

# Dental Technician Pneumoconiosis Case Report

## Diş Teknisyeni Pnömkonyozu Olgu Sunumu

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### Abstract

In this case report, we wanted to present the diagnostic and treatment process of a patient who was diagnosed with acute appendicitis in the preoperative period, was taken to surgery, and was diagnosed with cecum diverticulitis in the perioperative period. A 36-year-old female patient was admitted to our emergency department with complaints of abdominal pain, nausea, and loss of appetite for 3 days. Abdominal pain started in the lower right abdomen and gradually increased in severity as the day passed. On physical examination, there was defense and rebound localized to the lower right quadrant of the abdomen. In the laboratory, the white blood cell count was within normal limits ( $7.4 \cdot 10^9$  L-1) and the c-reactive protein (CRP) level was 79 mg L-1 (0-5 mg L-1). On abdominal ultrasonography, the diameter of the appendix vermiformis was measured as 8.5 mm, and it was observed that there was increased echogenicity in the fatty tissue around the appendix vermiformis. The patient was taken to emergency surgery. During exploration, the appendix was observed to be oedematous. Additionally, diverticulitis was observed in the anterior wall of the cecum, close to the ileocecal area. Simultaneous appendectomy and diverticulectomy were performed. The patient was discharged without complications on the 4th postoperative day.

### Keywords

Appendicitis, Colonic diverticulitis, Operative procedure

### Özet

Bu olgu sunumunda ameliyat öncesi dönemde akut apandisit tanısı konularak ameliyata alınan ve perioperatif dönemde çekum divertikülü tanısı konulan bir hastanın tanı ve tedavi sürecini sunmak istedik. 36 yaşında kadın hasta, 3 gündür devam eden karın ağrısı, bulantı, iştahsızlık şikayetiyle acil servisimize başvurdu. Karın ağrısı sağ alt karın bölgesinde başladı ve gün geçtikçe şiddeti giderek arttı. Fizik muayenesinde batın sağ alt kadranda lokalize defans ve rebound mevcuttu. Laboratuvarda beyaz küre sayısı normal sınırlarda ( $7.4 \cdot 10^9$  L-1), C-reaktif protein (CRP) düzeyi 79 mg L-1 (0-5 mg L-1) idi. Batın ultrasonografisinde apendiks vermiformis çapı 8,5 mm olarak ölçüldü ve apendiks vermiformis çevresindeki yağ dokusunda ekojenitenin arttığı gözlemlendi. Hasta acil ameliyata alındı. Eksplozasyon sırasında apendiks ödemli olduğu görüldü. Ayrıca çekum ön duvarında ileoçekal bölgeye yakın divertikül gözlemlendi. Eş zamanlı apendektomi ve divertiküektomi yapıldı. Hasta ameliyat sonrası 4. günde komplikasyonsuz olarak taburcu edildi.

### Anahtar

### Kelimeler

Apandisit, Kolon divertikülü, Ameliyat prosedürü

## INTRODUCTION

Occupational disease is a temporary or permanent illness, physical or mental disability suffered by the insured due to a recurring reason due to the nature of the job he/she works or performs or due to the conditions of work (1,2). They show a specific or strong relationship with the profession. Its incidence is higher in people working in the same profession, and it shows occupational clustering (2).

Pneumoconiosis is one of the occupational diseases that occurs as a result of dust accumulation in the lungs (such as silica, coal dust, asbestos) and tissue reaction to these dusts. Pneumoconiosis is an incurable disease. The disease may be clinically asymptomatic, or respiratory function losses may occur. This situation is affected by factors such as the type and amount of dust exposed, the duration of exposure, and the person's characteristics (genetic and immunological characteristics, smoking). It is not possible to predict when it will happen in which clinic (3).

Dental laboratory technicians are professionally exposed to a wide variety of chemicals, dust and noise, ergonomic risks and psychosocial risks (4). In the production of prosthesis, it may be exposed to substances such as plaster, wax, resin, ceramic, chrome, cobalt, silica, nickel, methyl mercaptyl and beryllium (5).

In prosthesis construction, cobalt-chromium and molybdenum alloys are used to create metal structures and refractory materials are used to make metal skeletal molds. Refractory materials consist of quartz, one of the most common forms of crystalline silica found in nature. It is exposed through inhalation to mixed mineral dusts containing respirable crystalline silica particles and metals produced during production processes (6).

The interstitial lung disease caused by these mixed dusts is called "dental technician pneumoconiosis". To prevent pneumoconiosis in dental technicians, effective measures should be provided to prevent the employee from being exposed to dust (7).

## CASE REPORT

A 39-year-old male patient, who had been suffering from shortness of breath and dry cough on exertion for the last few months, was admitted to the chest diseases outpatient clinic. Since he was a dental technician by profession, he was referred to the occupational diseases clinic.

Occupational history was asked. He has been working as a dental technician in dental laboratories of different companies for about 19 years. Although he may have been exposed to intense dust in the years started working, his

exposure to dust has decreased significantly with general and local ventilation systems. He was using appropriate personal protective equipment. He was last working in the metal leveling department at his workplace. He has a 15-pack-year history of smoking and continues to smoke.

In the physical examination of the patient, who had no additional complaints, respiratory system and other system examinations were normal. In the Posterior Anterior Lung (PA AC) Radiograph, millimetric nodular density increase was observed in all zones bilaterally (**Figure 1a**).

Respiratory Function Test (PFT): Fev1: 3.61 lt (98%)Fvc: 4.81 lt (108%) Fev1/Fvc:75% was observed (**Figure 1b**)



Figure 1a. PA AC Graph

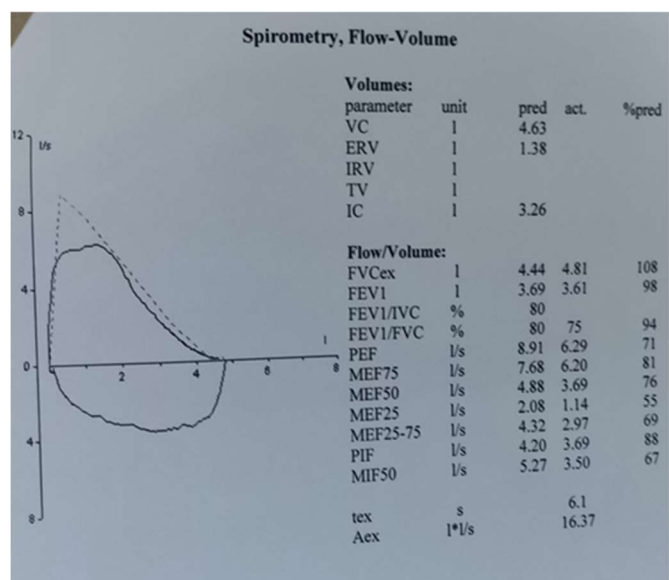


Figure 1b. SFT

In the requested High Resolution Computerized Tomography (HRCT), a widespread peribronchovascular micronodular infiltration image was observed in all lobes and segments of both lungs (Figure 2a). The recorded images of the case, taken in previous years, were examined. Thorax Computed Tomography (CT) with a slice thickness of 5 mm taken at the emergency clinic admission 3 years ago showed widespread micronodular density in all lobes of both lungs (Figure 2b).

Although there may be differences in the images due to HRCT and Thorax CT shooting techniques, the findings taken 3 years apart were similar to each other.

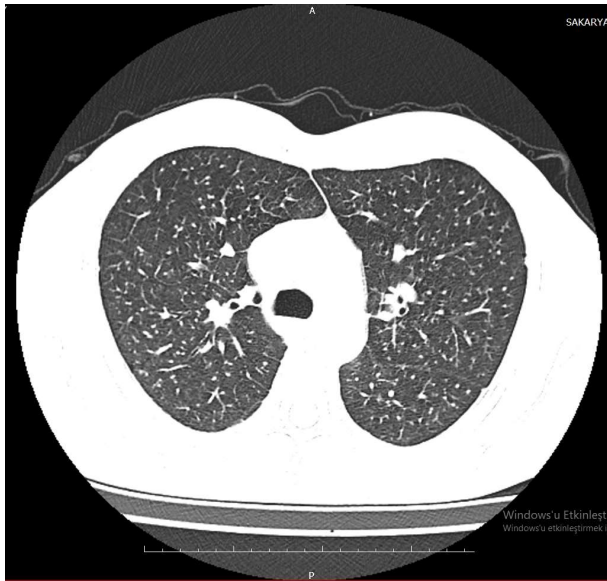


Figure 2a. HRCT



Figure 2b. Thorax CT

PA AC Radiography ILO((International Labor Organization) Pneumoconiosis evaluation was evaluated by a pneumoconiosis reader (physician trained in ILO

International Pneumoconiosis Classification). ILO Pneumoconiosis was evaluated as p/p 2/1. When the clinical and imaging examinations of the case were evaluated with the occupational history, the dental Technician pneumoconiosis was considered.

He stated that the subject did not have periodic examinations at the workplace. The case was referred from the SSI (Social Security Institution) institution for occupational disease and was evaluated at the health board. It was evaluated by other branches of the health board and no additional diseases or pathological findings were observed. He was advised to quit smoking and stay away from all kinds of air pollutants.

Unfortunately, although we do not know whether they have periodic inspections or whether the necessary precautions have been taken to minimize exposure to dust in the workplace and below the legal limit, the SSI institution will learn as a result of the necessary examinations and ensure that the necessary measures are taken.

## DISCUSSION

A wide range of materials and construction techniques are used in the construction of dental prostheses. It is because of this diversity that; Dental laboratory technicians are also exposed to a wide variety of chemicals, dust and noise professionally (4). Additionally, they may be exposed to ergonomic and psychosocial risks due to the conditions of work (2).

In dental prosthesis laboratories, there are stages of making prosthesis such as taking a plaster model, wax modelling, melting and sandblasting metals, and adjusting the metal to the model by leveling (8).

It contains chromium, cobalt nickel and small amounts of molybdenum and iron in dentures. Co-Cr alloys; While it is used in the construction of skeletal prostheses, Ni-Cr alloys are used in the construction of fixed prostheses. The most commonly used silica-containing materials in dental prosthesis laboratories are dental porcelains, leveling and polishing materials and investments (4).

During model making, porcelain making, casting, acrylic, leveling and polishing processes in laboratories, harmful substances such as metal, silica and acrylic dust mix with the ambient air. Workers are exposed to substances such as plaster, wax, resin, ceramics, chrome, cobalt, silica, nickel, methyl mercaptyl and beryllium, as well as silica dust (8).

Dental technicians are exposed to a very complex dust mixture due to the procedures they perform, and the interstitial lung disease caused by these substances is called "dental technician pneumoconiosis" (7).

Diagnosis of pneumoconiosis; It is made by occupational history compatible with the development of pneumoconiosis, radiological appearance compatible with pneumoconiosis, and the absence of any other disease that would explain the current radiological appearance in the differential diagnosis.

Pneumoconioses are preventable lung diseases. In cases where it cannot be prevented by engineering methods; With early diagnosis, exposure should be terminated and progression halted. The most appropriate method for early diagnosis is "Lung radiography". The ILO classification aims to create a common international language for pneumoconiosis findings by coding radiographic abnormalities with letters and numbers. Lung radiography is applied not only in employment examinations but also in periodic examinations (3).

HRCT is used because standard chest radiographs have low sensitivity in the diagnosis of pneumoconiosis and the difference in evaluation between readers is high and it shows parenchymal findings more clearly (3,9).

The routine protocol of HRCT is to take images from the lung apex to the costophrenic sinuses, one cm apart and 1-2 mm thick, in deep inspiration and in the prone position. Additionally, by reducing the number of slices and using lower beam doses, radiation dose can be reduced without decreasing resolution (10).

Differences in the prevalence of pneumoconiosis among dental technicians, differences in working hours, proportion of smokers, differences in working conditions of individuals, whether they work freelance or as members of a large company, use of beryllium, etc. It is caused by many factors such as (11).

Cases of dental technician pneumoconiosis have been reported from abroad and in our country (7, 11-13).

Technicians are at serious risk for occupational respiratory diseases, so primary prevention rules are essential for these workplaces (11). For protection, a working environment should be provided in dental laboratories where all contact with the materials used can be prevented (7).

Factors that cause disease in the workplace environment should be identified and eliminated from the environment with appropriate measures, or if it cannot be completely eliminated, they should be kept under control to prevent them from being affected by stopping contact with employees. The employer must work to improve the current situation, monitor and inspect whether occupational health and safety measures taken in the workplace are followed, and pay attention to eliminating non-conformities.

Employees must fulfill their responsibilities regarding occupational health and safety (14).

## CONCLUSION

Occupational diseases are preventable diseases and reporting is mandatory. Detection of occupational disease is of great importance. No matter which polyclinic one applies to, his/her occupational history should be asked and when there is a suspicion of occupational disease, one should definitely be directed to the occupational diseases clinic. When we look at the retrospective examinations of our case, we see that there are similar findings in the thorax CT images of the emergency clinic application 3 years ago. The occupational history of the patient may not have been taken because emergency clinics were busy. For this reason, we recommend that when registering your first patient, your profession should be recorded as well as your identity, address and telephone information and that this should be taken into consideration.

## Ethical Declarations

Written informed consent was obtained from the individual for the publication of any potentially identifiable images or data included in this article.

## Conflict of Interest Statement:

No conflict of interest was declared by the author.

## Financial Disclosure:

No financial disclosure was declared by the author.

## Author Contribution

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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