Advances in Clinical and Medical Research

Pain and Discomfort in the Cervical and lumbar Spine in Teachers in Santa Catarina during the COVID-19 Pandemic

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Abstract

Due to the pandemic caused by COVID-19, teachers across the state of Santa Catarina adapted to the new teaching method proposed by the government, and spent hours in front of a computer teaching their classes. The aim of the study was to verify the prevalence of pain and discomfort in the cervical and lumbar spine in teachers

in Santa Catarina during the COVID-19 pandemic. The study was descriptive, with a cross-sectional design and a quantitative-qualitative approach. The sample was made up of 105 teachers from the state of Santa Catarina who teach classes in elementary, secondary and higher education. Data were collected through online questionnaires, developed in Google Docs®, consisting of the sample characterization questionnaire, the neck-related disability index (NDI) questionnaire used to assess the functional capacity of the neck and the Owestry 2.0 questionnaire that provides information on pain and discomfort related to the lower back and its disability.

Due to the pandemic caused by COVID-19, teachers across the state of Santa Catarina adapted to the new teaching method proposed by the government, and spent hours in front of a computer teaching their classes. The aim of the study was to verify the prevalence of pain and discomfort in the cervical and lumbar spine in teachers in Santa Catarina during the COVID-19 pandemic. The study was descriptive, with a cross-sectional design and a quantitative-qualitative approach. The sample was made up of 105 teachers from the state of Santa Catarina who teach classes in elementary, secondary and higher education. Data were collected through online questionnaires, developed in Google Docs®, consisting of the sample characterization questionnaire, the neck-related disability index (NDI) questionnaire used to assess the functional capacity of the neck and the Owes try 2.0 questionnaire that provides information on pain and discomfort related to the lower back and its disability. The results showed that there was an increase in hours of work activity during this period, which led to the appearance of neck and back pain. The Owes try 2.0 questionnaire brought an average score of 13(±9), thus presenting a value of 6%, classified as minimal disability. The questionnaire neck-related disability index (NDI), presented an average score of 21(±5) presenting a value of 43%, being classified as moderate cervical disability. In this way, it was possible to conclude that with the beginning of home office work, the workload and the time teachers spent sitting in front of a computer increased, and the fact that the majority did not have a suitable place to carry out their work favored the beginning of complaints of lumbar and neck pain.

Keywords
COVID-19; Neck pain, Backache; Teachers.

Introduction

The year 2020 was marked in history due to several factors, including the virus that affected a large part of the world's population and ended up causing a pandemic. As a safety measure and with the aim of reducing the number of people infected by this virus, the federal government and the world health organization created measures to fight this pandemic. One of them was to institute the quarantine period, which, for the vast majority of people, was something new. Everyone had to adapt to this new phase, including teachers and their teaching methods.

The vertebral column belongs to the axial skeleton along with the cephalic skeleton, sternum bone and ribs. It consists of 33 vertebrae, 24 presacral, 7 cervical, 12 thoracic and 5 lumbar; by the sacrum, made up of 5 ossified sacral vertebrae and by the coccyx bone, made up of 4 rudimentary coccygeal vertebrae fused together [1]. It is a flexible and firm rod, composed of components joined by joints, interconnected by ligaments and supported by powerful muscle-tendon mass [2].

It plays an important role in posture, weight bearing, locomotion, protection of the spinal cord and nerve roots. When sitting, the spine transmits the weight of the body through the sacroiliac joints to the iliac bone, and thus to the ischial tuberosities. In an upright posture, the weight of the body is transferred from the sacroiliac joints to the acetabulum of the hip bones, then to the femurs [3].

The sitting position leads to prolonged support of lumbar flexion, reduced lordosis in this region and static overload on the osteo-articular tissues of the spine, factors that are directly related to the development of low back pain. Changing posture is recommended to avoid causing discomfort or fatigue and the average interval time between two consecutive changes is 5 minutes. Furthermore, staying in this position for more than four hours poses a risk of developing low back pain [4].

Due to the new school configuration due to the Covid-19 pandemic and with work being carried out at home, it was possible to notice that structurally not everyone has suitable spaces or furniture for this method of work, which caused them to develop the appearance of pain and discomfort in the cervical and lumbar spine. When a worker exerts a large workload in a sitting position, the internal pressure in the nucleus of the intervertebral disc and all its structures increases by an average of 35%. Prolonged sitting reduces the return circulation of the lower limbs, which generates edema in the feet and ankles and discomfort in the cervical region and upper limbs [5].

SARS-CoV-2 is a virus that affected a large part of the world's population and due to its great transmission potential, in-person classes were suspended for almost 1 year, with remote classes having to be held, in an attempt not to harm students during the academic year. This method forced teachers to spend many hours in front of the computer organizing, studying and teaching their classes. This fact led to a negative response in your body, as prolonged sitting in front of a computer can generate pain and discomfort, especially in the lumbar and cervical spine, as well as other negative results.

In view of the above, the choice of the topic was extremely important to evaluate and collect data about this period in which teachers were teaching classes from their homes and discover whether or not they present pain and discomfort in their cervical and lumbar spine, so that it is possible to guide future strategies and reduce the impacts of this pain on work and daily life activities. The general objective of this work was to verify the prevalence of pain and discomfort in the cervical and lumbar spine in teachers in Santa Catarina during the COVID-19 pandemic, and the specific objectives were: to understand the profile of educational activities used in the home office model during the pandemic COVID-19; check whether or not there is pain and discomfort in the neck and lower back and assess whether they have a suitable environment to carry out home office activities.

Methods

Search type

This study is characterized as a type of descriptive research, with a cross-sectional design and a quantitative approach. Descriptive research has as its main purpose the description of the characteristics of a given population or phenomenon, or the establishment of relationships between variables [6].

The type of cross-sectional research is included when the exposure is relatively constant and the effect or disease is chronic. It presents itself as an instantaneous cut that is made in a specific population through sampling, analyzing the members of the sample or case series, the absence or presence of exposure and also the effect or disease. The advantages are that it is a low-cost study and that there are practically no losses to follow-up [7].

Sample

The population involved in this study was made up of 105 teachers from the state of Santa Catarina who teach classes in elementary, secondary and higher education.

Ethical Procedures

The ICF was also made available online along with the questionnaire. All research volunteers who accepted the terms established therein, as recommended by resolution number 466 of the National Health Council of October 10, 2012, had access to the main questionnaire. The study was approved by the ethics committee of Facvest University Center through opinion number 4.143.079 on July 8, 2020.

Data Collection Procedures

Data were collected through an online questionnaire, developed in Google Docs® available at this link < https://forms.gle/PM1ZmsVuSFRKhngr7 >. The disclosure took place on the social networks Instagram®, Facebook® and WhatsApp® in the period between July and September 2020, after approval by the research ethics committee.

Data collection consisted of three questionnaires, namely:
- Participant characterization questionnaire: this questionnaire consisted of 17 closed and multiple-choice questions.

- Neck Disability Index - NDI Questionnaire:This questionnaire is used to assess the functional capacity of the cervical region. Its original version was developed in 1991, based on the Oswestry Disability Index, and was translated and adapted into Portuguese by Cook et al, 2006. The NDI consists of 10 questions relating to general activities and pain. The items are organized by type of activity and followed by six different statements expressing progressive levels of functional capacity. The average application time is three minutes. The score is made using a percentage of maximum pain and functional disability. The NDI score consists of the sum of points, from 0 to 5 for each of the 10 questions, totaling a maximum of 50 points. The value obtained can be expressed as a percentage, on a scale from 0% (no disability) to 100% (complete disability). The total score is divided by the number of questions answered multiplied by the number 5. For example, if all questions in the questionnaire were answered, the total score will be divided by 50 (10 x 5), while if there is one unanswered question, the same will be divided by 45 (9 x 5). The result of this division is multiplied by 100 and the final values are presented as a percentage, ([score ÷ (number of questions answered x 5)] x 100)35. Therefore, it is considered: ([score ÷ (number of questions answered x 5)] x 100)35. Therefore, it is considered: ([score ÷ (number of questions answered x 5)] x 100)35. Therefore, it is considered:

- No disability when the value is below 10% (less than 5 points);
- Minimum disability of 10 – 28%;
- Moderate disability 30 – 48%
- Severe disability of 50 – 68%;
- Complete disability above 72%.
- Owestry 2.0 Quiz: This oneThe questionnaire is designed to give us information about how your back (or leg) problem has affected your daily life. The questionnaire is divided into 10 sessions. For each session there are six statements, and the score is 5. If the first statement is marked, the point is 0. If it is the last, the point is 5. Intermediate statements are scored according to this rank. If more than one statement is marked in each section, choose the largest point. If all 10 sections are completed, the score is calculated as follows: If 16 points was the total point, with 50 possible points, 16/50 X100= 32%. If a section is not marked or does not apply the score is calculated as follows, according to the maximum score example of 16: 16/40 X100= 35.5%. The author recommends rounding the percentage to a whole number.

Interpretation of results:
- 0% to 20% - minimal disability;
- 21% to 40% - moderate disability;
- 41% to 60% - severe disability;
- 61% to 80% - crippled;
- 81% to 100% - invalid.

Interpretation of postoperative results
- 0% to 20% - excellent
- 21% to 40% - good
- 41% to 60% - unchanged > 60% - worsens. They will be evaluated regarding the inclusion criteria, to later respond to the questionnaire.

Data Analysis
The collected data were coded and stored in a database using the Excel version 12.0 Office 2010 program. The results are described as the mean, absolute frequency (n), relative frequency (%) and standard deviation.

Results and Discussion
The study included 105 questionnaires answered by teachers from across the state of Santa Catarina and who teach at different school levels. Table 1 represents the data collected on the sample profile, where the following information is observed: prevalence of females (77.1%), aged between 30 and 50 years (59%), married or in a union consensual (63.8%), and the majority are teachers in the Midwest region (79%), working in higher education (28.6%) and in early childhood and educational education (38%), carrying out their teaching activities in public institutions teaching (51.4%).

	N	%
Gender		
Feminine	81	77.1
Masculine	24	22.9
Age		
between 20 to 30 years old	20	19
between 30 to 40 years old	31	29.5
between 40 to 50 years old	31	29.5
between 50 to 60 years old	21	20
over 60 years old	two	1.9
Marital status		
Single	29	27.6
Married/consensual union	67	63.8
Divorced	9	8.6
Region of the state in which you work		
Coast	0	0
North East	0	0
North Plateau	3	2.9
Itajaí Valley	0	0
Serrano Plateau	1	1
South	13	12.4
Midwest	83	79
West	5	4.8
Institution that works		
Public	54	51.4
Toilet	51	48.6
Educational level taught		
child education	20	19
Educational Teaching	20	19
High school	18	17.1
University education	30	28.6
Technical courses	two	1.9
Postgraduate	two	1.9
Others	13	12.4

Table 1: Sample Profile

Table 2 describes the Profile of educational activities used in the home office model during the COVID-19 pandemic. We can observe that 63.8% of the sample reported difficulty in adapting to the new educational model, while 54.3% had no difficulty in mastering the tools. Among the most used tools were WhatsApp® with 77.1% of use and web conferencing with 70.5%.

The pandemic directly affected the educational area and meant that teachers had to adapt their daily lives at home to the new teaching method with remote classes. This was not an easy task, as most educators

did not receive adequate preparation/training to use this tool. The main means used to carry out the classes were online platforms developed by the institution itself, other tools used were the Moodle platform, Google Meet, emails and conferences on WhatsApp [8].

	n	%
Did you have difficulty adapting to the new educational model due to the COVID-19 pandemic?		
No	38	36.2
Yes	67	63.8
What tools did you use or have you used to teach classes during this period of home office activities due to the COVID-19 pandemic? *		
Chats	49	46.7
WhatsApp	81	77.1
Web conference	74	70.5
Others	52	49.5
Did you have difficulty mastering the tools used to carry out home office school activities due to the COVID-19 pandemic?		
No	57	54.3
Yes	48	45.7

Table 2: Profile of educational activities used in the home office model during the COVID-19 pandemic.

Graph 1 shows teachers' workload before and during the pandemic. The data shows that teachers' workload before the pandemic was lower, and during the home office period it increased significantly, consequently, the amount of time they spent sitting in front of a computer to carry out work activities also increased.
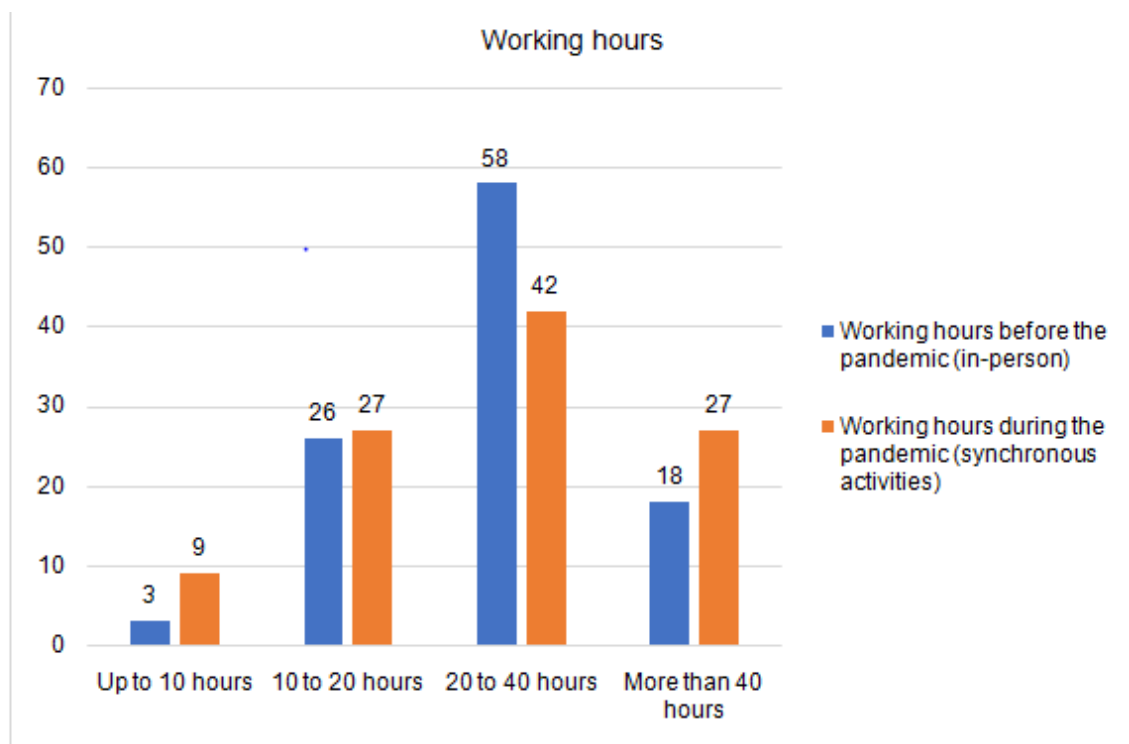
Graphic 1: Working hours before and during the Covid-19 pandemic

Graph 2 refers to the presence or absence of pain and discomfort in the lumbar and cervical spine during the Covid-19 pandemic. It was observed that 65.8% of the sample presented painful symptoms since the beginning of activities in the home office model. Of these, only 13.3% had a diagnosis of osteomyoarticular disease of the cervical spine and 16.1% had a diagnosis of osteomyoarticular disease of the lumbar spine. The remainder had neck or lumbar pain, but had no diagnosis of osteomyoarticular disease.

Sitting for many hours at a time with your neck flexed is common during long periods of study or work, especially in those who use technological devices such as notebooks and cell phones to carry out their activities at work, and this can be the reason for many pains related to cervical [9].

Working for many hours in a sitting position can lead to consequences such as pain and discomfort in the lumbar spine, as the sitting position provides little room for movement. Sitting posture, no matter how ergonomically correct it may be, generates a biomechanical load on the intervertebral discs, thus increasing the risk of herniated discs [10-12].
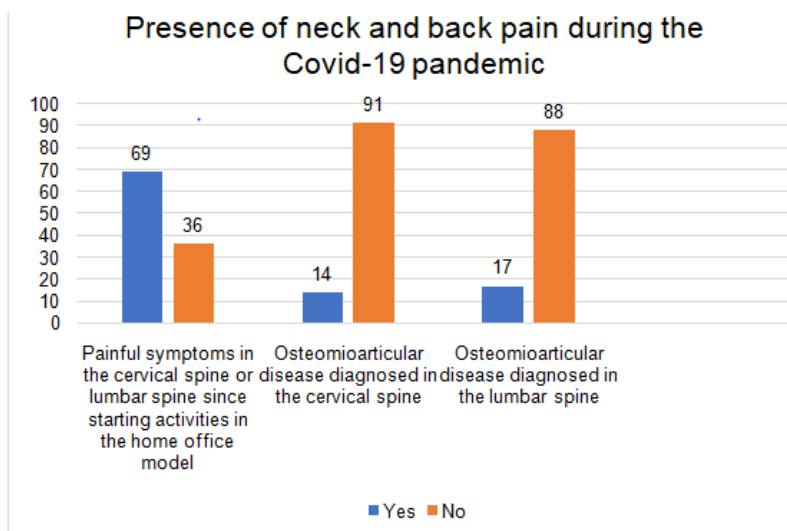
Graphic 2: Presence of pain in the cervical and lumbar spine during the Covid-19 pandemic.

	Presence of pain	
Adequate work environment	Yes	No
Yes	19% (n=20)	16.1% (n=17)
No	46.6% (n=49)	18% (n=19)

Table 1: Relationship between adequate work environment and the presence of pain in the cervical and lumbar spine during the Covid – 19 pandemic.

Table 3 represents the relationship between the appropriate work environment and the presence of pain in the cervical and lumbar spine. We can observe that teachers who did not have an adequate work environment were those who most frequently suffered pain in the cervical and lumbar spine, representing 46.6% (n=49) of the sample.

Complaints of pain in the upper limbs and in the cervical and lumbar spine have a greater incidence in those who work for many hours sitting in front of a computer, as this work involves low-amplitude, fast and repetitive movements, and signs of Pain appears more frequently in cases where there is no ergonomically correct space to carry out activities [13].

Graph 3 demonstrates the results of the Owestry 2.0 questionnaire, which assessed the functional incapacity of the lumbar spine in daily activities. It had 17 responses that presented an average score of 13 (±9). Therefore, the results show a risk of Owestry 2.0 of 6%, classifying it as minimal disability of the lumbar spine.

In another study carried out by [14], about low back pain and disability in employees of a telemarketing operator in a company located in Santa Maria/RS, had 08 participants who worked at the company, with an average age of 25 years. The study used the Owestry 2.0 questionnaire as a way of assessing lumbar disability, and the results obtained showed a disability score of 6.4%, also considered as minimal disability despite the participants having pain in the lumbar region.

Already [15], carried out research on the disability rate of low back pain in truck drivers. The study involved the participation of 29 male drivers, aged between 25 and 35 years old and with more than five years of experience in the profession. To assess lumbar disability, the Owestry 2.0 questionnaire was also used, where the results identified twenty-two drivers (75.86%) with a score of 6.58% being classified as minimal disability and seven drivers (24.14%) with score27.14% being classified as moderate disability. The results of all the studies described reinforce that the sitting position, regardless of the profession, can cause the risk of lumbar spine disability.
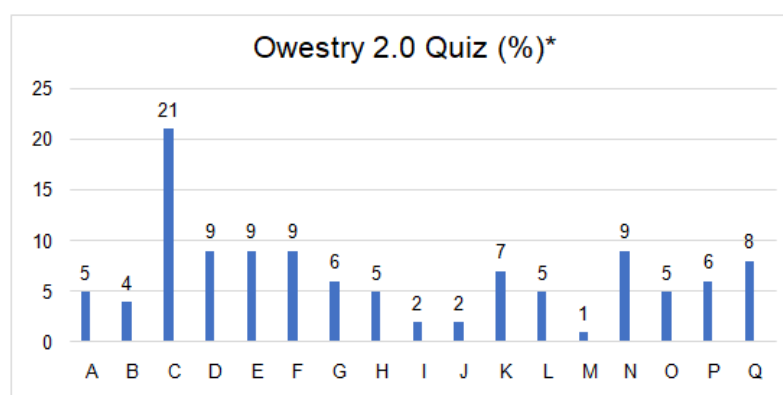
Source:(AUTHORS, 2023)
*interpretation of results: 0% to 20% - minimal disability; 21% to 40% - moderate disability; 41% to 60% - severe disability 61% to 80% - cripple; 81% to 100% - invalid.

Graphic 2: Individual Owes try 2.0 quiz result.

Graph 4 represents the results of the Neck Disability Index (NDI) questionnaire, which assessed neck-related disability. This had 14 responses, presenting an average score of 21 (±5), which corresponds to 43% of the NDI, classifying it as moderate cervical disability.

A study carried out on the prevalence of neck pain in medical students at the Pontifical Catholic University of São Paulo (PUC-SP), involved the participation of 100 students and assessed cervical disability using the neck-related disability index questionnaire (Neck Disability Index- NDI) taking into account the study time spent sitting associated with the use of devices such as notebooks and cell phones. Of the 100 participants,

34 had neck pain, with a prevalence in women, of which 32.3% had no disability, 64.7% had mild disability while 2.9% had moderate disability [9].

The study carried out [16], involved 242 students of both sexes, from all periods, who attended the physiotherapy course at a private university in the city of Uberlândia – MG. The study aimed to verify the neck disability of students, using the Neck Disability Index (NDI) questionnaire. The results of the study show that 48.9% had mild disability, while 41.9% had no cervical disability. Regarding the difference in gender, course period and marital status, there was no significant difference in terms of disability level.

The correlation between non-specific neck pain and functional disability in female computer users was verified in a study of [17]. In this, 155 women aged between 18-60 years who used the computer for at least four hours a day were evaluated. The results showed a moderate correlation between the intensity of pain presented and the degree of disability, showing that painful symptoms were presented by a combination of factors such as: prolonged time using the computer, poor posture of users and an environment not equipped to perform work. .

Observing the results of the studies described above, they emphasize that the sitting posture, associated with the use of electronic equipment and flexion of the cervical spine, regardless of the profession/occupation, can cause the risk of incapacity for the cervical spine.
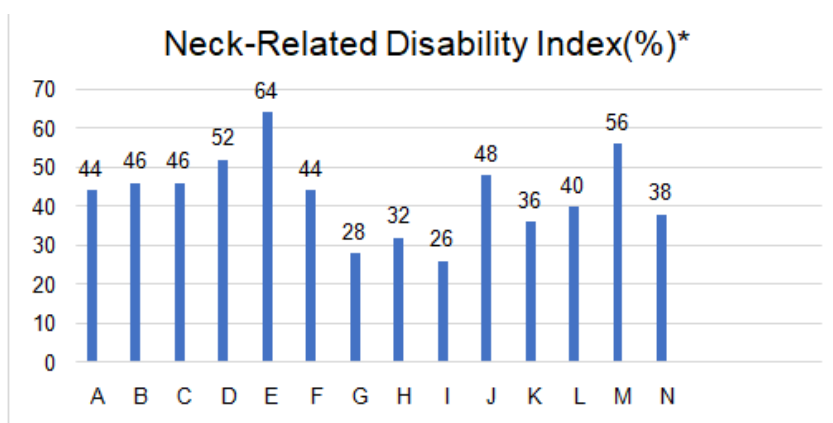
Source: AUTHORS (2023)
*Interpretation of results: no disability when the value is below 10% (less than 5 points); minimum disability of 10 – 28%; moderate disability of 30 – 48%; severe disability of 50 – 68%; complete disability above 72%.

Graphic 3: Individual result of the Neck Disability Index - NDI questionnaire.

Final Considerations

We know that nowadays complaints of pain and discomfort in the cervical and lumbar spine are common, and can arise due to several factors, bringing countless consequences to people's well-being. Through the data collected, it was possible to observe that there is a prevalence of pain and discomfort in teachers who started to work in the home office model, as the workload and the time they spent sitting in front of

a computer increased, and also , due to the majority not having a suitable place to carry out work activities.

The study showed that most participants had difficulties adapting to the new teaching method, however, the participants did not present difficulties in mastering the use of teaching tools, and it was possible to note that the main means of carrying out classes were through WhatsApp and web conferences. It was possible to observe that most teachers who did not have an ergonomically correct place to carry out activities presented symptoms of pain and discomfort in the cervical and lumbar spine. The risk of disability in the lumbar spine was classified as minimal, while in the cervical spine the risk of disability was classified as moderate among participants, thus confirming that increased workload and time in a sitting posture can increase the risk of disability and onset. osteomioarticular diseases in the cervical and lumbar spine.

It is suggested that based on this survey, more study proposals be developed with the aim of minimizing and/or preventing the impacts caused not only on teachers, but also on other professionals who spent more time sitting due to social isolation or changes in their work routine due to Covid-19.

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