LAMPIRAN

Lampiran 1 Rangkuman Singkat Jurnal

No	Penulis Jurnal	Jenis Penyakit/Gangguan Kesehatan	APD yang Direkomendasikan	Sumber Data Base
1	Titiek Berniyanti et al. (2018)	Mutasi genetik (ekspresi TP53), stres oksidatif, potensi kanker	Masker respirator N95/HEPA, sarung tangan, jas laboratorium tertutup	Google Scholar
2	Ergün D. et al. (2016)	Pneumokoniosis, penurunan fungsi paru-paru	Masker N95, ventilasi lokal, kacamata pelindung	**PubMed, Scopus,** atau **ScienceDirect**
3	Jiaxin Ding et al. (2023)	Fibrosis paru, inflamasi paru kronis	Masker HEPA, ventilasi lokal (LEV), pembersih udara	**ScienceDirect, PubMed**
4	Puspa Dila Rohmaniar (2023)	Peningkatan kadar P53, stres oksidatif, risiko kerusakan genetik	Masker N95, exhaust fan, APD lengkap (jas, sarung tangan, kacamata)	Google Scholar
5	Tiraboschi M.M. et al. (2021)	Lesi paru awal, pneumokoniosis subklinis	Masker partikulat, skrining kesehatan rutin, ventilasi lokal	**PubMed, Scopus**
6	Luigi Di Lorenzo et al. (2022)	Pneumokoniosis campuran, fibrosis paru kronis	Masker N95/P100, jas laboratorium, ventilasi area kerja	**PubMed, ScienceDirect**
7	Okamoto M. et al. (2017)	Fibrosis interstisial akibat logam indium, penurunan	Masker respirator khusus logam berat, sistem ventilasi	**PubMed,Scopus**

		fungsi paru	efektif	
8	Nur Şafak Alici et al. (2018)	Gangguan pernapasan, iritasi kulit dan mata, alergi	Masker pelindung, kacamata pelindung, sarung tangan, jas kerja	**PubMed, ScienceDirect,** atau **Google Scholar**
9	Gündüzöz M. et al. (2017)	Pneumokoniosis campuran, dermatitis kontak, efek neurotoksik	Masker HEPA, sarung tangan, jas pelindung, ventilasi ruangan	**PubMed, Google Scholar**
10	Puspa Dila Rohmaniar et al. (2016)	Peningkatan kadar logam darah, peningkatan P53, risiko mutasi genetik	Masker N95, sarung tangan, ventilasi lokal, skrining biomarker genetik	**Google Scholar**

Lampiran 2 Jurnal Penelitian Titiek Berniyanti et al.

Analysis of TP53 Mutants Due to Chromium Metal Exposure on Dental Technicians at Surabaya Laboratory

Indira Laraspputri[1], Titiek Berniyanti[2]*, Indeswati Diyatri[3]

1. Master Program Student, Faculty of Dental Medicine, University of Airlangga, Surabaya, Indonesia.
2. Department of Dental Public Health, Faculty of Dental Medicine, University of Airlangga, Surabaya, Indonesia.
3. Department of Oral Biology, Faculty of Dental Medicine, University of Airlangga, Surabaya, Indonesia.

Abstract

Dental technicians used chromium in base alloys to produced dental prostheses. In the process of manufacturing, metal dust could be absorbed to the body through inhalation, skin and digestion. Chromium could increase Reactive Oxygen Species (ROS) formation which triggered mutations in the P53 gene and increased expression of Tumor Protein p53 (TP53) mutant level. This study was conducted to look at the relationship between chromium metal exposures to TP53 mutant levels in dental technicians in Surabaya Laboratory.

Cross-sectional study was performed on 40 dental technicians and 30 controls after ethical clearance. Blood sampling was conducted for the examination of chromium by *Atomic Absorbance Spectrophotometry* (AAS) and examination of TP53 mutant by ELISA method.

The chromium metal concentration (367.98±141.30) and TP53 mutant level (0.69±0.2) in dental technician's blood samples were higher value than controls (0.09±0.17 and 0.54±0.16). There was significant difference result between dental technicians to controls P=0.000 (P<0.05). Spearman test showed a positive correlation between chromium and TP53 mutant levels P=0.000 and r= 0.41 (P<0.05).

Chromium metal plays a role increasing the level of TP53 mutant in dental technicians at the Surabaya Laboratory

Clinical article (J Int Dent Med Res 2018; 11(3): 950-954)

Keywords: Chromium, TTP53 protein, Reactive Oxygen species, Oxidative stress.

Received date: 15 March 2018 **Accept date:** 12 May 2018

*Corresponding author:
Titiek Berniyanti
Department of Dental Public Health (Environmental Health),
Faculty of Dental Medicine,
University of Airlangga
Surabaya, Indonesia.
E-mail: berniyanti@gmail.com

Introduction

Chromium (Cr) was used as a mixture with other metals in both base alloys, Ni-Cr and Co-Cr alloys, which were popularly used by dental technicians to create partial removable dentures, porcelain fused to metals and bridges.[1] Base alloys were chosen to replace gold alloys type (IV) because of the cheaper cost.[2,3] In the process of prosthesis manufacturing, dental technicians were particularly vulnerable to exposure of residual metal alloy dust or smoke.[4] Hariyani et al. (2015) had stated before that the chromium metal level of the dental technicians in Surabaya was 117 µg/L with an average control value of 0,06 µg/L. The high level of the chromium was motivated by the lack of selfprotection equipment used by dental technician that metal particles could be absorbed into the body.[5] This exposure could impair health status because of absorbed dust through inhalation, skin, and digestion.[6,7]

Metal dust or smoke induced respiratory and skin diseases in the form of pneumoconiosis, asthma, contact dermatitis, and also cancers.[8,9] Chromium exposure in some epidemiological studies was associated with the incidence of lung cancer.[8,11]

Lampiran 3 Jurnal Penelitian Ergün D. et al.

ORIGINAL PAPER

International Journal of Occupational Medicine and Environmental Health 2014;27(5):785 – 796
http://dx.doi.org/10.2478/s13382-014-0301-9

PNEUMOCONIOSIS AND RESPIRATORY PROBLEMS IN DENTAL LABORATORY TECHNICIANS: ANALYSIS OF 893 DENTAL TECHNICIANS

DILEK ERGÜN[1], RECAI ERGÜN[2], CENGIZ ÖZDEMIR[2], TÜRKAN NADIR ÖZIŞ[1], HINÇ YILMAZ[4], and İBRAHIM AKKURT[5]

[1] Ankara Occupational Diseases Hospital, Ankara, Turkey

Department of Chest Diseases

[2] Ministry of Health of the Republic of Turkey Training and Research Hospital, Ankara, TurkeyChest Diseases Clinic

[3] Istanbul Yedikule Chest Diseases and Chest Surgery Training and Research Hospital, Istanbul, Turkey Chest Diseases Clinic

[4] Ankara Occupational Diseases Hospital, Ankara, Turkey

Department of Toxicology

[5] Akay Hospital, Ankara, Turkey

Chest Diseases Clinic

Abstract

Objectives: To explore the rate of pneumoconiosis in dental technicians (DTP) and to evaluate the risk factors. **Material and Methods:** Data of 893 dental technicians, who were admitted to our hospital in the period January 2007–May 2012, from 170 dental laboratories were retrospectively examined. Demographic data, respiratory symptoms, smoking status, work duration, working fields, exposure to sandblasting, physical examination findings, chest radiographs, pulmonary function tests and high-resolution computed tomography results were evaluated. **Results:** Dental technicians' pneumoconiosis rate was 10.1% among 893 cases. The disease was more common among males and in those exposed to sandblasting who had 77-fold higher risk of DTP. The highest profusion subcategory was 3/+ (according to the International Labour Organization (ILO) 2011 standards) and the large opacity rate was 13.3%. **Conclusions:** To the best of our knowledge, it was the largest DTP case series ($N = 893/90$) in the literature in English. Health screenings should be performed regularly for the early diagnosis of pneumoconiosis, which is an important occupational disease for dental technicians.

Key words:

Lampiran 4 Jurnal Penelitian Jiaxin Ding et al.

Clinical Oral Investigations (2023) 27:1815–1829
https://doi.org/10.1007/s00784-023-04910-w[1]

REVIEW

Characterization of dental dust particles and their pathogenicity to respiratory system: a narrative review

Jiaxin Ding[2] · Junxuan Li[1] · Junnan Qi[1] · Li Fu[3]

Received: 18 September 2022 / Accepted: 3 February 2023 / Published online: 11 February 2023

Abstract

Objectives Dental professionals are exposed to large amounts of dust particles during routine treatment and denture processing. This article provides a narrative review to investigate the most prevalent dust-related respiratory diseases among dental professionals and to discuss the effects of dental dust on human respiratory health.

Materials and methods A literature search was performed in PubMed/Medline, Web of Science, and Embase for articles published between 1990 and 2022. Any articles on the occupational respiratory health effects of dental dust were included.

Results The characterization and toxicity evaluation of dental dust show a correlation between dust exposure and respiratory system injury, and the possible pathogenic mechanism of dust is to cause lung injury and abnormal repair processes. The combination use of personal protective equipment and particle removal devices can effectively reduce the adverse health effects of dust exposure.

Conclusions Dental dust should be considered an additional occupational hazard in dental practice. However, clinical data and scientific evidence on this topic are still scarce. Further research is required to quantify dust in the dental work environment and clarify its pathogenicity and potential toxicological pathways. Nonetheless, the prevention of dust exposure should become a consensus among dental practitioners.

Clinical relevance This review provides dental practitioners with a comprehensive understanding and preventive advice on respiratory health problems associated with dust exposure.

Keywords Dust · Dental staff · Respiratory tract diseases · Occupational exposure · Protective devices

Introduction

Dental professionals are constantly exposed to a variety of specific occupational hazards, including percutaneous exposure incidents (PEI), musculoskeletal disorders (MSD), contagious diseases, radiation, toxic effects associated with dental materials, respiratory diseases, and psychological problems [1]. The risk of bacterial and viral infections among dental personnel has been the focus of relevant research, especially during the coronavirus disease 2019 (COVID-19) outbreak [2, 3], and related guidelines have been developed to prevent occupational exposure [3]. However, dental dust, as a pervasive and potential health risk, has not attracted widespread attention.

Dust exposure is a well-known hazard to occupational health in industrial production. Pneumoconiosis, chronic bronchitis, emphysema, dust-related diffuse pulmonary fibrosis [4, 5], systemic connective tissue disease [6, 7], and even renal dysfunction [4, 5] have been linked to dust inhalation. In the daily dental work environment, we frequently observe visible dust particles floating around as dental materials and prostheses are being ground. Although numerous efforts have been made to improve the working environment, this phenomenon persists (Fig. 1). This inevitably raises concerns about the detrimental effects of dental dust particles on practitioners' health.

The Centers for Disease Control and Prevention (CDC) previously issued a report on a group of dental professionals,

[1] Li Fu fuli1127@jlu.edu.cn

[2] Hospital of Stomatology, Jilin University, Changchun, China

[3] Department of Oral Implantology, Hospital of Stomatology, Jilin University, 1500 Qinghua Road, Chaoyang District, Changchun 130021, China

Lampiran 5 Jurnal Penelitian Puspa Dila Rohmaniar

Dental Journal
(Majalah Kedokteran Gigi)
2017 March; 50(1): 19–22 Research Report

The correlation between the use of personal protective equipment and level wild-type p53 of dental technicians in Surabaya

Puspa Dila Rohmaniar,[1] Titiek Berniyanti,[2] and **Retno Pudji Rahayu[3]**
[1]Department of Dental Public Health, Faculty of Dentistry, Institut Ilmu Kesehatan Bhakti Wiyata, Kediri - Indonesia
[2]Department of Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga, Surabaya – Indonesia
[3]Department of Oral Pathology and Maxillofacial, Faculty of Dental Medicine, Universitas Airlangga, Surabaya - Indonesia

abstract

Background: *Exposure of metals among dental technicians that come from the working environment can lead to the formation reactive oxygen species (ROS). ROS can cause mutations in the p53 gene (p53). The mutation is transversion mutation GuanineThymine. p53 mutations can lead to low expression of the wild-type p53 protein (p53). Wild-type p53 involved in many biological processes such as regulation of genes involved in cell cycle, cell growth after DNA damage, and apoptosis. However, exposure to metals among dental technicians can be prevented through the use of personal protective equipment (PPE) during work.* **Purpose:** *The purpose of this study was to analyze the correlation between the use of personal protective equipment to wild-type p53 protein levels among dental technicians in Surabaya.* **Method:** *This study was observational analytic with cross sectional approach. 40 samples were taken by random sampling. Data were retrieved through interviews and observations. Wild-type p53 was analyzed from saliva with indirect ELISA method. Analysis of data used Kolmogorov Smirnov normality test and a Pearson correlation test. Value significance was p<0.05 (95% confidence level).* **Result:** *There was a significant association between the use of personal protective equipment with wild-type p53 levels with p=0.002* **Conclusion:** *The use PPE properly is positively correlated with the wild-type p53 protein levels of dental technicians in Surabaya.*

Keywords: *personal protective equipment; dental technician; P53 wild*

Correspondence: Titiek Berniyanti, Department of Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga. Jl. Mayjend. Prof. Dr. Moestopo no. 47 Surabaya 60132, Indonesia. E-mail: berniyanti@gmail.com

introduction

Dental technician should be exposed to various physical agents, chemical, and biological derived from the work environment. That exposure by inhalation, ingestion or skin contact.[1] Exposure of dust or smoke to the dental technician are coming from grinding of dental restoration materials during processing.[2] There is a study that reported high concentrations of cobalt metal, nickel, chromium in blood of dental technicians in Surabaya, such as: levels of cobalt: 27 g/ L, nickel 37 g/ L, and chromium 117 mcg/ L.[3] Other research in northern Jordan also reported high levels of cobalt and chromium in blood of dental technicians. [2] Exposure may result in potential lung diseases such as bronchial asthma, cancer, mesothelioma and pneumoconiosis depends on the duration of exposure.[4] The prevalences of contact dermatitis among dental technicians are 22% in Australia and 43% in Denmark.[5] The prevalence of pnumoconis among dental technicians in Ankara is 10.1% and the prevalence of dermatitis kontakta of the dental technicians in Germany is 16%.[4]

It is important for dental technicians to obey the standards and safety procedures. Dental technicians must wear personal protective equipment (PPE) including work wear, protective mask, protective gloves and goggles, and ventilate the workplace. If ventilation, exhauster, adequate and adequately filter will reduce the level of chromium, cobalt, and nickel in the air.[1]

Genotoxic metal exposure may increase the number of reactive oxygen species (ROS). The metal ions of chromium, cobalt, and nickel can produce hydroxyl radicals
(OH) through the Fenton and Haber-Weis reaction. The

Dental Journal (Majalah Kedokteran Gigi) p-ISSN: 1978-3728; e-ISSN: 2442-9740. Accredited No. 56/DIKTI/Kep./2012. Available at http://e-journal.unair.ac.id/index.php/MKG
DOI: 10.20473/j.djmkg.v50.i1.p19-22

Lampiran 6 Jurnal Penelitian Tiraboschi M.M. et al.

Tiraboschi *et al. BMC Pulm Med (2021) 21:352*
https://doi.org/10.1186/s12890-021-01721-1

BMC Pulmonary Medicine

CASE REPORT Open Access

Early signs of pneumoconiosis in a dental technician in Italy: a case report

Mara Maria Tiraboschi[1], Emma Sala[2], Matteo Ferroni[3,4], Andrea Tironi[5], Andrea Borghesi[6], Maria Enrica Gilberti[2], Paolo Ceruti[7], Emanuele Sansone[1] and Giuseppe De Palma[1,2*]

Abstract

Background: Dental technicians are at high risk of pneumoconiosis, usually driven by inhalation of mixed dusts, including metals. An etiological diagnosis is not easy to be performed, particularly in advanced stages.

Case presentation: We describe the case of an early pneumoconiosis occurring in a 47-year-old dental technician who developed respiratory symptoms shortly after beginning work. She described the work environment as dusty and lacking relevant primary prevention tools. A chest CT showed multiple peripheral pseudonodular lesions in both lower lobes; bronchoalveolar lavage and bronchial aspirate evidenced numerous macrophages with reflective metal bodies included into the cytoplasm, that at scanning electron microscopy coupled to Energy Dispersive X-Ray Analysis resulted Zirconium and Aluminum, whereas Tungsten (W) was localized outside cells. End of shift urinary concentrations of W were substantially raised as compared to pre-shift (1.1 vs. 0.2 µg/L).

Conclusions: We concluded for diagnosis of early work-related pneumoconiosis due to abnormal occupational exposure to metals. The case demonstrates the need also for dental professionals to comply with industrial hygiene standards and to be monitored by occupational health physicians.

Keywords: Dental technician, Metals, Pneumoconiosis, Occupational disease, Case report

Background

Dental technicians are exposed to pneumotoxic elements, including crystalline silica and hard metal alloys that can lead to pneumoconiosis [1–4]. Recently, a cluster of 9 cases of idiopathic pulmonary fibrosis (IPF) among dentists and other dental professionals has been reported [5]. An etiological diagnosis is not easy to be performed, particularly if formulated at an advanced stage. We describe an early pneumoconiosis occurring in a dental technician who developed early respiratory symptoms shortly after beginning work.

*Correspondence: giuseppe.depalma@unibs.it
[1] Department of Medical and Surgical Specialties, Radiological Sciences, and Public Health, Unit of Occupational Health and Industrial Hygiene, University of Brescia, Brescia, Italy
Full list of author information is available at the end of the article

Case presentation

On 27th July 2020, a 47-year-old woman, working as a ceramic dental technician since November 2018, required a medical examination at our Occupational Health Dept., as in the previous months she was affected by dry and irritating cough, especially related to intense work activity. She also suffered some episodes of low-grade fever and fatigue and dyspnea on efforts. In March 2020, chest CT showed lung nodules characterized by net margins and oval shape, in peripheral or subpleural site, especially in the inferior lobes. The biggest nodule, 9 mm, with polygonal shape, was in the anterior basal segment of the righ inferior lobe (Fig.1).

Pulmonary function tests were in the normality range and revealed a normal diffusing capacity, albeit at the lower limits of the normal (DLCO/VA 73%); autoimmunity markers were in the normal range. Then, she underwent fibro-bronchoscopy with bronchoalveolar lavage

Lampiran 7 Jurnal Penelitian Luigi Di Lorenzo et al.

Di Lorenzo *et al. BMC Pulmonary Medicine* (2022) 22:161
https://doi.org/10.1186/s12890-022-01948-6

BMC Pulmonary Medicine

CASE REPORT Open Access

Mixed-dust pneumoconiosis in a dental technician: a multidisciplinary diagnosis case report

Luigi Di Lorenzo[1*†], Francesco Inchingolo[1*†], Antonella Pipoli[1†], Filippo Cassano[1], Maria Elena Maggiore[1], Angelo Michele Inchingolo[1], Sabino Ceci[1], Assunta Patano[1], Giuseppina Malcangi[1], Antonio Mancini[1], Giosi Longo[2], Rossella Attimonelli[2], Eugenio Maiorano[3], Rocco Laviano[4], Nicola Mariano Manghisi[5], Antonio Scarano[6*], Felice Lorusso[6*], Antonio Di Lorenzo[7†], Alessio Danilo Inchingolo[1†] and Gianna Dipalma[1†]

Abstract

Background: In dental laboratories, exposure to crystalline silica can occur during procedures that generate suspended mineral dusts, e.g. dispersion of mixing powders, removal of castings from molds grinding, polishing of castings and porcelain, and use of silica sand for blasting. There is also a large list of toxic agents (acrylic resins, polymeric materials, etc.) used to produce removable and fixed prostheses, but also impression materials and more. Using personal protective equipment and other aids reduces the exposure to these potentially harmful agents.

Case presentation: We report the case of a 42-year-old male dental technician who began to suffer from a dry cough and exertional dyspnea after approximately 15 years of work. The operations he conducted for his job resulted in the generation of crystalline silica, aluminum, chromium and titanium dust. The worker did not regularly wear personal protective equipment and some of the above operations were not carried out in closed circuit systems. The Chest X-ray showed diffused micronodules in the pulmonary interstitium of the upper-middle lobes, bilaterally, and a modest left basal pleural effusion. Simple spirometry showed small airway obstruction in its initial stage. High Resolution Computerized Tomography of the chest showed bilateral micronodulation of a miliariform type, with greater profusion to the upper lobes, also present in the visceral pleura, bilaterally. Histological examination showed aggregates of pigment-laden macrophages forming perivascular macules or arranged in a radial pattern around a core of sclerohyalinosis. Scanning Electron Microscopy and Energy Dispersive Spectrometry revealed several mineral particles, typically characterized by the presence of crystalline silica and metal aggregates. The environmental concentrations of total dust and its respirable fraction were all lower than the relative TLV-TWA—ACGIH, yet not negligible.

*Correspondence: luigi.dilorenzo@uniba.it; francesco.inchingolo@uniba.it; ascarano@unich.it; drlorussofelice@gmail.com
†Luigi Di Lorenzo, Francesco Inchingolo and Antonella Pipoli have contributed equally to this work as co-first authors
†Antonio Di Lorenzo, Alessio Danilo Inchingolo, Gianna Dipalma have contributed equally to this work as co-last authors
[1] Department of Interdisciplinary Medicine, University of Medicine Aldo Moro, 70124 Bari, Italy
[6] Department of Innovative Technologies in Medicine and Dentistry, University of Chieti-Pescara, 66100 Chieti, Italy
Full list of author information is available at the end of the article

Lampiran 8 Jurnal Penelitian Okamoto M. et al.

Internal Medicine
The Japanese Society of Internal Medicine
doi: 10.2169/internalmedicine.8860-17
Intern Med 56: 3323-3326, 2017
http://internmed.jp

[CASE REPORT]

Dental Technicians' Pneumoconiosis

Masaki Okamoto[1], Masaki Tominaga[1], Shigeki Shimizu[2], Chiyo Yano[1], Ken Masuda[1], Masayuki Nakamura[1], Yoshiaki Zaizen[1], Takashi Nouno[1], Satoshi Sakamoto[1], Mitsuru Yokoyama[3], Tomotaka Kawayama[1] and Tomoaki Hoshino[1]

Abstract:
A 40-year-old female dental technician visited our hospital for the investigation of a chest X-ray abnormality. Chest computed tomography demonstrated centrilobular nodules and lung volume reduction, and her serum KL-6 level was elevated. A histological analysis of the specimens obtained on a surgical lung biopsy showed peribronchiolar fibrosis with pigmented macrophages and cholesterol clefts. An energy-dispersive X-ray analysis showed that these lung tissues contained some metals, including indium. The serum indium level was also elevated. We diagnosed this patient with pneumoconiosis caused by exposure to sandblasting certain dental metals. This is the first reported case of pneumoconiosis in a dental technician associated with exposure to indium.

Key words: dental technician, pneumoconiosis, indium

(Intern Med 56: 3323-3326, 2017)
(DOI: 10.2169/internalmedicine.8860-17)

Introduction

Pneumoconiosis is a fibrotic pulmonary disease caused by the accumulation of inhaled particles in the lungs. It is an important occupational disease because it leads to chronic respiratory failure with a high risk of complicating tuberculosis and lung cancer (1). Dental technicians are exposed to various airborne particles because their work includes the sandblasting of dental metals. Therefore, their working conditions carry a risk of pneumoconiosis (2-14). Indium is a rare element included in indium-tin oxide (ITO), a material in flat-panel displays or plasma display panels for television screens, and has been reported as a risk factor for occupational lung disease (15-19). We herein report for the first time a case of pneumoconiosis in a dental technician associated with exposure to dental metals including indium.

Case Report

A 40-year-old woman visited our hospital in October 2015 because of an abnormality on a chest X-ray film taken during a health checkup. She had no symptoms, such as coughing or shortness of breath. She had never smoked and had no history of respiratory disease. She had worked as a dental technician since 20 years of age and had been engaged in the sandblasting of dental metals for 20 years. She had no occupational history of exposure except as a dental technician.

Her vital signs on admission were as follows: respiratory rate, 20/min; heart rate, 84/min; blood pressure, 91/50 mmHg; and body temperature, 36.3°C. A physical examination and blood hematology gave normal results. She had no fine crackles or clubbed fingers. Hematology and laboratory examinations revealed elevation of the erythrocyte sedimentation rate (ESR 40 mm/h) and the serum levels of lactate dehydrogenase (LDH 302 IU/L) and KL-6 (1,797 IU/mL) as biomarkers of interstitial lung disease (ILD). Diagnostic biomarkers of connective tissue diseases, such as rheumatoid factor and antinuclear antibody, were negative. An arterial blood gas analysis indicated no abnormalities, such as hypoxemia or hypercapnia (PaO_2 95.4 Torr, $PaCO_2$ 38.4 Torr).

[1]Division of Respirology, Neurology and Rheumatology, Department of Internal Medicine, Kurume University School of Medicine, Japan, [2]Department of Pathology, Kindai University Faculty of Medicine, Japan and [3]Shared-Use Research Center, University of Occupational and Environmental Health, Japan
Received: January 13, 2017; Accepted: March 27, 2017; Advance Publication by J-STAGE: October 11, 2017
Correspondence to Dr. Masaki Okamoto, okamoto_masaki@med.kurume-u.ac.jp

Lampiran 9 Jurnal Penelitian Nur Şafak Alici et al.

Original Article

Dental Technicians' Pneumoconiosis; Illness Behind a Healthy Smile – Case Series of a Reference Center in Turkey

Nur Şafak Alici, Ayşe Coşkun Beyan, Yücel Demıral, Arif Çimrin
Department of Occupational Medicine, Faculty of Medicine, Dokuz Eylul University, İzmir, Turkey

Abstract

Background: Dental laboratories include many hazards and risks. Dental technicians working in an unfavorable work environment in Turkey and other parts of the world may develop pneumoconiosis as a result of exposure to dust, depending on exposure time. In this study, we aimed to investigate the clinical and laboratory findings of dental technicians. **Materials and Methods:** The study consists of a case series. Between 2013 and 2016, a total of 70 who were working as a dental technician and referred to our clinic with suspicion of occupational disease were evaluated. Comprehensive work-history, physical examination complaints, functional status, chest X-ray, and high-resolution computed lung tomography (HRCT) findings were evaluated. **Results:** In all, 46 (65.7%) of the 70 dental technicians were diagnosed with pneumoconiosis. About 45 (97.8%) subjects were male and 1 (2.2%) was female. The mean age of starting to work was 15.89 ± 2.79 (11-23) years. The mix dust exposure time was 176.13 ± 73.97 (18-384) months. Small round opacities were most common finding. In 16 patients, high profusion being 2/3 and above were identified, and large opacity was detected in 11 patients. The radiological profusion had a weak negative correlation with FEV 1 and FVC (correlation coefficient – 0.18, $P = 0.210$ and – 0.058, $P = 0704$) and moderate negative correlation between radiological profusion and FEV1/FVC (correlation coefficient – 0.377, $P = 0.010$). In addition, no correlation was observed between the age at start of work and the duration of exposure. **Conclusion:** The presence of pneumoconiosis continues in dental technicians in Turkey, especially because there is an early childhood apprenticeship culture and almost all workers in this period have the history of sandblasting.

Keywords: Dental prosthesis, lung, occupational, pulmonary disease

Introduction

Dental laboratories include many physical, chemical, ergonomic, and biological hazards and risks. Employees are exposed to various chemicals and dust, such as chromium, cobalt, molybdenum, beryllium, nickel, and a small amount of gallium, ruthenium, or aluminum, silica particles, methylmethacrylate during grinding, sandblasting, casting and polishing of ceramic, acrylate, and chromium alloys.[1,2] Lack of unsuitable ventilation and protective measures can cause health problems. As a result, dental technicians may develop occupational lung diseases such as asthma, allergic alveolitis, bronchial cancer, mesothelioma, and pneumoconiosis, depending on exposure time.[3,4]

The International Labor Organization (ILO) defines pneumoconiosis as occupational and environmental dust accumulation in the lungs and the resulting tissue reaction.[5] Dental technicians working in an unfavorable work environment in Turkey and across the world may develop pneumoconiosis as a result of exposure to dust.[4,6-8] This is defined as dental technician pneumoconiosis. In many cross-sectional studies, the prevalence of dental technician pneumoconiosis has been reported to be 4.5%-38.6%.[3,9-13] It is one of the business sectors where pneumoconiosis occurs most frequently in our country.[14]

In the Worldwide Orthopedic Market research report, the global dental implant industry was foreseen to reach a trading volume of $4.2 billion in 2015 and $9.1 billion in 2018.[15] In the light of the general sales data of IMPLANTDER representatives sector, dental implants sales were foreseen to be about 350,000 pieces in Turkey in 2013. According to the records of Local Health

Address for correspondence: Dr. Nur Şafak Alici, Department of Occupational Medicine, Faculty of Medicine, Dokuz Eylul University, İzmir, Turkey.
E-mail: safak.alici@hotmail.com

Access this article online

Quick Response Code:

Website: www.ijoem.com

DOI: 10.4103/ijoem.IJOEM_41_18

How to cite this article: Alici NŞ, Beyan AC, Demıral Y, Çimrin A. Dental technicians' pneumoconiosis; illness behind a healthy smile – case series of a reference center in Turkey. Indian J Occup Environ Med 2018;22:35-9.

Lampiran 10 Jurnal Penelitian Gündüzöz M. et al.

The Turkish Journal of Occupational / Environmental Medicine and Safety

2017; Vol:2, No:1 (4) : Poster Page 50 Web: http://www.turjoem.com ISSN : 2149-4711

S50. Dental Technicians' Pneumoconiosis: A Case Report][Biyosidaller, Maruziyet ve Hastalıklar

Meşide Gündüzöz (1), Nejdiye Mazıcan (2), Canan Demir (3), Servet Birgin İritaş (4) Türkan Nadir Özis(5), Vugar Ali Türksoy (6), Lütfiye Tutkun, (7) Ömer Hınç Yılmaz(8)

(1) Ankara Occupational Diseases Hospital, Department of Family Medicine, Ankara, Turkey
(2) Ege University School of Medicine, Department of Public Health, Division of Work Health and Occupational Medicine, İzmir, Turkey
(3) Ege University School of Medicine, Department of Public Health, Division of Work Health and Occupational Medicine, İzmir, Turkey
(4) Council of Forensic Medicine, Ankara, Turkey
(5) Ankara Occupational Diseases Hospital, Department of Pulmonary Disease, Ankara, Turkey
(6) Bozok University, Department of Public Health, Yozgat, Turkey
(7) Bozok University, Department of Medical Biochemistry, Yozgat, Turkey
(8) Yıldırım Beyazıt University Faculty of Medicine, Department of Public Health, Ankara, Turkey

Introduction: Dental technicians' pneumoconiosis is a result of direct exposure to dental alloy, acrylic resin, quartz, carbon, silica, and hard metal dust that are abundant in the air respired by dental technicians. We presented a case of dental technicians' pneumoconiosis with clinical and radiologic findings.
Case: A 33 year-old man admitted to our occupational medicine outpatient clinic with dyspnea. He had worked in a private dental laboratory as a dental technician for 18 years. He had a smoking history of one packet per day for 10 years. He had no history of tuberculosis or any other systemic or local diseases. Pulmonary function testing presented the following values; FVC:70 %, FEV1:74 %, FEV1/FVC:90 %. Chest X-ray revealed an increase in reticular density and millimetric nodules in both lungs . International Labor Office (ILO) profusion score was q/q 3/3 A, ax. High Resolution Computerized Tomography (HRCT) demonstrated a diffuse micronodular pattern in both lungs that holds all zones. There were also irregular fibrotic opacities due to conglomeration in right apical region and honeycombing pattern next to pleural surfaces.
Conclusion: Dental technicians are exposed to various dusts and chemicals during processing of dental prosthesis. They should be informed on the potential hazards in their occupational area and they should get the proper information on personal protective equipment and on all the other preventive strategies. It is necessary to ensure the proper working conditions for all dental technicians.

Key Words: Dental Technicians' Pneumoconiosis, Quartz Exposure, Mixt Dust Exposure

Lampiran 11 Jurnal Penelitian Puspa Dila Rohmaniar et al.

JURNAL WIYATA

HUBUNGAN ANTARA AKUMULASI LOGAM DENGAN KADAR P53 PADA TEKNISI GIGI

CORRELATION BETWEEN METAL ACCUMULATION TO P53 LEVEL ON THE DENTAL TECHNICIAN

[1]Puspa Dila Rohmaniar*, [1]Hari Wibowo, [1]Yolanda Kartika Asmarani
[1]Program Studi S1 Kedokteran Gigi , Institut Ilmu Kesehatan Bhakti Wiyata Kediri

Info Artikel
Sejarah Artikel :
Submitted: 4 Desember 2019
Accepted: 28 Januari 2020
Publish Online: 28 Januari 2020

Kata Kunci:
Akumulasi Logam, Teknisi Gigi, P53.

Keywords :
Metal accumulation, dental technicians, P53.

Abstrak

Latar belakang: Teknisi gigi tidak dapat terhindar dari paparan berbagai agen fisik, kimia, dan biologis yang berasal dari lingkungan kerja. Paparan pada teknisi gigi dapat berupa debu atau asap yang berasal dari grinding saat pengolahan bahan restorasi gigi. Pada penelitian Haryani dkk, 2014 dilaporkan terdapat konsentrasi logam kobalt, nikel, kromium yang tinggi pada darah teknisi gigi di Surabaya yaitu kadar kobalt 27 µg/L, nikel 37 µg/L, dan kromium 117 µg/L. Paparan logam dapat menyebabkan terbentuknya Reaktive Oxygen Species (ROS) dan menyebabkan terjadinya kerusakan DNA. Kerusakan khas yang terjadi pada P53 terjadi mutasi Guanine. Salah satu peran P53 yaitu untuk proses perbaikan DNA. **Tujuan:** Untuk mengetahui hubungan antara akumulasi logam dengan kadar P53 pada teknisi gigi. **Metode:** Penelitian ini merupakan penelitian observasional analitik dengan pendekatan cross sectional. Jumlah sampel sebanyak 40 yang diambil secara acak. Data diambil melalui wawancara dan observasi. P53 diperiksa dari saliva dengan metode indirect ELISA. Analisis data menggunakan uji korelasi Pearson. Nilai kemaknaan yaitu nilai p<0,05 (tingkat kepercayaan 95%). **Hasil:** Tidak ada hubungan signifikan antara akumulasi logam dan P53 pada teknisi gigi. **Simpulan dan saran:** terdapat korelasi positif namun hubungan tersebut tidak signifikan antara lama bekerja dengan kadar P53 pada teknisi gigi.

Abstract

Background: *Dental technician should be expose to various physical agents, chemical, and biological derived from the work environment. Exposure of the dust or smoke derived from grinding during the processing of tooth restoration materials. In the research of Haryani et al, 2014 reportedly about the concentration of cobalt metal, nickel, high chromium in the blood of dental technicians in Surabaya, namely the level of cobalt 27 µg/L, nickel 37 µg/L, and 117 µg/L chromium. Exposure to the metal can cause the formation Reaktive Oxygen Species (ROS) and causing damage to the DNA. The typical damage that occuring in P53 gene is a Guanine mutation. The P53 gene roles is for the DNA repair process.* ***Objectives****: To analyze the correlation between metal accumulation to P53 level on the dental technician.* ***Methods:*** *This research is an analytical observational with a cross sectional approach. The amount of samples taken at random 40. Data retrieved through interviews and observations. P53 checked from saliva with indirect ELISA method. Data analysis using Pearson correlation test. Value significance is P< 0.05 (95% Confidence Level).* ***Results:*** *There was a not significant correlation between the metal accumulation in dental Technician to P53 gene, ie, p= 0,818, r= -0,038.* ***Conclusions and suggestions:*** *There is a negative correlation but its not significant between the metal accumulation to P53 level in dental technician.*

P-ISSN 2355-6498 | **E-ISSN** 2442-6555

Korespondensi :
E-mail: dila.rohmaniar@iik.ac.id

Lampiran 12 Hasil Cek Plagiarisme (Turnitin)

Hubungan antara tingkat paparan debu logam dengan gangguan kesehatan pada teknisi gigi.docx

ORIGINALITY REPORT

17%	16%	4%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	repository.poltekkes-tjk.ac.id Internet Source	6%
2	dspace.umkt.ac.id Internet Source	2%
3	fajardent.wordpress.com Internet Source	1%
4	eprints.umm.ac.id Internet Source	<1%
5	adoc.pub Internet Source	<1%
6	digilib.uinsby.ac.id Internet Source	<1%
7	guides.lib.vt.edu Internet Source	<1%
8	Submitted to Universitas Nahdlatul Ulama Surabaya Student Paper	<1%
9	Submitted to Hankuk University of Foreign Studies Student Paper	<1%
10	Submitted to Universitas Sam Ratulangi Student Paper	<1%