

# Skeletal System Problems in Anthropology, Archaeology and Art History Professionals

Ahmet Ihsan AYTEK<sup>1\*</sup>

<sup>1</sup> Asst. Prof. Dr., Burdur Mehmet Akif University, Faculty of Arts and Sciences, Department of Anthropology, Burdur / TURKEY

\* Sorumlu Yazar / Corresponding Author:

Ahmet Ihsan AYTEK

Burdur Mehmet Akif Ersoy Üniversitesi, Fen-Edebiyat Fakültesi

Antropoloji Bölümü, Burdur / TÜRKİYE

E-posta: [aytek@mehmetakif.edu.tr](mailto:aytek@mehmetakif.edu.tr)

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## Antropoloji, Arkeoloji ve Sanat Tarihi Profesyonellerinde İskelet Sistemi Sorunları

### Abstract

Anatolia has been settled by numerous civilizations and many excavations uncover the traces of these civilizations. Excavation is a hard labor and some part of this hard work are performed by anthropologists, archaeologists and art historians. This can affect the skeletal systems of the workers after a long period of labor in excavations. In order to see whether physical activity has an effect, a survey was designed. The aim of the study is to reveal the most common skeletal system problems and their reasons in these professionals. A 20-questions-survey was applied to 303 academicians and museum staff who actively attend archaeological and paleontological excavations. The Google Forms application was used to apply the survey and its automatic statistic program yields the descriptive statistics for the research. The results reveal that working in excavation conditions cause effective skeletal system problems, especially in vertebral bones. 208 of 303 participants declare vertebra related problems, whereas 71 of them were diagnosed with herniated disc. These problems are seen in the later ages in the field work and therefore can be related with excavation conditions. Working in relatively short excavation periods and with a low budget, anthropologists, archaeologists and art historians have to overwork in little time. This is the major cause of working in unsuitable body postures. Nevertheless, a new strategy of the Ministry of Culture and Tourism plans to extend the excavations for the whole year with more professional workers to provide a chance to reduce skeletal system problems in anthropologists, archaeologists, art historians.

**Key Words:** Excavation problems, skeletal system problems, hernia, back pain

### Introduction

Anatolia has been settled by numerous different civilizations due to its geographic position. It has been hosting humans for at least 1,2 million years and

### Öz

Anadolu birçok medeniyet tarafından iskân edilmiştir ve birçok kazı bu medeniyetlerin izlerini ortaya çıkarmaktadır. Kazı aktivitesi ağır bir fiziksel iş olup bu ağır işin bir kısmı antropolog, arkeolog ve sanat tarihçileri tarafından gerçekleştirilmektedir. Bu ağır çalışma da, uzun vadede iskelet sistemini etkilemektedir. Bu ağır çalışmanın etkileri olup olmadığını görmek için bir anket düzenlenmiştir. Bu çalışmanın amacı en çok rastlanılan iskelet sistemi sorunlarını ve bunların sebeplerini ortaya koymaktır. Araştırmada, 20 soruluk bir anket, akademisyenler ve müze personelinin oluşmuş ve aktif olarak arkeolojik ve paleontolojik kazılara katılan 303 kişi üzerinde uygulanmıştır. Anket, Google Formlar uygulaması ile gerçekleştirilmiş olup, tanımlayıcı istatistikler bu uygulama tarafından otomatik olarak yapılmıştır. Araştırma, kazı aktivitesinin özellikle omurlarda olmak üzere iskelet sistemi sorunlarına yol açtığını ortaya koymaktadır. 303 katılımcının 208 tanesi omurga ilişkili sorunları olduğunu belirtmiş, bunlardan 71 tanesinde ise fitik olduğu ortaya konulmuştur. Bu sorunların kazı faaliyetlerinin ileriki yıllarında ortaya çıktığı görülmektedir ki bu da kazı faaliyetlerinin bir sonucu olarak ortaya çıkmaları olarak yorumlanabilir. Kısa dönemli ve düşük bütçeli kazılarda, antropolog, arkeolog ve sanat tarihçileri de ağır işler yapmak zorunda kalmaktadırlar. Bu da kısa sürede çok iş yapmayı zorunlu hale getirir. Bu yüzden uygun olmayan vücut pozisyonlarında çalışma da zorunluluk haline gelmektedir ve iskelet sistemi üzerinde sorunlar ortaya çıkmaktadır. Ancak, Kültür ve Turizm Bakanlığının, kazıları daha büyük bütçeler ile bütün yıla yayma planı ile daha çok profesyonel işçi ve alet sağlanabilecek ve böylece antropolog, arkeolog ve sanat tarihçilerinin üzerindeki yük azalacaktır. Bu da iskelet sistemi sorunlarının azalmasını sağlayacaktır.

**Anahtar Sözcükler:** Kazı sorunları, iskelet sistemi sorunları, fitik, bel ağrısı

different parts of it has been populated by different groups.

The traces of these habitations are being unearthed by anthropologists, archaeologists and

art historians with the permissions of the Ministry of Culture and Tourism. In 2018, 431 excavations (153 Ministry-directed excavations, 50 museum-directed excavations, 193 rescue excavations, 31 public investment excavations and 4 underwater excavations) and 129 surface prospections and 6 underwater research were conducted ([kulturvarliklari.gov.tr](http://kulturvarliklari.gov.tr)<sup>1</sup>). This number is increasing gradually. These studies are conducted with the intensive effort of anthropologists, archaeologists and art historians and they are laboring and exhausting activities. Although most of the hard work (especially in high-budget archaeological excavations) are performed by professional workers and, in some cases, construction machines, anthropologists, archaeologists, art historians and students can not totally be aware of these hard activities in the field. Lifting materials, digging in narrow places and in improper body postures, walking long distances and uneven fields during the surface prospections compel the people to force their body limits. Thus, most of these professionals suffer from skeletal problems at different levels.

Even though it is a very common and a well-known problem, no scientific study was conducted on this topic. Therefore, this study was set up to (1) expose the most common skeletal problems, (2) find out the reasons of these problems and (3) try to find possible solutions.

## Materials and Methods

Participants of this study comprise anthropologists, archaeologists and art historians from Turkish universities and museums. The survey of the study was directly sent to academic staff via their e-mail addresses. For the museums, since there is not contact information for each museum staff on the web, the survey was sent to the museums' contact addresses and requested to distribute among their staff. The total number of participants is 303. The detailed information is given in Table 1.

A survey, which consists of 20 questions, was used for the method of the project (Table 2). To perform the surveys, Google Forms application was used ([docs.google.com/forms](https://docs.google.com/forms)<sup>2</sup>). This application is very useful and easy to apply. It also conducts the statistical analyses of the data from the surveys. Since it is aimed to use just descriptive statistics for this research, statistical significance is not presented.

1 <https://kvmgm.ktb.gov.tr/TR-227176/2018-yili-kazi-ve-yuzey-arastirma-faaliyetleri.html> (Last Access: 19.08.19)

2 <https://docs.google.com/forms> (Last Access: 19.08.19)

## Results

After analysing the answers from the survey, the following descriptive statistics are determined: 71 participants have been diagnosed with herniated disc (23,4%). Herniated discs are cervical (13), thoracic (1), lumbar (33) and sacral vertebra (8). 15 participants did not answer this question. Four participants had an operation for herniated disc (6,9%). All of these four operations solved the disc problems (100%). 137 participants have undiagnosed back pains (45,7%). Vertebra problems of 86 participants started after they worked in an excavation for the first time (41,3%). 69 participants have other skeletal system problems than vertebra problems (23,2%), which are straightening of cervical spine (most common with nine cases), scoliosis, meniscal tear, pain in patella and knee area and fractures in long bones. Eight participants had an operation for their problems (11,8%). These problems of the 43 participants started after their first time in an excavation (62,3%).

The level of effect of the problems are following:

0: 44, 1: 9, 2: 16, 3: 22, 4: 17, 5: 39, 6: 24, 7: 23, 8: 23, 9: 8, 10: 5.

Numeric inputs for some questions are discussed in the discussion part.

**Table 1.** Information of the participants

	University	Museum	Total
Anthropologist	31	6	37
Archaeologist	177	39	216
Art Historian	42	8	50
<b>Total</b>	<b>250</b>	<b>53</b>	<b>303</b>

## Discussion

Archaeological and paleontological excavations are mostly carried out under very difficult circumstances by anthropologists, archaeologists, art historians and students regardless of the gender of the individual. In terms of its nature, that is really weary and back-breaking activity.

Albeit most of the hard parts of works, especially in well-financed archaeological excavations, are done by professional workers and construction machines, those researchers can not totally be aware of these facilities in the field.

Lifting and removing materials, digging in narrow places and in improper body postures, walking long distances and uneven fields during the surface prospections urge them to push their bodies to their limits.

Thus, it can cause important skeletal system problems, especially in neck and back area and the findings of this study support that. 208 of

the participants declared back pain and 71 of them has been diagnosed with a herniated disc.

If we look at the effect level of the problems, 120 participants are affected between 5-10 level and thus, it can be concluded that if all the participants had a medical examination, more herniated disc would be diagnosed. Among the herniated discs, most common occurrence was seen on lumbar vertebrates in our participants. Indeed, the literature presents that lumbar area as the most affected region for herniation (Videman *et al.*, 1995; Schroeder *et al.*, 2016; Sarsilmaz *et al.*, 2018). It is known that prevalence of herniated disc is increasing with age and is most commonly seen between ages 30-60 (Cummins *et al.*, 2006; Luchtmann and Firsching, 2016; Kim *et al.*, 2018). The average is 43,6 years for the prevalence of herniated disc in this study and just one individual was under age 30 (29 years old). Disc herniation is the major reason of back pain and it does not just affect working conditions negatively but also daily life. Beside the diagnosed disc herniation for 71 participants, 137 participants declared they had back pain in different levels. Thus, it can be seen that the majority of skeletal system problems show themselves in vertebrates.

41,6% of participants, who suffer from back pain, declared that their pain appeared after they started working in an excavation and the average of their work duration in the excavation is 15,4 years.

This percentage supports the idea that excavation conditions (especially in long periods) cause back pains. Although there are various other factors causing back pain, the main reason is sudden or cumulative mechanical load to vertebrates, which is very common in excavations.

Furthermore, digging activity is usually not performed in the optimal environment for the body. In most cases, one has to work in narrow places or work in inappropriate body postures during the excavations. Since around 75% of back pain can be prevented by protection (Özcan, 2004), it is very important to use the correct anatomical position during the work. Although it is not always possible in field works, the highest effort possible would serve to decrease pain in skeletal system (see Özcan, 2004 for the prevention rules for vertebrate problems).

After the lower back area, the second most common skeletal problems can be seen in the neck area. 13 participants had cervical disc hernia and 9 participants had straightening of cervical spine. This can also be linked with working in the same body position for long periods during the excavations.

Unfortunately, working in relatively short excavation periods and with a low budget,

anthropologists, archaeologists and art historians have to overwork in little time. This is the major cause of working in the wrong body posture.

However, fortunately, the Ministry of Culture and Tourism plan to extend the excavations to whole year with more professional workers. By this way, with a higher budget and relatively less time constraint, excavations will be conducted by professional workers and equipment, and this will enable lightening the work load of anthropologists, archaeologists and art historians, thus reducing the skeletal system problems.

**Table 2.** Questions used in the survey

N	Question	Answer explanation
1	Age	Numeric input
2	Sex	M/F
3	Employment Type	University/Museum
4	Profession	Anthropologist/Archaeologist/Art Historian
5	Total working year(s) in this profession	Numeric input
6	Excavation Type	Archaeological/Paleontological/Both
7	How many years have you been in excavations?	Numeric input
8	Do you have any diagnosed herniated disc?	Yes/No
9	If yes, in which vertebra?	Vertebra type and number
10	Have you ever had an operation for hernia?	Yes/No
11	If yes, when?	Numeric input
12	If you had an operation, was your problem solved after operation?	Yes/No/Partly
13	Do you have any undiagnosed back pain?	Yes/No
14	If yes, did it develop after you started working in excavations?	Yes/No
15	Do you have any skeletal system problems other than vertebra?	Yes/No
16	If yes, please explain	Problem explanation
17	If yes, did it develop after you started working in excavations?	Yes/No
18	Have you ever had an operation for this problem?	Yes/No
19	If yes, when?	Numeric input
20	How do your skeletal system problems affect you in your field work?	0-10 (0: Don't affect - 10: Totally affects my performance)

**Conclusions**

It is seen in the results of this study that working in hard excavation conditions could be harmful to the

skeletal systems of anthropologists, archaeologists and art historians when they work in long periods in the field. To avoid this, more professional workers and equipment should be integrated into the excavations.

On the other hand, if anthropologists, archaeologists and art historians have to perform heavy duties, they should avoid working in the same posture for long periods and lifting heavy equipment.

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