mohammed, & Bansal, 2014). Therefore, it is necessary to consider not only technological advances, but also ergonomic issues in the development of projects for the production of goods, services and products. Through its innovative approach, ergonomics seeks to ensure the effectiveness, safety and prevention of accidents and musculoskeletal disorders, establishing a connection between the design of projects and technological advances (Hokwerda et al., 2006). Regulatory Standard No. 17 of 2007 plays a key role in ensuring an adequate work environment for dental surgeons. This standard establishes that the workstation must be designed or adapted in order to allow the performance of tasks in a seated position (Hokwerda et al, 2006). This guideline seeks to promote ergonomics in the dental environment, recognizing the importance of a correct and comfortable posture for the health and well-being of professionals. A significant milestone in the development of dental ergonomics is the ISO/TC 106/SC 6 N 411 Draft Standard, entitled "Ergonomic requirements for dental equipment". This project is an important reference that establishes guidelines and recommendations for the design, construction and selection of dental equipment, taking into account the available knowledge about human anatomy, physiology and ergonomics. One of the main contributions of this project is to provide information on the adequate, comfortable, safe and healthy posture for dentists during dental procedures. Based on scientific studies and specialized knowledge, guidelines are established for the appropriate choice of equipment that favors correct posture, avoiding excessive effort, muscle tension, and musculoskeletal injuries. Ergonomic guidelines aim to provide a safer and healthier work environment for professionals, minimizing the risks of health problems related to dental

practice (Garbin et al., 2009). By adopting an ergonomics-based approach, it is possible to promote the comfort and safety of professionals, contributing to the quality of the services provided, reduction of work-related injuries, and patient satisfaction.

In the context of ergonomic and technological advancement, it is essential to highlight the importance of using appropriate chairs, making use of an adjustable stool and correctly positioning mobile equipment. These measures have been effective in reducing WMSD-related problems, allowing professionals to make modifications and optimize their workspace. A notable example is the availability of ergonomic saddle seats on the market, which promote the adoption of a healthier posture. With a saddle seat, the pelvis rotates anteriorly and the lumbar spine takes on the correct curvature, thus decreasing the risk of musculoskeletal problems during dental activities (Gandavadi & Ramsay, 2005).

4.3. Musculoskeletal Discomfort and Risks in Dental Practice: The Importance of Ergonomics in Dental Stool Design.

Initially, dental surgeons used to work standing up, but over time and with the development of the work philosophy, dental practice has evolved significantly. The professionals went from standing next to the chair to a sitting position. With technological advances, more suitable chairs, adjustable owls, and mobile equipment have emerged, all of which are well positioned, which has helped to reduce related problems (Dable et al., 2014). However, dentists are still a population susceptible to joint and muscle pain due to inadequate postures According to Maehler (2003), despite technological and ergonomic advances, dental professionals face discomfort due to excessive working hours and individual predisposition to skeletal degenerations that affect the spine. The international literature reveals that approximately 65% of dentists, that is, 2 out of 3, suffer from musculoskeletal problems, which vary in severity and involve symptoms such as discomfort, pain, functional difficulties and loss of work time. The risk of disability, in whole or in part, as a result of physical factors or a combination of mental and physical factors, is considerable. Muscle tension increases proportionally to stress, as does muscle load. In addition, the physical load is already often high (Read, Salmon, Goode, & Lenné, 2018).

According to Dul et al. (2012), these risks can affect the physical and mental integrity of professionals, compromising their safety and productivity, resulting in discomfort and/or diseases. The following are considered ergonomic risks: inadequate manual movement of loads,

incorrect postures and movements, repetitive movements, direct pressure on body tissues, vibrations and thermal discomfort of the environment.

Dental practice requires dynamic and damaging daily postures that cause cumulative bodily microtrauma. The detrimental consequences of this process lead to several detrimental physiological adaptations, such as decreased oxygenation, painful musculoskeletal dysfunctions, and bone degeneration (Maehler, 2003).

In dentistry, professionals are exposed daily to dynamic and harmful postures, which cause cumulative body microtraumas. These detrimental consequences lead to a variety of unhealthy physiological adaptations, such as decreased oxygenation, painful musculoskeletal dysfunctions, and bone degeneration (Hayes, Cockrell, and Smith, 2009) According to De Sio et al., (2018), in a literature review that analyzed 29 articles, the most significant ergonomic risk factors related to dentistry were static posture, repetitive movements, muscle imbalances, non-ergonomic equipment, duration and extent of muscle effort and vibrating instruments. Garbin et al., (2009) also highlight that the most frequent occupational risk factors perceived by professionals include inadequate spinal flexion and remaining in the same position for long periods. Hayes et al., (2013) showed that even in a correct posture in the common owl, 50% of the body muscles contract and limit vertebral movements. The studies by Gandavadi and Ramsay (2005) and Gandavadi, Ramsay and Burke (2007) investigated the influence of different sitting positions on upper limb function and posture in dental students. These studies have demonstrated that the proper choice of seating position can have a significant impact on the function and musculoskeletal health of professionals. Highlighting the importance of considering ergonomics in the design and use of the dental stool in order to promote work positions that minimize the risk of injury

4.4. The relationship between ergonomics and the choice of the right stool type.

The dental stool is directly related to ergonomic practice, and its anthropometric dimensions must comply with NBR 13962/1998 of ABNT. Among the ideal characteristics, the following stand out: five casters to allow movement without risk of falling, seat height that meets the height variation from 1.50 m to 1.80 m, and backrest that correctly supports the lumbar spine, with vertical and horizontal adjustments for the professional's adaptation.

The conventional stool has few differences between its manufacturers, with aesthetic and ergonomic aspects, for the most part, similar to those of an office chair. It is characterized by a geometric seat and backrest, seat and back height adjustment, and a structure with five

casters for mobility. Although the geometric shapes with adjustment facilitate the adaptation of the structure to any user, its non-anatomical shapes, lack of support for the upper limbs and absence of anterior support for the trunk are negative points to be considered (Bertolaccini, Paschoarelli & Medola, 2015). While the saddle seat promotes a healthy posture, contributing to the maintenance of the lumbar region and associated with lower disc pressure. In addition, studies suggest that a saddle seat reduces the physical workload on the arms and trunk during dental care (Dable et al., 2014). The Saddle type owl was designed taking into account the postural needs of professionals. In addition to offering a comfortable and convenient posture, with the legs at a 45º downward angle and tilting the pelvis to an almost neutral position, as if standing, this posture provides a natural curve to the lower back and keeps the shoulder-neck region upright (Dable et al., 2014). Authors such as Kothiyal & Kayis (2001) suggest that ergonomic owls reduce hip flexion, promote better lumbar and spine posture, and are associated with lower muscle tension.

An example of an owl manufactured by the Salli company has an ergonomic seat of the horse saddle type and a structure with five casters. This configuration ensures greater comfort for the upper limbs, as the support is articulated, allowing a greater variety of configurations for the position of the arms. The design of the seat, inspired by the horse saddle, contributes to the maintenance of a neutral posture, that is, with zero degree of trunk inclination (Dable et al., 2014). Recent studies, such as those by Garcia-Vidal et al. (2019) and Lopez-Nicolaz et al. (2019), have emphasized the important role of the owl in maintaining posture and reducing muscle activity in the upper muscles, which favors ergonomics during working hours and decreases the risk of injury.

The concept of the saddle seat was developed based on the studies presented by Corlett, which indicate the most correct posture for the sitting position. This type of seat is designed to prevent the buttocks and thighs from being compressed against the chair, providing firm support of the sitting bones. With the thighs tilted downwards, forming an angle of 120 to 130º in relation to the trunk, the pelvis adopts an almost neutral position, similar to the standing position, and the knee angle is enlarged. This allows the lower back and upper torso to adopt a natural, relaxed posture without the need for support (Corlett & Bishop, 1976; Corlett, Madeley & Manenica, 1979). Dynamic seats, such as saddle seats, favor a neutral lumbar spine posture. These seats allow for constant movement due to the design of the chair, even during the period in which one is sitting. In this way, the saddle seat differs significantly from the traditional way of sitting (Gouvêa, 2015). Postural control requires a complete interaction between the neural

and musculoskeletal systems, with activation of the limb and trunk muscles through spinal cord signals (Gunning, Callaghan, & McGill, 2001).

According to Gouvêa (2015), the saddle seat has been widely used by health professionals, especially dentists, as a preventive or corrective measure for postural problems. This is because the saddle seat reduces posterior rotation of the pelvis, facilitates the positioning and maintenance of physiological curvatures of the spine, and minimizes intradiscal compression.

Studies that evaluated the alteration of the conventional owl in relation to the saddle type, with or without support for the arms, point to better results in relation to the overload of the lumbar, intercostal and shoulder muscles (Haddad et al., 2012). However, although conventional owl modification has been shown to be effective, the benefit found in studies, such as those by Garcia-Vidal, et al. (2019) and Lopez-Nicolaz et al. (2019), is limited. It is observed that, in most of the studies analyzed, the anatomical owls showed the best levels of muscle activation in the lower trunk muscles, responsible for the better stabilization of the area and decompression of the upper muscles, as seen in the studies by Bruyne et al. (2016) and Turner et al. (2016). The upper muscles of the body, especially in the back and shoulder region, are actively required during dental care and are often responsible for the appearance of inflammatory disorders, such as bursitis, tendinitis and other joint disorders. Thus, finding solutions that minimize the activation of these muscles is extremely important for the longevity of professional performance (Oliveira and Saraiva Neto, 2018; Almeida and Stefenon, 2018).

5. CONCLUSION

In conclusion, this integrative study highlights the importance of the use of saddle-type dental owls in improving posture during dental care, contributing to the occupational health of professionals. The results highlight the need to consider the appropriate choice of owl as an effective strategy in preventing musculoskeletal injuries and improving clinical performance. To advance in this area, it is suggested that future studies explore specific ergonomic mechanisms, evaluate complementary interventions, and deepen the understanding of the benefits of different types of owls for the health and well-being of professionals.

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