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DENTAL OCCUPATIONAL HAZARDS AND SOME SURVEY FINDINGS IN MALAYSIA

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치과임상의 직업성 위해점과 말레이지아의 치과의사에 대한 몇가지 조사연구

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》국문초록《

치과임상에 있어서 약제, 재료, 기구 및 기타 부대시설과 치료실 환경은 오랜동안에 걸쳐 현금에 와서 놀라운 발전을 이룩하였음에도 치과의사가 시술중 받게되는 위해의 가능성은 아직도 여러곳에 상존하고 있는 실정이다.

의사가 늘 갖고 또 자신이 느껴야 되는 책임감에서 오는 긴장, 기계에서 오는 소음이 미치는 신체적영향 특히 청력과 관계되는 점 및 각종약제의 부작용 및 중독증, 그리고 치료중 예기치 않게 발생될 수 있는 환자로 부터오는 각종 감염, 또한 치과의사의 특수한 치료자세로 부터 생기는 습관적인 정형외과적 문제와 정신적 육체적으로 겪게 되는 격무로 부터 오는 전신피로등의 문제를 어쩔수 없이 또는 치과의사 자신의 부주의로 당하고 있는 실례가 많다. 저자는 이 점에 대하여 위해가 생기는 문제를 항목별로 기술하면서 문헌적 고찰과 말레이지아의 치과의사 164명으로 부터 설문을 통하여 수집한 사실의 통계를 분류하여 정리하고 그 예방 및 개선의 방법을 제시하면서 이는 치과의사뿐 아니라 종사자 전원이 숙지하여야 할 사실로 강조하였으며 가장 이상적인 치료실내의 치과의사용 의자를 고안하고 그 구조에 대하여 설명하였다.

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I. INTRODUCTION

Through the decades, the environment in the dental clinic has been very much improved for the dental surgeon. In the field of dental materials, medicaments, cutting instruments, dental units, dental chairs and other facilities, there has been much technical advancement. Along with these advancements, haszards, related to the profession have been known and emphasized. However, unfortunately, preventive measures against these important factors have been forgotten or neglected by more than half of the members in the profession. By ignoring the preventive measures, we are increasing the risks for our staff, patients and ourselves. It is rather unethical from this point of view. Considering the amount of time we spend in the surgery with our patients, we must not neglect these dangerous factors.

The term occupational hazard seems rather insignificant and of no value to us sometimes but I would say it is important since it concerns the immediate health of the surgeon, staff and his patients. This would be a good opportunity to take into your greater account the importance of these hazards.

We are now living in what we call an age of pollution. Technical and industrial development leads the world to deal with pollution problems with greater emphasis. I prefer to describe hazards in Dentistry as a form of pollution. Obviously there will be pollution when there is scientific and technological development and it is true that the nature of pollution will vary from time to time. Conditions have been improving but science and technology goes further ahead all the time.

At this 9th K.L. congress, it is my intention and purpose to emphasize once again the importance of dental occupational hazards and prevention of its side effects, through our knowledge and effort, among all my dental colleagus in the region.

II. OBJECT AND METHOD

To aid me in preparing this talk, I have collected 164 adequate replies to questionaires from dental practitioners either in the private or Government, all over Malaysia where I am now serving under the Government. Through my questionaire I have obtained certain useful information. Also I have indirectly led my colleagues to check on the hazards and to take better preventive measures against them. I have classified the hazardous factors as follows:

A. Stress

Psychological Stress, noise and hearing problem.

B. Chemicals and Intoxication

Sensitizing agent and Asbestosis.

C. Infection

Viral, Spirochaetal and Bacterial origin.

D. Habitual

Posture and orthopaedic problem, General Fatigue.

E. Mercurialism and Radiation Dermatitis.

My talk will cover each of these factors with the exception of mercurialism and radiation as I intend to carry out another survey concerning them at a later date.

III. RESULT AND DISCUSSION

A) Stress

(1) Psychological Stress and Noise

As dental surgeons, we are constantly engaged in stressful situations, by virtue of our occupation. This, coupled with nervous tension, noise from the air-rotor and worries set up additional psychological stress which in turn brings about higher incidence of coronary heart disease. In a 1961 survey by Russek,[10] he reported that the general dental practitioner is 3 times more prone to coronary disease as compared to orthodontists and periodontists. Oral surgeons are just as prone as the general practitioner. It is likely that there is a definite co-relation between occupational stress and coronary heart disease among dental surgeons, physicians and lawyers.

(2) Noise in Relation to Hearing Problems

Occupational deafness occurs slowly in workers exposed to noise and vibration in response to repeated noise. Sometimes to certain persons, even short exposures cause deafness. Workers in volved in aviation and ultrasonic vibrators face a common problem of hearing and deafness.[7] If humans are exposed to more than 100 decibels, permanent deafness results. Keeping away from the stimulus would promote recovery. However, a small number of people are not affected with the same stimulus. A range of 10 to 60 decibels is considered to be within the normal hearing range. 30 decibels is a pleasant level to the ears. Sometimes 60 decibels or more is considered pollution. If the magnitude and frequency of a sound exceeds 75 decibels and 7,500 c.p.s. respectively, it will damage the hearing slowly. Currently, most handpieces are claimed by manufacturers to produce a sound level of less than 75 decibels. Through improved designs and air-exhaust method, more quiet instruments have developed. Some early instruments produced sound levels of 75 to 100 decibels and frequency of 9,000 c.p.s. This had a damaging effect to the surgeon and patient.[2] According to reports by Councils and Bureaus[6] (ADA) the total intermittent average exposure time of the dental surgeon to noise is estimated at 12 minutes per day. Also there is little evidence to indicate that permanent hearing loss is to be expected from the sound of present dental handpieces. It is advisable to take precautionary measures when such damage is suspected. Periodic audiograms and use of cotton or other ear-plugs may be beneficial.

B) Chemicals and Intoxication

(1) Sensitizing Agents on Skin

I think we should keep in mind that all medicaments and materials excepting metals are potential sensitising agents causing dermatitis. The base for local anaesthetics procaine and monocaine consists of an aromatic amino group attached to a benzene ring in the para- position. It has been well known that this type of local anaesthetic is a sensitizing agent responsible for dermatitis, especially on fingers. In the modern clinic local anaesthetics supplied no longer contain the sensitizing base eg. lidocaine, ravocaine. When there is any suspicious skin changes on the fingers, one should check on the local anaesthetic in use. Should there be a persistent skin problem on the finger, a dermatologist is to be consulted. This dermatitis mostly starts around the nail base and nail end.

It shows initially as a slight redness. This is followed by itchiness, peeling of the skin and vesicle formation. The skin may become dry, tends to crack and secondary infection sets in.

(2) Asbestosis

Asbestos is used in conjunction with a casting machine in the dental laboratory. Fortunately it is used in small amounts. Inhalation of asbestos dust causes asbestosis and this may lead to lung cancer or mesothelioma of the pleura and peritoneum. Asbestosis is a more serious disease than silicosis. Asbestos has been utilised by human as far as 2000 years back. Nowadays it is widely used in industries. We as dental surgeons use asbestos sheets in the laboratory almost every day even though the amount is limited. When we consider this toxic action, we should take necessary precautions. X-ray studies show characteristic asbestos fibrosis of the lungs.

Dyspnoea is an early symptom and most cases present with non–productive cough. Slight pain may be recorded between shoulders, scapula or behind the sternum. There have been reports on group intoxication and death. Detoxification of early Asbestos is not possible. There also have been reports[7] that the onset of the disease can occur 8 years after last contact of asbestos. At this point I will emphasize the risks of working with asbestos.

C) Infection

(1) Infection of Viral, Spirochaetal and Bacterial Origin

One of the commonest forms of infection from the patient is influenza. However, the most troublesome is Type B (Serum) Hepatitis. It is therefore advisable to wear a mask and gloves when treating suspicious cases.[3] From my survey, it was interesting to note that those in the younger age group do not seem to like wearing gowns compared to those in the older age group. On the whole, 77 were using gowns and 84 were not. More of them seem to be wearing masks. The number using masks were 135 and those not using were 25. As regards to this, a poor percentage was shown among those in the 30 to 50 age group.

Oral surgeons do have an increased incidence of viral infection because most of their work is related with bleeding. Hepatitis B virus can be transmitted through a minor inflammation or abrasion on the finger from the patient's blood. A recent report[8] says that saliva is the primary vehicle in oral to oral and respiratory transmission of type B Hepatitis. Droplets from sneezing, coughing and wet field technique are also a possible means of transmission. Previously it was understood that hepatitis B virus could be transmitted through the obvious percutaneous introduction but this concept is no longer valid. Epidemiologic data shows that about 0.5% of the general population may be carriers of hepatitis B virus (HBV) and dental surgeons are supposed to have 2 to 4 times more risk of acquiring this viral infection than the general public.[8]

McKinney[9] in 1975 reported about hand-foot-and-mouth disease of viral origin. Fortunately this disease is quite self-limiting. However it shows a higher epidemic tendency. The disease is characterised by vesicular, ulcerative lesions on mucosa of the mouth, pharynx, hand and foot. Coxsackie virus group A Type 16 is the etiologic agent. The disease takes a mild course, usually lasting 7 to 10 days.

An epidemic broke out among the dairy animals in Malaysia late last year and this lasted for

more than 2 months. Strict supervision was done on slaughtering of the animals and their movements were strictly monitored. there was no official report on any infection among the people.

There has been a number of reports on accidental syphilitic infection. As we know, it practically impossible to perform serologic tests on every patient seeking dental treatment. Fortunately it is uncommon but when it arises, it becomes a serious personal problem. Sometimes prophylactic (antiluetic) penicillin therapy is administered on a suspicious case. Care must be taken when handling the dental problems of a syphilitic patient. We should check on any minor wounds or inflammation on our hands and scrubbing should be avoided as it may create mild abrasions to enable the Treponema Pallidum to invade our body.

Without a doubt, the eye is one of the most important organs to the dental surgeon, just as his hands are. Modern air turbines, three-way syringes, cavitron and other equipment using a wet-field technique may carry infection and trauma through flying particles of the patient's saliva, blood, calculus and tooth tissues. A pair of spectacles is the simplest form of protection one could afford. Those of us not wearing corrective lenses should wear protective ones. Infection and foreign bodies due to the wet-field technique and patients sneezing may be washed off with 2% boric acid solution. Chloramphenical opthalmic drops or ointment application is helpful. Washing off with saline helps remove materials and medicaments from the eye. If necessary, the eye surgeon should be consulted. Lighting and illumination in the clinic must be in good harmony to provide a feeling of comfort and minimise strain.

Tuberculosis is another potential problem to the dentist. There are other bacterial infections which are of acute nature but TB takes on an entirely chronic course. Usually we attend to patients without proper knowledge of the condition of the patient's health. This may put us in a risky situation. Hence, proper history-taking and examination of the patient is essential. Precautions should always be taken. We should make it a practise to go for periodic physical examinations to check on any unwanted conditions which may be in progress.

Soap is easily overlooked as a sensitising agent. We wash our hands very often. On top of that, heavily chlorinated water tends to aggravate the condition. If soap is suspected, it is advisable to change to a non-saponifying acid detergent. Vesicular eruptions with slight itchiness are early signs. Later the skin thickens and gets darker and tougher. At the next stage, it cracks and forms a line which becomes deeper. Secondary infection set in. Fingers, back of hand and in between fingers are common sites of occurrence. It is also more common in cold seasons and in temperate countries.

Dental materials and medicaments like eugenol, aromatic oils, phenol, creosote, formalin, iodine-containing preparations, methyl methacrylate, alginate, investment material and curing agents for epoxy resins are potential sensitising sensitizing agents.

D) Habitual

(1) Postural and Orthopaedic Problems

Most of the hazards could be prevented or avoided through one's knowledge and judgement of the situation. However orthopaedic problems arising from poor posture has a relationship with one's habits. Therefore we must learn good and correct habits from the very beginning. As dental

surgeons, our field of operation is mostly confined to the oral cavity and because of this, we are constantly experiencing both physical and psychological strain. Posture therefore has a very important relationship with this. Strain accumulated throughout the day could be eliminated quite simply through regular exercise. HANSER[4] suggested that walking, golfing and swimming even for a short while will be ideal forms of exercise.

Prolonged standing in one position results in tension and weight-bearing disturbances, creating foot strain with pain in the calf muscles, over the longitudinal arch and in the ball of the foot.[1] These are early signs of foot strain. If the foot muscles are tired they lose control and the burden of the body weight would be born instead by the ligaments. This will cause inflammatory changes in the ligament and later causes a sharp pain along the longitudinal arch. Direct pressure from body weight is transfered to the body joints and chronic damage through a typical wear and tear process leads to osteo-arthritic symptoms. Along with this process, if the body is overweight or some congenital deformity is present or some trauma has occured along with old age, these degenerative changes will be accelerated. Even if one has got an ideal posture, it is not advisable to stand in the same position for too long. Constant alternation of our position will help improve circulation, making us less tired.

From the survey, I gathered the following information concerning the various types of pain which may be due to some orthopaedic problem:

1. Back pain – 91 cases.
   Strangely, most of the cases of back pain were reported from the younger age group.
2. Arm pain – 48 cases, 12 in the left and 36 in the right.
3. Shoulder pain – 44 cases, 13 in the left and 31 in the right.
4. Stiff neck – 34. This was higher among the elderly group.
5. Calf muscle pain – 22
6. Ankle and foot pain – 14
7. Knee joint pain – 2
8. Tennis elbow – 14
9. Hand pain – 2
10. Sciatica – 1

8 respondents wore special shoes in the surgery.

WRIGHT[11] in 1947 suggested the ideal posture of the dental surgeon. Feet must be parallel to one another, one foot slightly ahead of the other. The body weight should fall slightly ahead of feet and supported by the external border of the feet. Knees should be straight and the body bent at the hips. Turning movements should be made at the waist and not the neck.

Prolonged standing also causes vascular congestion and may result in varicose veins and hemorrhoids. It is advisable to lie down for 10 to 20 minutes at lunch break to relieve oneself of strain in the feet, knees, back, shoulders and arms. A short rest in between work is more beneficial than a long one after continuous work. It is good practice to keep the feet higher during rest and ideal to change the nature of work every 2 hours so as not to strain the same group of muscles for too long.[4]

In case of excessive pressure applied on the front foot for prolonged periods, mechanical irritation may result in a bunion on the great toe. In response to abnormal pressure, localized thickening of the skin results in a callosity. This occurs under a prominent bone. Plantar callosity is callosity on the sole of the foot and if on the toes, it is known as a corn. This may be caused by pressure of tight shoes or it may be common with a hammer toe.[1)]For prevention of strain, flat feet, bunions and callosities, one should wear comfortable and soft shoes. Soft flooring also proves beneficial.

Of recent, most dental clinics are equipped with stools. A Stool should have a back rest, then only if is helpful in relieving stress on the lower limbs and spine. According to GOLDEN'S report[4)] (1959) on electromyographic studies, it is 27% more strenous to work in a standing position then when using a stool. My survey revealed the following;

98% of the dentists in Malaysia possess stools

39% were using it full time

37% were using it half the time

24% do not use the stool even though they have one. The survey also revealed that the older age group prefer not to use the stool compared to the younger group. This is definitely due to habit.

As a comparison, the percentage of dentists in the 20 to 30 and 30 to 40 age group who use the stool full time is 58% and 41%, half time 30% and 43%, none 12% and 16%.

As for those in the 40 to 50 and 50 to 60 age group shows the percentage as follows:

Full time – 27% and 24%

Half time – 36% and 35%

None – 38% and 41%

I shall now proceed to describe what I feel is the ideal type of stool. Preferably the stool seat should be round with a diameter of not more than 38cm. (15 in.). If the seat is about 15" diameter, the edge should not be angulated but well-rounded and smooth so that the thigh muscles are not pressed against it. Elevation and descent should be smooth. Free rotation, which when necessary may be locked, should also be a feature. A back rest is essential. Ideally the material should be of rough texture to provide ventilation. With proper usage of the mouth mirror, one can obtain a better posture with ideal usage of the stool made possible. We can minimise the common movements of bending the neck and back muscles. Lastly, I suggest that one should keep the body weight within the normal range so that orthopaedic problems, coronary disease and hypertension which are among the common problems to our profession may not arise.

(2) General Fatigue

I would like to suggest one of the new and important type of hazard: Due to the nature of our work, we often suffer from fatigue. It is a common happening that after a hard day's work, we lose our desire for social activities, mainly because we are thinking of getting some rest. My survey revealed that out of 164 dental surgeons, 47 do not engage in any form of exercise. This constitutes a percentage of 29. The male to female ratio is 32 to 15.

29 cases of finger tremors were reported. The cause may very from tiredness and ordinary tremor to mercurialism or plain anxiety tremor.

Actually General Fatigue is the worst kind of hazard of the occupation as compared to any of the others. To combat this undesirable situation and to maintain a sociably pleasant character, one should exercise regularly to eliminate fatigue and refresh the body and mind by engaging in some form of recreation to make our life more cheerful. I will emphasise that we should live life to the fullest.

IV. Conclusion

To make a conclusion on dental occupational hazards, as a final word of advice, I would like to remind my colleagues to pay more attention to the wearing of masks and gowns for their protection and also to try and use the stool all the time. Do arrange your appointments well and try to engage in some form of exercise whenever you can to help eliminate orthopaedic problems. To eliminate general fatigue, the development of advanced instruments will be essential as these would help shorten operating time.

Education of the junior staff on the hazards already mentioned should also be done as I have found that about 25% of the respondents (40 out of 164) admitted to not having spillage of mercury properly removed.

I also wish to recommend that the surgery assistants be allowed to wear comfortable spongious shoes while at work as the most common problem among them is pain in the calf and foot. I feel that this should be taken into consideration especially here in Malaysia as we have a nationwide service with a large number of assistants involved.

Last but not least, let us not forget to thank the manufacturers who have made life easier for us with the development of advanced dental equipment. We hope that they would carry on with their fine endeavours for the benefit of our profession.

I would like to thank the Director of Dental Services, Dr. Abdul Rahman bin Awang, the President of M.D.A. Dr. Lim Chee Shin and all the dental practitioners for their kind advice and cooperation. Also I would like to thank Dr. Fazah Yakin as she has assisted me efficiently to make this report a success and also all the staff in the dental department, G.H. Klang. for their full cooperation.

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