The Study on Occupational Cervicobrachial Disorders (OCD)

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Preface

Since the second half of 1960's, physical disorders by strain have abruptly increased in Japan. Especially, occupational cervicobrachial disorders (OCD) which were called tenosynovitis for 1960-1967 or cervicobrachial syndrome for 1968-1972 among industrial workers have inceased suddenly in 1970's.

Many researchers in several related learned soceities as well as officers in related administration offices have faced to OCD problems. The present author has buckled down to OCD problems for about 20 years from the very beginning of the incidence.

The author has conducted many epidemiological studies for OCD problems in various kinds of workplaces and examined the relationships between OCD and labour. And base on these studies, present author has proposed various counterplans to prevent incidence of OCD. Further, the author has examined many OCD clients and investigated the symptom characteristics of OCD, processes of disease, methods of medical treatments, and conditions for returning to workplace.

Recently, OCD problems have been commenced by several researchers in the foreign countries. I recieved various qustions with OCD from foreign reserchers.

In this article, the author wishes to present a research summary for 20 years of my study. It is the author's pleasure if this summaY gives a benefit to the people who are facing to OCD problems now. Because there have still been misunderstandings concerning OCD among employers as well as among trade unions, and especially among orthopedists in regard to medical definitions and treatments for OCD.

Epidemiological Study

Dr. Tadakichi Kubokawa published a book entitled "Industrial Hygiene" in 1901. This

is the first and an authentic text of labour hygiene in Japan. He described that cramps are sometimes noticed in finger, hand and/or limbs among craftmen of cigarette making, clock making craftmen, shoe making craftmen, metal screw making craftmen, ornament craftmen, taglors, glassworkers, lithographers, compositers, locksmiths, and clothworkers. This is the first description of occupational disease of upper-limbs in Japan.

The occupational health literatures published since 1920s revealed that occupational diseases such as tenosynovitis, bursitis, paratendinitis, and occupational cramp were noticeable among pianists, telegraphists, and stenographists. In 1955 the Royal Free Hospital in London had to be clothed for some months because muscle pain, cramps and emotional upset affected these hundred of its staff.

The recent abrupt increase of occupational diseases may be due to an "industrial rationalization" as well as a "technical innovation" from 1955. Apparently, keypunch operators' disease have increased in the introduction of computer systems in the office in 1955. The suicide of OCD patients occured.

The following stress causing factors might bring the high incidence of occupational cervicobrachial disorders (OCD) at different work places. That is,

1) increase of the intensive work with speed and more often use of the manual handled machines,
2) long lasting work caused by the prevalent use of conveyer belt systems,
3) increase of the manual work involving frequent finger movements and repetitive movements in the hand-arm area,
4) poverty of working environments in addition to poorly designed office funitures and machines,
5) severe work control by managers or operators,
6) shortage of the rest break and the leisure time.

The causes of OCD seem to be related to an combination of these several stress causing factors. However, it is possible to identify medical and ergonomic factors as the crucial causes of OCD.

The present author have conducted epidemiological studies for OCD among workers in various industries and workplaces.

The essential methods of the author's studies were as follows;

1) Long-term observation or examination of workplace, and hearing of worker's opinions,
2) Evaluation of workload and measurement of workplace environment by labour physiological and psychological techniques,

3) Administration of questionaire inquiry for all workers concerning workload, fatigue, progress cause of fatigue accumulation, fatigue symptoms, fatigue part, physical and mental subjective sympotoms,
4) Administration of health examination for OCD to all workers and analysis of results,
5) Administration of (3) and (4) to control group workers and comparison of the results, and cohort study,
6) Analysis of OCD causing factors in OCD high-risk and low-risk workplaces,
7) Administration of periodical health examinations from the set work and examination of physical condition,
8) Investigation of OCD incidental factor, progressive history among OCD patients (including recovered patients)

Independent variables of the present author's investigation include worker's sex, age, work content, work experience, physical condition before set work, physique, anamneses, etc.

The author also examined parameters such as work amount, working hour (per day and per week), continuous working period, rest, working action, working posture, state of muscle use, work environment, degree of restriction to work, health control, etc, which interact OCD incidence.

The following methods were employed to investigate these parameters' effect on OCD incidence; Inquiries by questionaire, photographic/video tape analysis, flicker-test, analysis of physiological measures such as EOG, respiration rate, GSR, eye-movements, EMG, and ECG. Muscle strength and oppressive pain were also examined. The same age and indentical sex workers to the experimental group in a low-risk OCD workplaces in the factory acted as control group subjects.

1. Key Punch Work

Around 1960, key punch operators in banking and stock market bussinesses began to complain of physical impairments in their hand-finger areas as well as in their shoulder-arm areas after the introduction of computer systems in their office works. At that time, tenosynovitis was the name which was often diagnosed and medical findings showed the muscular and tendon impairments of the fourth finger of their right hands. This was due to the fact that the operators had to strike the key "O" by their fourth fingers frequently to operate their poorly designed machines. Some doctors noticed that the operators

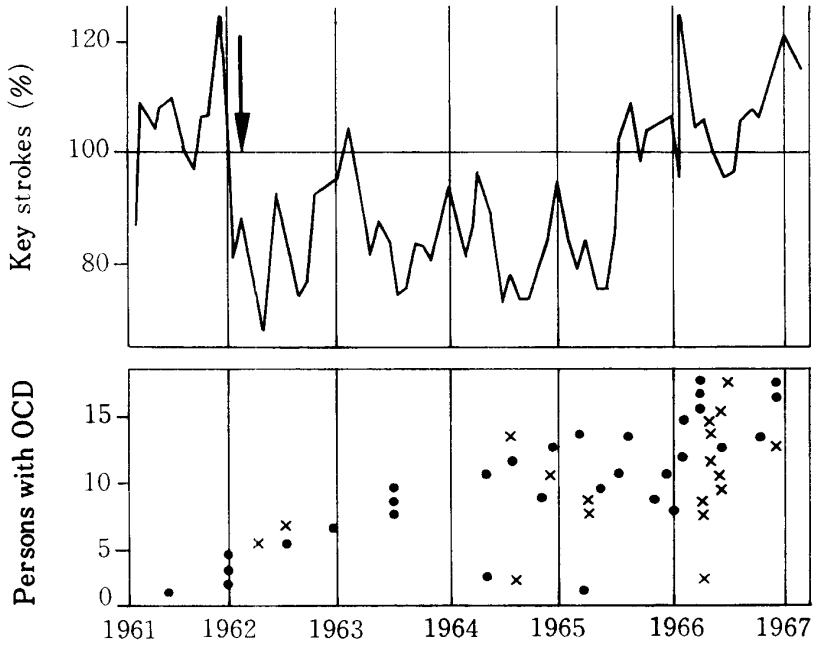


Fig 1. Relative work intensity and occurrence of patients with OCD*. Work intensity shows the relative changes of the average key strokes. 100% =2.2 strokes/sec which was calculated from the ministerial guideline of 40,000 strokes and 300 min/day. The arrow shows the time when the guideline came into effect, ●, persons with OCD; ×, persons suspending job due to OCD.

complained of pains or troubles in their shoulder-arm-hand areas.

In addition to these physical impairments, the operators complained of other sympotoms such as headache, irritative feeling and sleep disturbance. As for the work load of the operators, it is extremely important to notice that are exposed to excessive keyboard works even today (300-420 minutes. 40000-80000 strokes per day)

In 1964, the Ministry of Labour, Japan adopted the guideline of work administration standards for keyboard work. The main points of this guideline were as follows;

1) keyboard work should be limited to 300 minutes per working day,
2) key strokes should be less than 40000 strokes per day,
3) one continuous working period should be limited to one hour for key punch work.

Since the enforcement of this guideline, it seemed that the incidence of OCD decreased. However, it should be noted that the risk of OCD incidence seems to increase depending on the increase of work load, i. e., increase of work speed, working time and/or work amount.

Figure 1 shows the occurrence pattern of OCD among punch workers at Osaka stock exchange. Their work loads are influenced vividly by the bussiness activities. During the

full boom period, the key strokes of the workers exceeded the 1964's guideline and the occurrence of OCD increased parallely. On busy period, many OCD patients occured. Among the patients, seven female were recognized by the goverment.

2. Typing Work

The typists using the Japanese typewriter or the traditional English typewriter complained of pains in their neck-shoulder-arm[1]hand area and complained of numbnesses in their hand-finger areas in many banks, bussiness firms, courts, and other offices. It was shown that the main causing factors of their impairments were the requirments of high intensity and high speed work due to the mechanization of office work. The typists generally used mechanical typewriters of heavy key resistances. Further, they typed more than 10,000 strokes per hour for 2 to 3 hours without a rest break. Introduction of an electric typewriter into office reduced typists' work load. However, the introduction of an electric typewriter did not necessarily reduce the number of OCD patients because it brought more speedy work and longer typing hours without a break than before.

In addition to the occurrence of OCD among the typists, OCD occured among workers who engaged in duplication (or triplication) of slip with ballpoint pen, continuous note or card counting job, and operation of register.

In 1970, the author firstly read the paper for the occurence of OCD in several kinds of occupation at the annual meeting of Japan Association of Industrial Health.

3. Telephone Service

Since 1970, telephone networks have developed all over the country and the workload of each worker increased very rapidly. This brought the high incidence of OCD. Figure 3 shows the incidence of OCD in the NTTPC from 1971 to 1978. It shows that the incidence of OCD reached 3349 in 1975 and 2706 in 1978. However, as the statistic of the OCD incidence in Figure 2 was based on the numbers of patients who were recognized as OCD officially, the actual incidence of OCD including non-recognized might reach from 13 to 24% among workers at that time.

The author investigated the problems in several telephone service offices.

The results of research for several telephone exchanges (1963-1964) showed frequent symptoms by telephone operators as follows:

Direct Call Group: right shoulder pain (32%), left shoulder pain (26%), headache, especially right side (21%).

Indirect Call Group: right shoulder pain (26%), left loin pain (21%), left shoulder pain (19%), right loin pain (17%), back pain (13%) etc. But OCD patients was a few.

Their stress causing factors from the work were as follows:

1) Repetitive use of the upper limbs to operate the switches and the cables with connector of telephone exchange machine or to takeout and replace a telephone directory from a shelf,
2) Nervous tention to retain their short term memory for inquires,
3) Eye strain from looking up a telephone number in the telephone directory,
4) Bending forward with static muscular tention in the neck, the back, and the low

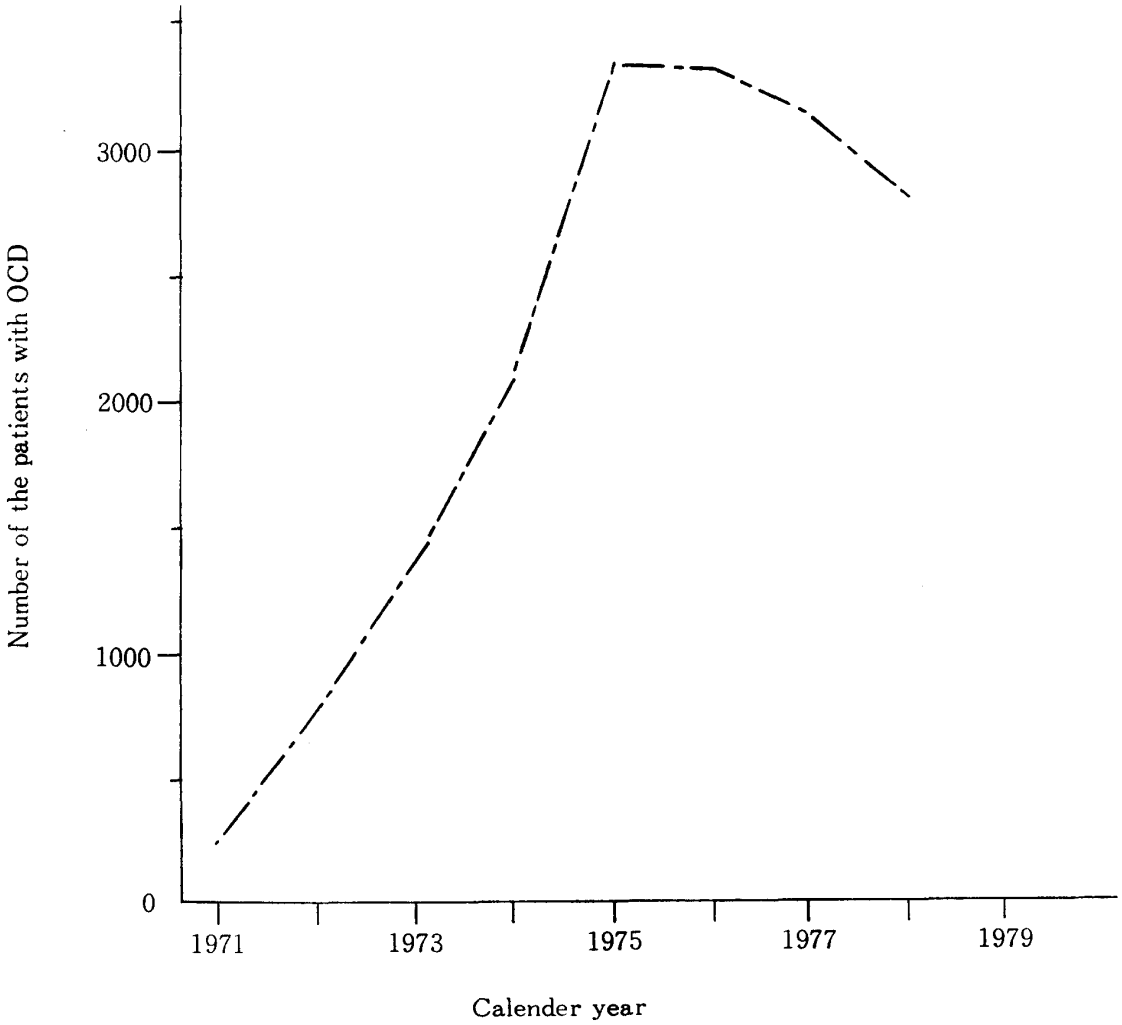


Fig 2. Incidence of the patients with OCD in the Nippon Telegraph and Telephone Public Corporation.

back,

5) Wearing a heavy headphone,

6) Night shift work,

The main aim was for the completion of the nation-wide direct call system and the mechanization of telegraph relay stations. In addition, it had included:

1) Dismissions of workers, changes in personnel or changes in duty.

2) Increase of work density, mainly by the use of crossbar exchange machines* and super panels**.

* Lines are automatically connected to each exchange table with an empty line and immediately after the connection telephone operators or telephonic telegram operators must operate for the subscriber. It becomes difficult for the operator to take spontaneous rest periods during work.

** By using the super panel the operators' superiviser can easily check work output and "quality control".

3) One continuous working period extending from 60 minutes to 105 or 120 minutes.

4) Severe work control of supervision by the organization and watching.

Table I shows the assessment of working conditions in two machine offices. The oc-

Table 1. Assessment by the operators of working conditions in two telephone service offices.

	Conditions of work	Office (A) (Frequent OCD occurrences)	Office (B) (Few OCD occurrences)
Specific items	*The level of the table is too high.	47.2%	17.5%
	*The neck is bent forward when working.	48.8	16.1
	*The hands are often lifted as high as shoulder level.	70.1	54.2
	*Key counterpressures are too large.	66.9	30.7
	*The noise induces irritation.	67.2	47.9
	*Inquiring work induces irritation.	76.4	63.7
	*Discomfort due to polluted air	84.3	69.5
General items	The table is too narrow.	43.3	43.2
	Motion activity is limited	49.6	49.4
	There is little opportunity to rest the hands when feeling tired.	67.7	75.0
	Work is forced.	74.0	68.8
	The work is superintended by the chief.	78.0	77.2
	Little relaxation in the resting room.	80.3	79.8

* There was statistical significance at level of $p<0.05$.

currence of OCD was frequent in office A, and was fewer in office B (1973). Inadequate working postures resulting from the ergonomically poor switchboard brought telephone operators' diseases. The decrease in OCD incidence from 1975 may partly be accounted by ergonomic improvements such as using light headphones and shortening of continuous working periods. But the project team of NTTPC stated that the causing factors are mass hysteria or psychoneurosis.

From these study, the author pointed the causative factors of OCD among telephone operators.

1) Rapid work output increase as from about 1960.

   Number of telephone calls/operator in 1971 had increased by about 1.5 times since 1968 and by 3 or 4 times since 1961. This increase had been accompanied by the change of telephone calls distribution, from 1 peak to 3 peaks (early morning, afternoon and late evening). So work-load of the night shift was especially increased.

2) Elongation of a work spell.

   In 1971 enforcement of a perfect 5 day-week without reduction of working times (48 hours/week). As a bargaining point between employees and employers, one work spell was prolonged from 60 min to 105-120 min.

3) From 1968 the Corporation had adopted many new kinds of labour management methods in order to impose "the rationalization" as follows;

   Shaft System: management and control of private daily living.

   Surveilance table: Observing machine of response to call.

   Backiside supervisor patrol. Headphones stay on operator and no signal such as alarm or buzzer as a warning for a call.

4) Wrong environment and equipment

   80 cm work height was too high. 300 g touch of pushing buttons was too heavy. Air-conditioning was too cool. Telephone directories were too heavy and too thick. Height of telephone directory shelf was too high.

4. Checkout Work in Supermarkets

In a supermarket, which is designed on the one hand to offer a large variety of goods and on the other to reduce labour, the customer serves himself from the shelves and then takes his purchases to the cash desk. The job of a check-out worker working at a cash desk is reminiscent of mass production in manufacturing and has the same negative re-

percussions on health. The work is done by women, requires no skill, has to be learnt on the job, is poorly paid, and so on. They operated cash registers with heavy key resistance. They did not take rest breaks.

Since 1965, the decline in commodity prices, the introduction of the self-service practice to save labor costs, and the rapid development of mass media have fostered the growth of chain stores around supermarkets. Until 1965, the 10 top ranks in corporate retail sales were occupied by department stores. In 1975, however, chain stores occupied 6 of the 10 top companies, including the lst rank. It is estimated that about 173,000 workers are in service at about 9400 chain stores.

Among checkout workers in supermarkets, OCD was noticed since around the year of 1970. In 1971, the author found that OCD occured among 10 to 15% of checkers in several supermarkets. Figure 3 shows the movements of worker's fingers.

As regards fatigue complaints of operators during work, fatigue felt in the right shoulder accounted for 56.5%, that of the left shoulder for 27.1%, and that in the posterior cervical region for 25.7%. The ratio of operators who complained of thirst, visual fatigue, stiffness in the shoulders and mental irritation increased to 40-75% in the morning; in the afternoon, the number of operators complaining of malaise of legs increased, accounting for 90.0%, while that of operators complaining of general malaise also went up. The CFF (Critical Flicker Frequency) value diminished correspondingly, and no significant effect of meal intermission for fatigue refreshment was found.

In a health survey conducted in 1970 for the co-workers at a shop, 8 of 27 checkout workers were considered to require medical treatment on account of positive complaints, tenderness and induration of muscles, motor disturbance of the neck and shoulders, positive Morley's test, peripheral circulatory disturbance and disturbance of perception, and decrease in muscle strength (29.6%), while 11 operators (40.7%) were considered to require a follow-up observation. The author submitted these results to the Japanese Association of Industrial Health in 1972.

We refer to heaviness of the legs (89%), eyestrain (56%), stiffness of the shoulders (72%), general fatigue (66%), all symptoms that become accentuated towards the end of the day and of the week. Another study refers to the frequency of pain in the shoulder, arm and hand, accompanied by a weakening in pinching ability and gripping strength which, though almost nil among young or newly employed checkout workers, at supermarkets is very high among employees of longer standing.

The main causes of their OCD might be as follows;

1) The operators used cash registers with heavy key resistance (700 to 2400g),

2) There was no rest break time except for lunch time,

3) The operators had psychic pressure from bust services to a long line of customers in front of their checkout station (they treated 2500 to 3500 pieces of goods per day),

4) The operators had to keep standing posture for a long period of their service time.

In 1973, the Ministry of Labour, Japan issued the guideline of the work administration standards for cash register oparators. The main points of the guideline were as follows;

1) To exchange the checkout work and packing work frequently during bust periods of service time,

2) One continuous keyboard task should be limited to 60 minutes,

3) To conduct medical examination for the operators periodically.

The impairments among the operators reduced gradually since then by the enforcement in addition with the following ameliorations;

1) Introduction of self service system for packing articles,

2) Increase of the staffs by the employment of part time workers.

3) Introduction of electronic cash register instead of mechanical one.

In 1973, we conducted medical examinations of about 800 workers employed at one of the most prominent super stores. According to the results, in 1973 20% required medical treatment and 45% required follow-up; in 1975, the respective percentages dropped to 6%

Table 2. Comparison of percentages of workers having complaints related to work before and after putting into effect of the guideline on cash register work.

Impairments	Before the guideline (1972) (%)	After 6 months (1973) (%)	After one year (1974) (%)
Stiffness in the shoulders	56.6	54.2	57.5
Tiredness in the arms	37.0	31.1	29.6
Tiredness in the legs	58.6	49.6	27.7
Tiredness in the body	52.5	45.1	31.1
Eye fatigue	44.3	42.4	51.8
Weariness	54.5	50.4	46.6
Irritation	37.8	36.0	33.0
Wish to lie down when being free	41.1	38.1	27.0
Feel dry in the mouth	35.1	31.3	28.4
Dizziness. giddiness	30.4	27.9	22.6
Numbness in the arms and hands	12.7	11.5	8.5
Tremor of fingers	15.5	14.5	10.8
Depressive	21.3	18.3	19.7

and 43%.

According to a questionnaire survey of workers' complaints, 15.6% indicated improved machine handling, 15.5% indicated lightened pressing of keys, 11.7% indicated reduction of the number of shoppers to deal with, 4.0% were relieved by the reduced time required for pressing the keys of the cash register, 10.3% felt a reduced dullnessin their hands and arms, and 17.4% refered to more consideration shown by the store manager.

It is possible to prevent OCD by means of a limited key stroke number/day and the introduction of an electronic keyboard with light key force of 60-80g. However, such kind of keyboard is strongly associated with a high speed keyboard operation, thus a long continued keyboard operation easily inducing or increasing complaints of stiffness, cramp and pain in the neck, shoulders and back regions.

Figure 4 and Table 2 shows the effects of prevention. However, it is not enough to prevent the register operators from the occurrence of OCD.

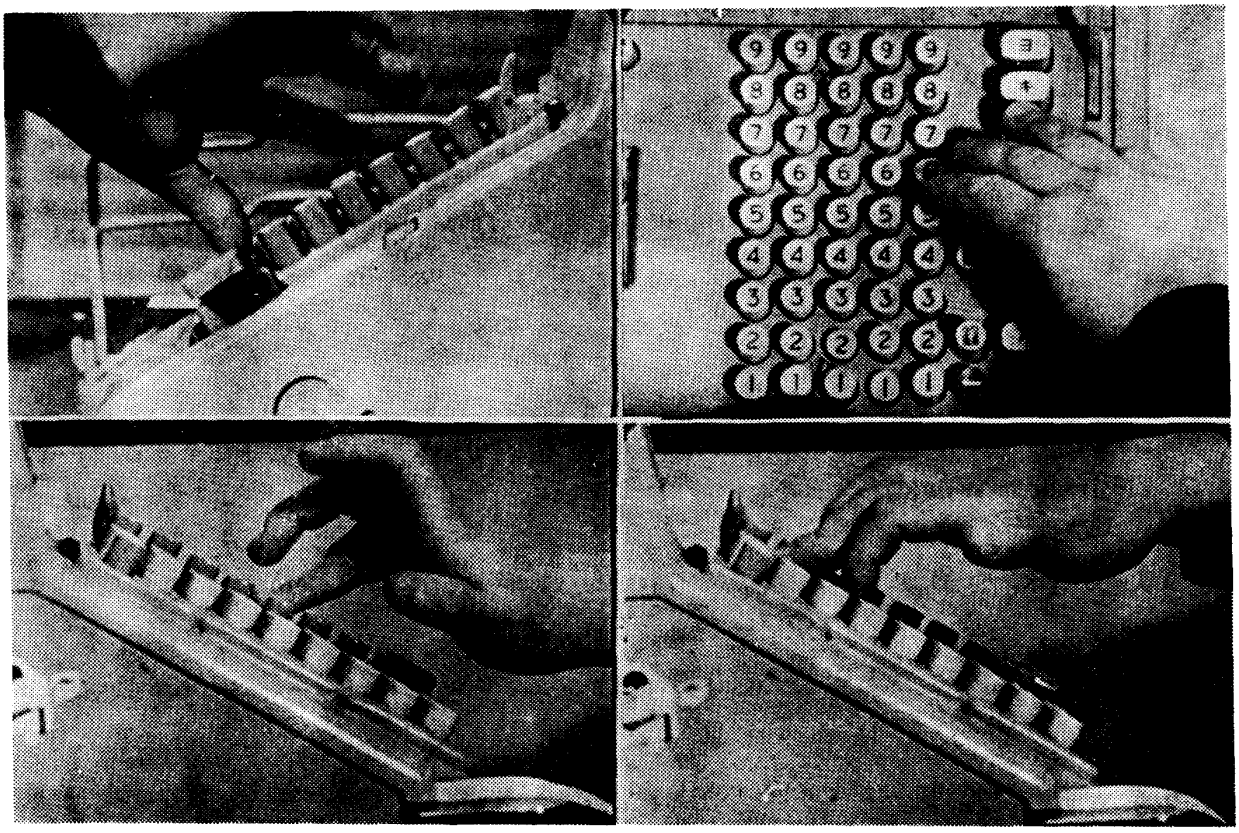


Fig 3. The Movements of Worker's Fingers

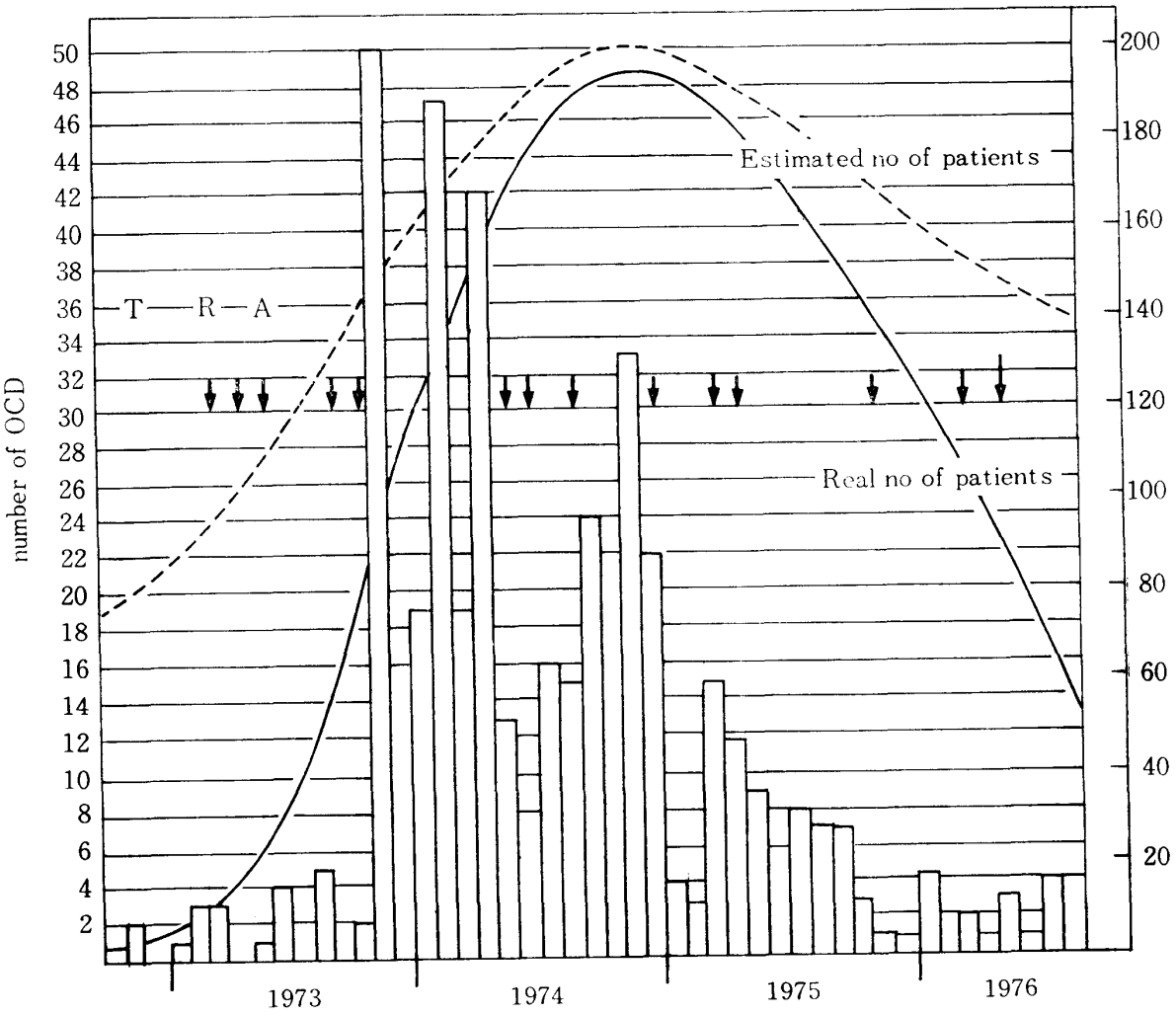


Fig 4. Change of the prevalence of OCD in cash register operators in a certain supermarket.

T: Requested by trade union
R: Regulaion issued by the labovr Ministry
A: A gree ment between employer and labour union
↓: Physical examination

5. Nursery Work

With the development of social welfare services in the last two decades in Japan, the number of institutions for children has increased rapidly. There are a number of the nursery schools for healthy children aged 0 to 5 and the schools for the handicapped. The numbers of nurses in these schools were about 143000 in 1980. An increasing tendency has been observed among the workers, especially nursery teachers, to complain of chronic fatigue, low back pains and pains in the neck, shoulder and arm areas, etc.

Among the nurses in nursery schools for pre-school children, OCD was frequently

noticed from 1968 by the present author.

The field studies carried out since 1972 proved that 4-5% of the nursery teachers needed therapy for either low back pain or cervicobrachial syndrome, and 8% of them needed clinical observation.

Our investigations showed that the nurses had a high incidence of pain complaints in the shoulder-area as well as the back and low back areas. Generally, symptoms of lumbago in the nurses are heavier than in other business machine operators. In our systematic studies of OCD on nurses, it was estimated that 4000 to 8500 nurses were at the

Table. 3 Distribution of persons with OCD and/or lower back pain in public nursery schools.

Questions		Total (n=347) (%)	Nursery teachers (n=246) (%)	Others (n=101) (%)
Have you suffered from OCD or lower back pain?	No	50.1	51.2	47.5
	Yes	46.4	47.2	44.6
Have you had medical treatment of OCD or lower back pain?	Yes	66.9	55.2	82.2
	No	33.1	44.8	17.8
Have you been absent due to OCD or lower back pain?	Yes	29.2	25.9	37.8
	No	70.8	74.1	62.2

Table 4. Main factors causing stress of nursery teachers dealing with children of different ages.

Stress causing factors	Age of children						Head teacher
	0	1	2	3	4	5	
Frequently taking inadequate postures	○	○	○	○			
Being worried about the work		○	○	○			○
Physical work	○	○		○	○	○	
Frequently taking standing posture			○		○	○	
There is no place to rest with relaxation						○	
Using often a localized part of the body	○	○					
Paying attention on surroundings					○		○
Working without interruption		○	○	○			○
Little time to complete work				○			
Having a lot of work to do				○	○		
Walking around for work	○				○	○	
To much work to do by myself							○
Mental stress							○
Being worried about human relations							○
Too many kinds of work			○	○			
Needing a lot of patience	○						
Short rest breaks						○	
Long working hours			○				
Few number of rest breaks				○		○	

Table 5. Causing factors of disorders in nursery workers. ( ) shows the age of children.

(1) MOST INFLUENTIAL FACTORS
1. Extreme use of particular body part (O to2 yrs. old).
2. Frequent holding up of heavy materials (0 to 2 yrs. old).
3. Too much work load (0 to 2 yrs old).
4. Bother brain about work (mixed class, 0 to 2 yrs. old).
5. Too much variety of work (3 yrs. old).

(2) INFLUENTIAL FACTORS
6. Difficulty to rest (3 yrs. old).
7. Lack of exercise (0 to 2 yrs. old).
8. Poor work environment (0 to 2 yrs. old).
9. Heavy responsibility (0 to 2 yrs. old).
10. Long working hour (3 yrs. old).

(3) AFFECTING FACTORS
11. Too long standing (4 to 6 yrs. old).
12. Difficulty to take paid vacation (4 to 6 yrs. old).
13. Difficulty to find pause in work (mixed class).
14. Human relationship in workplaces (mixed class).
15. Pressed of work (3, 0 to 2 yrs. old).
16. Lack of sleep time.

(4) FACTORS NOT SO INFLUENTIAL
17. Using of mental power.
18. Inadjustable work-pace.
19. Inexperience for work.
20. Irregurality of life-pace.
21. Difficulty to take rest in home.
22. Need for patience.
23. Long attending time to office.
24. Suffering from other disease.

(5) FACTORS NOT AFFECTING
25. Work is monotonous.
26. work is dangerous.
27. No aptitude for this work.
28. Difficulty to enjoy work.
29. Human relationship except in workplaces.

clinical stage and 11000 to 17000 nurses were at the chronic stage in Japan.

Distribution of patients with OCD and/or lower back pain in a city is shown in Table 3. About a half of those workers in nursery schools had symptoms of OCD and/or lower back pain. Their works require them to do many kinds of upper limb activities with stressful postures and motions of the trunk. In addtion to these physical stresses, the teachers showed mental stresses from looking after small children and also from subsidary work.

Table 4 shows the stress-causing factors of the nursery work in different classes. It

should be noted that there were differences in these factors between the teachers, depending on the number of children per class, the age of children and the size of the institution or nursery school. In most of the public nursery schools, the prevention of OCD is known to be facilitated systematicaly by increase of the number of staffs, medical examination for OCD, introduction of rest breaks, and setting up of rest rooms. Table 5 shows the relationships between OCD symptoms in nursery teachers and causing factors.

6. Assembly Line Work

In an assembly line for making shoes, there are twelve work processes. A. conveyer belt production system is not adopted. By one assembly line 1300 to 1400 pairs of shoes are produced. In each work process, the right hand is used frequently to pick up a 400-1200 g last of cloth accompaned with rotation of the wrist. On the other hand, the left hand takes different postures and motions, depending on the work processes of the assembly

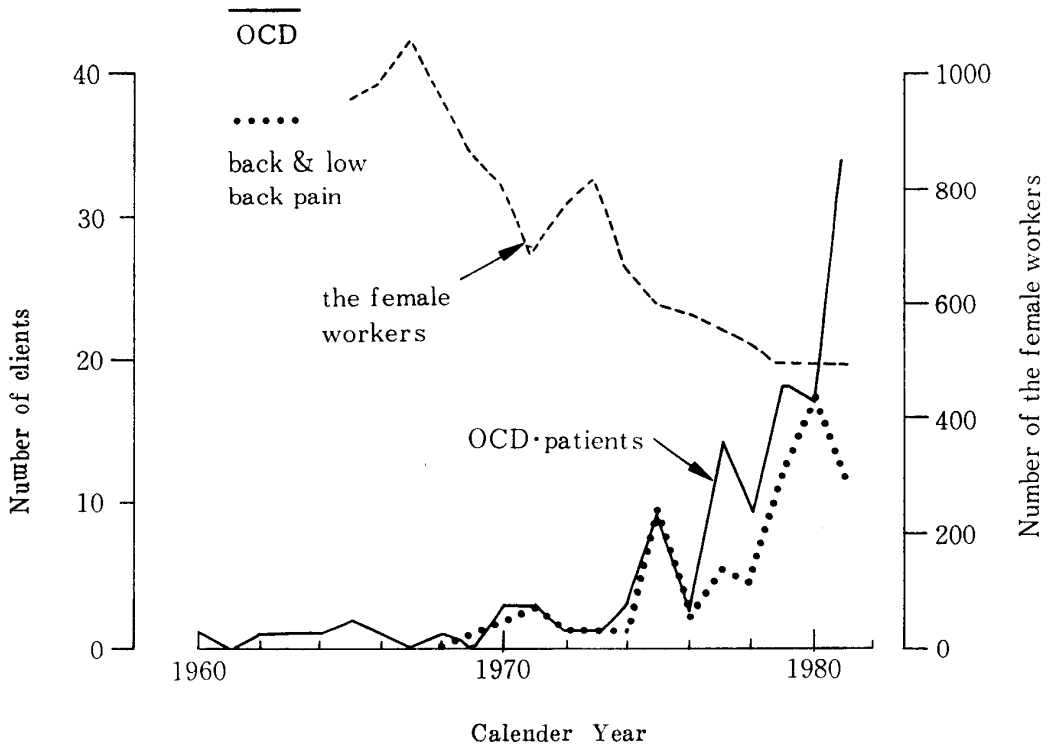


Fig 5. Incidence of OCD, and low and low back pain in the female workers working on assembly line.

line.

However, thier pain complaints were generally similar between both hands. Besides of these localized muscular activities in the upper extremities and constrained postures of the trunk, the workers had to do a fine task with high speed.

According to our systematic study on the female workers on the shoe-making assembly line, pain complaints in the neck-shoudler-arm-hand area among the workers in these situations have increased according to the decrease of workers. Figure 5 shows the tendency of OCD incidences and complaints of the female workers.

Ergonomic improvements for a new assembly line is now under consideration.

Confectionary work is also an example of conveyer belt productions where OCD has been frequently noticed. Conveyer belt systems are adopted to bake and decorate cakes. Whole processes of cake making are automatically controlled. Female workers predominated (70%) in these works stand along side by side of the conveyer belt and use funnel shape bags to press and release the cream continuously (Fig. 6). This action needs a strong muscular effort of the hands and arms. Working hours of these female workers are 8 hours per day including one hour lunch time break. But there is no rest break time during their working time. One group, consisting of 6 female workers makes 500 to 800 X'mas decorated cakes per hour. In the case of making a usual cake, one group makes 6000 to 8000 pieces per hour. The group had to produce X'mas cakes concentrately before X'mas time, therefore, at that period their working hours become 16 hours or more. In these confectionary factory, one third of the workers was diagnozed as OCD from the second half of 1980 to the first half of 1981.

OCD was noticed also among workers in a factory of the precision machinary industry. Workers who inspect or correct an etching miss of shadow mask (parts of TV screen) have to hold up a thin iron plate over their head.

In the first health examination of this factory by us, 21% among 43 female workers were diagnosed as OCD who needed immediate medical treatment, 74% were diagnosed as the one who need cautious care. The advices to control work load per day, revision of working condition and/or rearrangement were given by us. Three years later, 78% of the workers were diagnosed as normal in this factory.

Further, OCD was occurred among workers in the lace making industry. Particularly, severe OCD was noticed among female workers who managed drafting, punching, and finishing machine works. The first examination found that 11.8% among 229 workers were diagnosed as OCD who needed immediate medical care and 32.7% were diagnosed as the

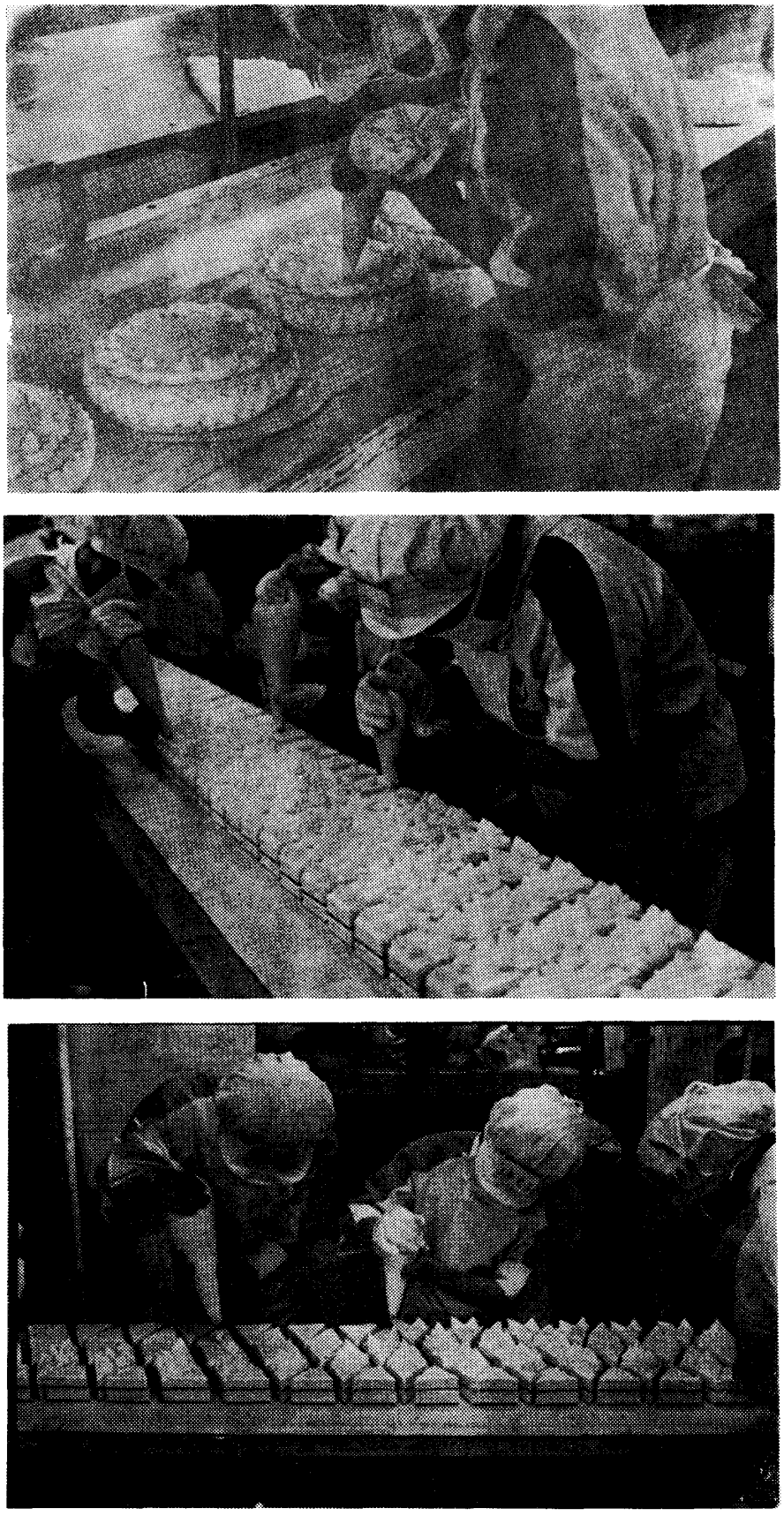


Fig 6. decorating work in cake-making

one who needed cautious care. The advices to revise working condition, athletics in the work place, and rehabilitation exercises have improved the situation gradually.

7. VDU (Visual Display Units) Work

Introduction of microelectronics has increasingly expanded into office work. Ninety to 100% of the large and middle size industries has already introduced computer systems and word processors in Japanese language.

The purposes of introduction of VDU work were rationalization, speed up of work, and increase of efficiency as similar in the case of introduction of checkout or keyboard pressing work. This is apparent from the results of the survey entitled the survey for technical innovation and labour in 1983: investigations for actual condition of office automation (OA). According to the survey, the purposes of introduction of OA machine were rationalization and increase of efficiency of office work (88%), speed up of information processing (36%), economy in expenditures (19%), and control of staff members (17%). The employers regarded the role of OA machine as to control staff members (55%), improvement of service or increase of efficiency (46%). Only 1% of them introduced OA machine to improve working conditions.

In the results of our recent field study (The Service Training Institute for Safety and Health of Labourer) comprising 1591 VDU operators in 72 industries and 175 controls (general office workers) , the rate of self-reported inconvenient factors associated with physical discomforts and pain was 38% for immovable or unadjustable screen height, direction and inclination, 67% for insufficient working space on the table, 41% for unadjustable height of seat pan, and 90% for unadjustable height of the back rest of chair.

It was found that a majority of the VDU operators had complained of uncomfortable and fatigued eyes, neck and upper limb impairments, and jobstresses of the whole body.

Especially, the risk of OCD incidence was prominent among workers of data inputting, cashing workers on dialogue-type computer terminals, and workers using a word processer of Japanese language. Generally, all of these workers are required high speed and continuous operations. Figure 7 shows the physical complaints of VDU workers.

Figure 8 indicates the relationship between physical complaints of VDU workers and working conditions. It is apparent that OCD incidence has strong correlations to the factors such as the size of characters on the screen, the width of lines, the distinction of characters, flickering of images, the space size of the working desk, foot-rest, condition of

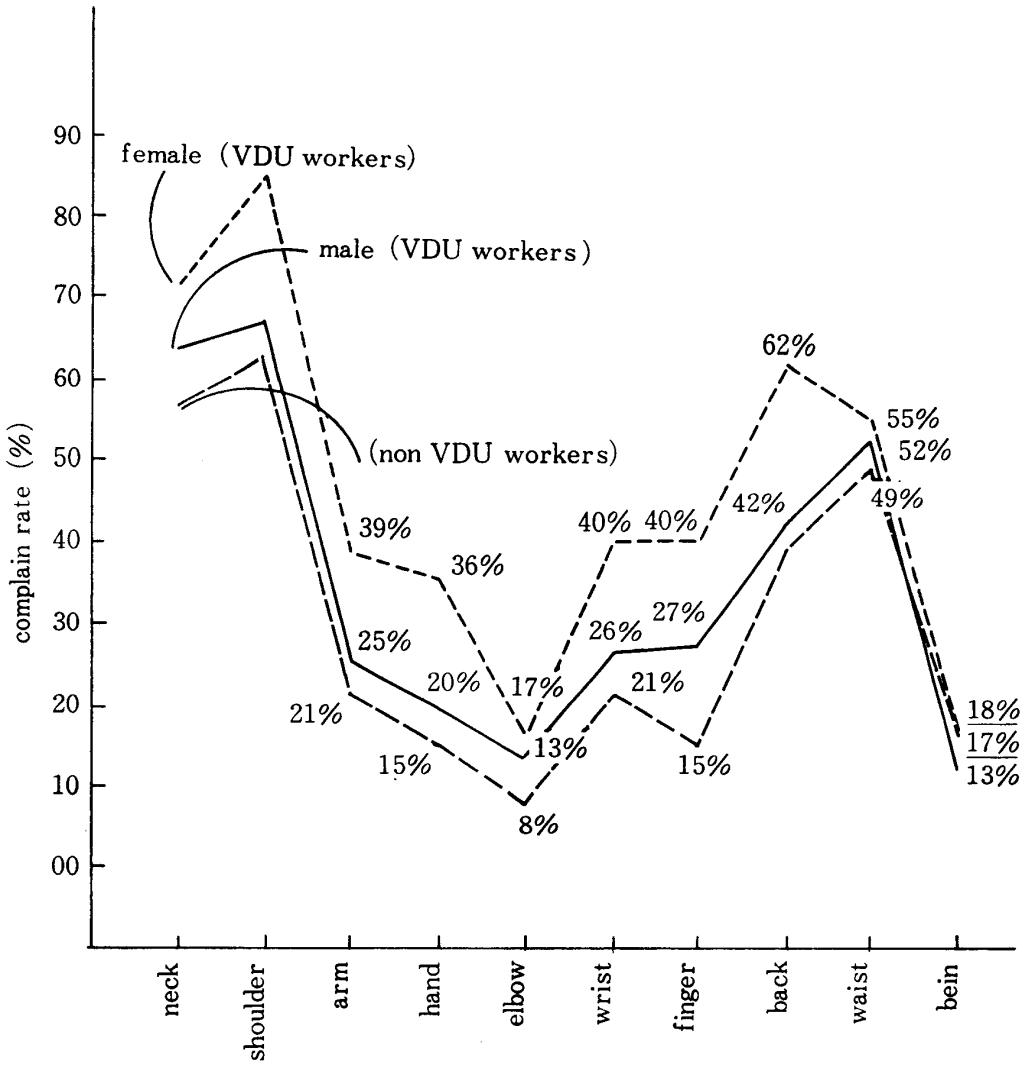


Fig 7. Body parts of complaints in VDU and non-VDU workers

chair for lean, reflection of screen, and rest time.

The reusults of survey indicate clearly that by introduction of OA machine, working loads of workers in the office increased significantly rather than it decreased workers' loads.

Increased VDU work brought health impairments among operators and anxious futures for their own living styles. It is considered that this problem was brought by insufficient considerations for safety, health aspects of VDU devices, and bad work environments in workplaces as well as inadequate working conditions to VDU operating works.

The guideline concerning to occupational safeguards for VDU operators was issured in 1984. This recommends the improvement of lighting condition and one continuous touch of less than 60 min. The effects of this guideline for reducing OCD occurrence is rather doubtful for the the present author.

	eye fatic	eye ache	eye mucus	become dim	drop eye sight	dazzling	neck pain	arm pain	back pain	low back pain	languid	no patience	wrist pain
size of screen	**			*			*	***	*	*	**	*	
mobiling of screen					**	***			*			***	
size and interval of letter	***	***		***	**	***	***	***	***	***	***	***	
clearness	*	***	*	***			**		*	**	***	***	
flicker	***	***	***	***	***	***	***	***	***	**	***	***	
space of table	*	**	***	**	**	***	**		**	**	***		
space for resting hands								*					
foot rest							**	***	***	*			**
thick of keyboard								*					
interval between keyboad and table						***	*		*	**			
adjustment of height of chair									*	**			**
adjustment of back of chair								***					***
reflection of screen	***	***	**	***	***	***	*		***	*	***	**	
voluntory rest	***	***		***	***		***		***	***	***		
over time	*	**		***	**			*					*

* 5%　　** 1%　　*** 0.1%　　correlation coefficient

Fig 8. Relation between VDU workers complaints and working conditions

8 Other Work

In addition to the above workers, OCD was noticed among the following workers ;

1) Packing or inspecting workers in food, cigarette, and pharmacological factories,
2) Telecommunication assembly workers in electronics factories
3) Sewing (by manual or by machine) workers,
4) Cloth workers,
5) Assorting workers of mails and parcels,
6) Tracing workers or writers of leaflets,
7) Workers in a hospital and an institute who give an injection or exchange bed sheets.
8) Workers in barber shops or beauty salons,
9) Workers in a kitchen,
10) Workers in a laundry.
11) Drivers of motorbicycle and forke-lift car,
12) Workers in a foundry,
13) Cutting workers in a bag manifucture,
14) Translators for sign language.

Table 6. Number of OCD patients in private companies who were recognized officially as occupationally originated.

Year	Total number of Patients
1965	2
1966	4
1967	6
1968	18
1969	40
1970	90
1971	160
1972	217
1973	300
1974	324
1975	546
1976	398
1977	428
1978	358
1979	305
1980	394
1981	439
1982	344

9. Official Statistics

The actual conditions of OCD incidence are not clear at present. Table 6 indicates the number of OCD patients who were officially recognized in private companies from 1965 to 1982. It is apparent from this that the incidence of OCD increased from around 1970. However, it should be noted that these numbers were those of officially recognized OCD patients. The author believes that we had more latent OCD patients in addition to this official statistics.

The standard of prescribing for OCD was regulated officially in 1964, 1969, and 1975. These standards are very restricted standards, especially with the period of work, work condition, symptom, and clinical sign.

Table 7 shows the number of OCD patients who were recognized officially and were received compensation in various kinds of work from 1977 to 1982. Compared with the other works, OCD occurred frequently among keyboard operating workers. Further, OCD also often noticed in work places where machines are not used.

According to the survey of health hazards for 6,100,000 manufacturing workers by the Ministry of Labour, Japan, 9462 workers were suffering from OCD and 655 workers were getting guaranteed wages for diseases contracted during working time in 1974.

Table 7. Number of OCD as diseases contracted during carrying out job in different occupational groups* (persons)

Occupation \ Year		1977	1978	1979	1980	1981	1982
Keyboard operating work	Key punch operator	73	33	34	44	46	56
	typist	48	27	25	23	28	18
	business machine operator	16	14	16	20	18	14
	cash register operator	48	51	26	29	38	37
	others	9	12	2	8	5	4
Manual work with repetitive elements	telephone operarator	5	5	2	3	3	2
	assembly line operator and inspectors	29	23	21	1	1	1
	others	70	74	65	53	60	29
Business work	drawing worker	5	4	1	2	3	3
	writer	7	6	3	32	42	11
	others	53	54	31	115	127	110
Other work	nurses in a day nursery	22	24	38	31	36	14
	others	43	31	41	33	44	45
Total		428	358	305	394	439	344

* The data was obtained from the Labour Standards Bureau. 1977～1982.

Table 8. The estimated number of workers with occupationally induced complaints of "tiredness" in the shoulder-arm-hand area

occupation	number of the workers with complaints	incidence of complaints
Management staff	51,000	4.0%
Engineers and researchers	109,000	5.4
Office work	373,000	9.4
Assembly line work	483,000	20.9
Vigilance work	21,000	5.9
General work	351,000	11.6
Transportation work	78,000	7.5
Sales or service work	103,000	6.0
Others	119,000	9.9
Total	1,691,000	10.0%

* Population was 16,910,000 workers employed in enterprises with more than 30 workers.

The estimated statistical results of the occupationally induced complaints in Table 8 show that 20.9% of workers in the conveyor belt production line complained "tiredness" in their shoulder-arm-hand areas, and various works produced physical complaints.

In 1984, the Ministry of Labour, Japan conducted health investigation on approximately 20,000 workers and found that male VDU workers complained of eye fatigue (58.5%), numbness of fingers (7.9%), languid feeling on arm (12.4%), stiffness of shoulders (42.7%), and back pain (15%). On the other hand, non-VDU male workers had similar compalints but the numbers were fewer than those of the VDU workers. The percentages of their complaints were 36.5%, 3.6%, 6.8%, 32.9%, and 10.6%, respectively. Female VDU workers complained of eye fatigue (70.5%), numbness of fingers (11.6%), languid feeling on arm (19.3%), stiffness of shoulders (59.3%), and back pain (19.3%). The percentages of non-VDU female workers were 47.9%, 5.3%, 10.1%, 44.4%, and 13.1%, respectively. It is apparent that VDU workers have symptoms of OCD.

The Ministry of Labour, Japan have not conducted any epidemiological study for OCD except this work.

Causing Factors of OCD

At the begining of the 18th centry, Italian physician, Ramazzini pointed out following three as the crucial causes of stenographist's and clerk's occupational diseses:

1) long lasting sitting postures,

2) repetitive work due to the use of upper limbs,

3) psychic depression due to the serious responsibility and the work involvong high speed and accurate performance.

In Japan, the tenosynovitis, the joint inflamation and the neck-arm syndrome among female peasants and blacksmiths have been reported by overuse of hands.

The causing factors of OCD are not simple, but complicated.

The work stress can be regarded as the following causing factors of OCD. OCD is a disorder which closely relates to the complex of chronic physical and mental fatigues.

(1) Repetive, streotyped upper limb exertions for long time and quantitative overload

(2) statically substained and/or unnatural posture.

(3) Mental stress and human relation

(4) Audio-visual stress

At the same time, the recuperation parameters are also important in modern work systems which deprive workers of freedom to rest from acute overfatigue or chronic fatigue during work.

(1) Insufficiency of all kinds of pauses during the work and voluntary rest (leisure, sports, recreation etc).

(2) Shortage of sleeping hours and free periods during off-the-job hours and holidays. domestics and childcare duties. Personal, social or environmental factors reduce the invidual's tolerance, especially in the female employees who have their baby.

The risk of strain increase when the workers habitually work and live beyond their capacity.

We must take account of this kind of bias in assessing parameters.

Table 9 shows the results of inquiries to 200 patients who were under long-term medical treatments concerning the causing factors of their OCD. The table represents the causing factors in various kinds of occupation.

Firstly, repetive and high speed hand work can be regarded as causing factors of OCD.

Above mentioned punching and assembly line work are the typical cases. Excessive frequency and speed of movements of the fingers, hands or arms is encounered on machine-paced operations; dispatched work, transfered work and at-home work.

Secondly, effective use of hand can be regarded as a causing factor of OCD. OCR (optical character) work is one of the typical examples.

OCR work means a work to input written scripts and digits into computer, and has been introduced in many workplaces. To input scripts and digits into computer requires special limitations in writing. Computer can not read out free writen scripts.

Table 9. Incidental Factors of OCD

(1) GENERAL OFFICE WORKER

* Continuous and repetitive work of duplitation by ball point pen, slip operations by abacus, turning over of slip, note accounting, oparations of cash register, and data input by OCR.
* Bending posture, sitting with differents of hands.
* Heavy account book, telephone directiry, and documents.
* Fast writing.
* Nervous tension by variety of work contents, sole work, reception of guest and telephone, and severe attitude for mistakes.
* Bad environmental condition such as exposure to cold wind, strong air-conditioning, poor warming.
* Lack of enough members and resting time.

(2) PUNCHER, TYPIST, MACHINE OPARATOR, AND CASH REGISTER WORKER

* Lack of uniformity of work, intensive work, required speed, overtime work, in the case of busy time, closing time, and events day.
* Heavy key registance, arm streching posture, machine which requires complicated manipulation, desk and chair which requires bad posture, and noisy circumstances.

(3) TELEPHONE SWITCHBOARD OPERATORS

* Increase of workload and ununiformity in work.
* Increase of restriction of movement and response by mechanization and automation.
* Change of continuous work period to 105-120 min. (max. 150 min).
* Change of dial to a heavy one.
* Heavy directory.
* Inspection from behind by those who perform managerial functions.
* Bad ventilation, uncomfortable air conditioning.
* Bad personnel management.

(4) CONSTRUCTION, INSPECTION, DRAFTING, AND PACKING WORKER

* Restless wrist-twisting movements with bad posture. (halfsitting, hold arm up, etc) in conveyer work in textile, electric, pharmaceutical, tabacco making, and machinery industries.
* Cold work bench, to hold arm up, to hold elbow up, and bending posture.
* Noise, vibration, high temparature, and coldness

(5) KITCHIN AND NURSERY WORKER

* Continuous strained work with had posture (halfsitting, and crouching) in excretion, meal time, and bathing cares.
* Mopping up, and dish washing.
* Inexperience of work, lack of manpower, outside nursery work, and events in addition with noise and coldness in winter.

Among OCR workers, OCD patients were frequently noticed. Table 10 shows the results of electromyograms to know how much muscle powers are needed in writing. As shown in this table, to write demanded digits requires 2 times or more strength than to write digits freely. Further, the required times to write demanded digits are 20-30% longer than in free writing. The writing pressure increases to 500-600 g in accord with the increase of writing times.

Thirdly, to hold up arms and effortive using of arms can be regarded as causing factors of OCD. Shoe making factory above indicated is one of the typical examples. Figure 9 shows the shoe-hunging work.

We conducted health inquiry, ocular inspection, and palpatory examination to 120 sitting workers in a shoe making factory. The results are shown in Table 11.

Table 10. Mean electric muscle discharge (μV/sec) per script writing as a function of writing materials in the right forearm extensor muscles for OCR writing

	Ball point pen free writni (A)	propelling pencil free writing (B)	propeling pencil OCR writing (C)	C/A	C/B	B/A
Script 1	1.086	15.18	27.70	2.55	1.82	1.40
2	17.32	21.79	45.87	2.65	2.11	1.26
3	17.56	22.02	65.05	3.70	2.95	1.25
4	24.64	26.61	39.20	1.59	1.47	1.08
5	26.85	34.58	76.10	2.83	2.20	1.29
6	18.39	23.45	62.27	3.39	2.66	1.28
7	27.98	30.71	41.98	1.50	1.37	1.10
8	24.70	30.48	92.86	3.76	3.05	1.23
9	22.38	26.43	79.51	3.55	3.01	1.18
0	18.99	24.35	77.56	4.08	3.19	1.28
Mean	20.97	25.56	60.81	2.90	2.38	1.22

Table 11. The results of palpation and ocular inspection of female workers in a shoe-making factory

	(N)	Hunging (35)	Inspection (15)	Sole pasting (15)	Taping toe-guard (26)	Others (29)	Total (120)
Ratio of patients among workers		51.4%	80.0%	20.0%	38.5%	24.1%	38.3%
Neck	languor, stiffness	51.4	60.0	46.7	30.8	31.0	40.8
	pain, numbness	17.1	20.0	0	11.5	13.8	12.5
	induration, oppressive pain	34.3	33.3	13.3	15.4	24.1	24.2
Shoulder	languor, stiffness	85.7	73.3	86.7	84.6	90.0	83.3
	pain	60.0	53.3	20.0	34.6	37.9	42.5
	induration, oppressive pain	54.3	66.7	40.0	50.0	48.3	50.8
Arm	languor, stiffness	42.9	40.0	20.0	23.1	27.6	30.8
	pain	40.0	40.0	26.7	30.8	17.2	30.8
	induration, oppressive pain	45.7	33.3	26.7	26.9	31.0	40.0
Hand, Finger	languor, stiffness	40.0	26.7	33.3	15.4	13.8	28.3
	pain, numbness	34.3	60.0	33.3	23.1	34.5	34.2
	induration, oppressive pain	11.4	6.7	13.3	11.5	0	8.3
Anamnesis of neck, shoulder, arm, and hand disease		37.1	40.0	46.7	30.8	20.7	31.7
Anamnesis of low back disease		5.7	13.3	0	3.8	6.9	10.0

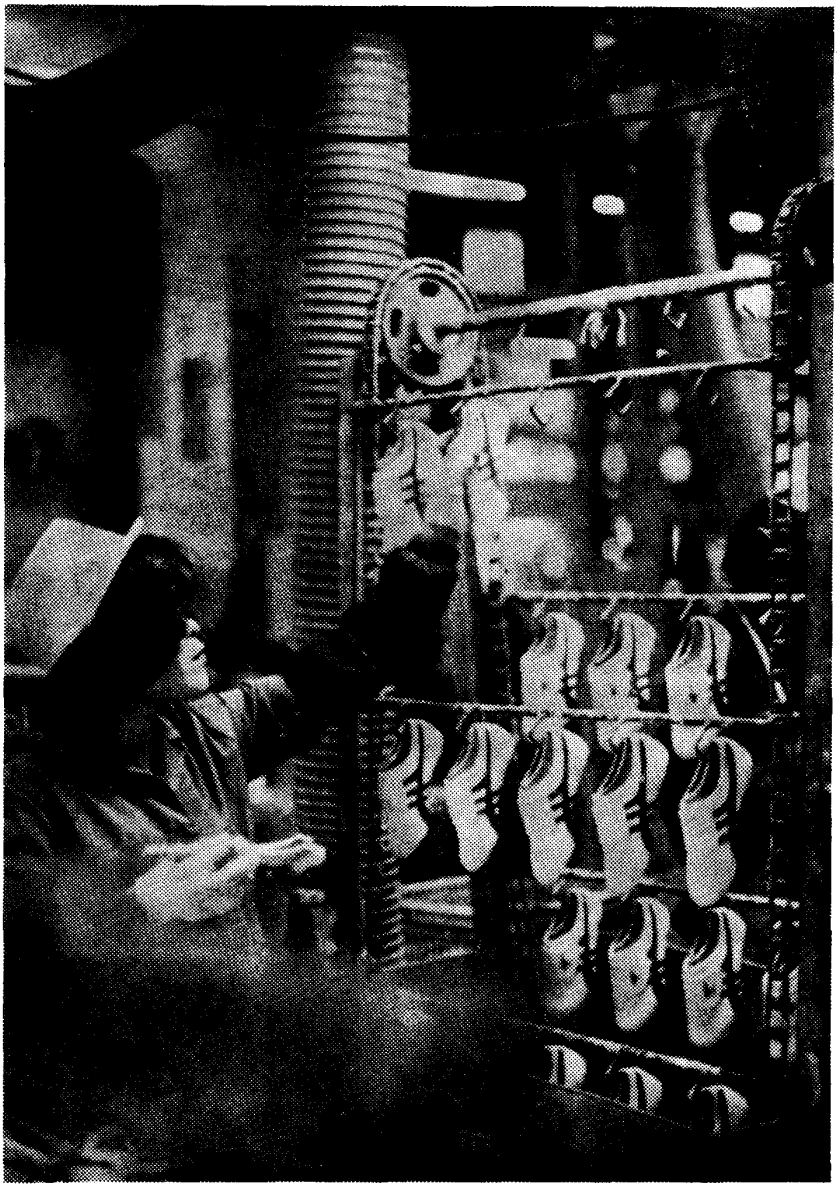


Fig 9. Shoe hunging Work

Table 11 indicates that overload of the upper part of the body in shoe-hunging, and overload of the shoulder in tape attaching and toe guard attaching are prominent. Overload of the shoulder is apparent in pressing work. Further, these results suggest that shoulder pain seems to be incidental and OCD sympotoms are incidential according to the kind of involved load in different work processes.

Fourth, bad posture and continuous compulsive movements can be regarded as causing factors of OCD or chronic low back pain.

Nursery work is a typical case. We conducted health inquiry to 243 nursery workers four times per day, (before work, before lunch break, after lunch break, and after work,)

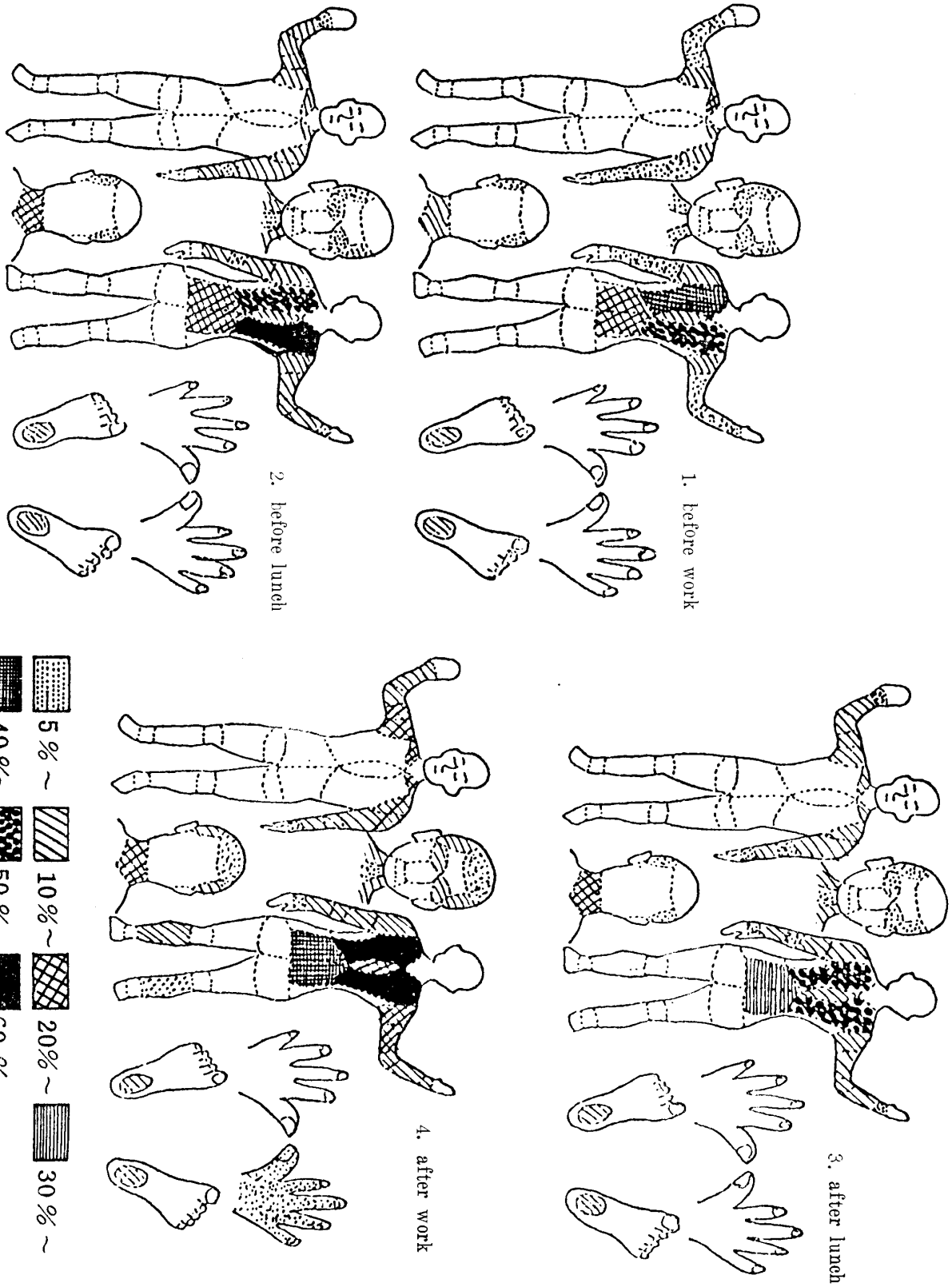


Fig 10. Change of part of nursery teacher's complaints per day

Table 12. Frequencies of various work postures per one hour in nursery teachers

work contents \ posture	duaration (s)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20	21 others
*preparation and clearance work	241	29.8	134.4	239.0	104.5	89.6	59.8	59.8	0.0	14.9	14.9	29.9	0.0	14.9	0.0	0.0	29.9	0.0	0.0
*playing and lesson	7019	27.2	122.1	130.8	51.8	43.5	2.6	16.4	1.0	12.3	3.6	40.0	11.3	19.5	4.6	0.5	3.1	20.5	16.4
*meal preparation	2098	27.5	187.0	152.7	34.3	37.7	17.2	5.1	1.7	5.1	1.7	15.4	10.3	3.4	1.7	0.0	0.0	20.6	10.2
*care in meal time and refresh time	3136	23.0	118.2	156.1	74.6	16.1	6.9	4.6	0.0	6.9	1.1	18.4	2.3	5.7	0.0	0.0	0.0	6.9	20..7
*clearance work in meal time	762	9.4	245.6	198.4	37.8	33.0	23.6	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4
*care of excretion	4396	12.3	90.1	136.8	81.0	31.9	20.5	6.6	0.0	0.8	0.8	19.7	10.6	11.5	6.6	0.0	0.0	21.2	22.1
*care of napping	4403	66.9	265.0	337.9	187.6	58.2	34.7	31.3	0.0	1.7	0.0	8.7	0.9	10.4	3.5	0.9	0.9	0.9	18.2
*administration work	3275	11.0	36.3	25.2	3.3	18.7	18.7	4.4	0.0	3.3	1.1	37.4	3.3	17.6	0.0	0.0	0.0	12.1	9.9
*cleaning and washing	1438	20.0	257.9	277.9	100.1	35.1	40.1	27.5	0.0	0.0	0.0	10.0	5.0	2.5	0.0	0.0	7.5	0.0	5.0
TOTAL	27011	19.6	106.4	116.6	47.1	28.1	18.7	9.3	0.4	4.9	1.5	19.8	6.2	11.0	2.8	0.1	1.4	12.2	14.7

for two days.

Figure 10 shows the results of the nursery workers' body complaints. As shown in this figure, areas of neck, shoulder, arm, back, and low back were the fatigued part of over 5 % of workers marked. The complaints variations in a day were noticed.

It is prominent that as the increase of working period, the fatigue complaints increase in areas of neck, arm, back, and low back.

Table 12 indicates the rates of frequency of postures required in the nursery work.

It is apparent that bad postures which bring overload to neck, shoulder, back, and low back areas are shown in playing, care in mealtime, and care for excretion.

Fifth, eccess of working hours, especially excess of continuous working period and insufficiency of rest period, is an important factor as the following facts clearly indicate.

Around 1973, frequent OCR patient appeared among telephone exchange operators in NTTPC. This was due to the fact that one continuous working period changed from 60 min. to 105-120 min. On the other hand, OCR incidental rate among check out operators in supermarkets have decreased since the introduction of rest time every after 60 min. work.

In a manual work which requires high-speed operation and high-tentioned concentration such as word-processor or computer terminal operators, frequent short-term rest should be introduced. Word-processor operators used to press the key-board 80,000-100,000 strokes per day, 6-8 hours per day, and 35-50 hours per week. In such case, OCD is liable to occur. To reduce workload of these workers, 1) reduction of work amount, working hour per day, continuous working period, 2) to allow for voluntary rest, break, and relaxiation, 3) increase of holiday are effective.

Clinical Aspects

The characterisics of complaints by OCD patients are 1) perversive and untolerable pain, stiffness, and languid feelings continuing for a long period though the degree is not constant, 2) work load such as hand using (turn over, write, pick up), to carry luggage, to hang bags up on the shoulder, to be exposed by cold wind, or to talk complicated topics which were quite easy task before disease beats the patients, 3) mental stresses by the fact that no one knows the patient's real feeling, 4) continuous bad feelings such as lack of sleep, headache, irritative feeling, or bunging feeling on ears, 5) effects of remedial treatments seem to be appeared very slowly and the patients lose their will to continue

remedial training partly because of poor communication with their doctors.

The status of OCD by the author's examination on 200 OCD patients were as follows;

1) Symptoms before and after OCD incidence

The majority of patients claim that unusual stiffness on their necks and shoulders continues for 3 to 6 months, then the feeling of pain, stitch, swelling on neck areas, and pain on shoulders appear. The back pain, oppressive pain, interuption of sleep by pain, headache, and pain by the neck movement are noticed by many OCD patients at this stage. Some clients complain the following symptoms that to drop their personal goods, and others claim the severe languid or painful feeling on the day of bad weather.

Further, some notice that it is not possible or painful to hold handbag, purse, or telephone receiver and to squeeze towell or washing cloths. They also complain of sleep disturbance, headache, irritative feeling, absentmindness, or lack of appetite. Eye fatigue and low back pain are sometimes main complaints of OCD patients.

2) Sympotoms in worsing stage

Frequent and strong pain and aching are the main symptoms in this stage. The pains are easily induced by light touchings or movements and continue night and day. Full movements of neck or hands are impossible. Only just sitting induces a fatigue easily. In a cold day, neck and back are felt as heavy as lead. Frequent drop of carrying goods and stumbling against goods are noticed.

To carry some heavy luggage or to write down are untolerable on a day of bad weather. Almost patients complained of symptoms such as headache, irritative feeling, absentmindness, nausea, sleep disturbance, slight fever and eye pain in this stage. The feeling of nose or ear bunging, husky voice, and liable to catch cold are also the symptoms which are noticed in this stage.

3) Symptoms in the stage of recovering

Pain decrease gradually and appear only in the occasion of excessive work. However, slight work induces fatigue, stiffnes, stitch, and swelling in the area of neck and shoulder. These feelings can be reduced by resting, exercise, and massages. Everythings can be done if the pace is keep reasonably slow. The symptoms in this stage can be strongly reflected by the weather or the air-conditioning.

1. Duration of Working Experience Until OCD Incidence

Table 13 shows the duration of working experiences until the incidence of OCD. This

Table 13. Work Experience Periods Until the Incidence of OCD

Experiences	Number of Patients (Makino Hospital)		Number of patients (Author's Clinic)	
0 - 3 months	38	(6.6%)	4	(1.1%)
3 - 6 months	36	(10.4%)	12	(3.3%)
6 - 12 months	46	(13.3%)	57	(15.6%)
12 - 24 months	93	(26.9%)	63	(17.2%)
24 - 36 months	57	(16.5%)	78	(21.3%)
over 37 months	91	(26.3%)	152	(41.5%)
Total	346		366	

data is based on the patients who admitted to the Makino Hospital and my clinic. This data does not include the patients whose complaints were temporal pain of fatigue. This table represents that there are two peaks, at 1 to 2 years and 3 to 5 years of working experiences, in the incidence of OCD.

Table 14 shows the relationship between OCD incidence and working experiences in cash register workers of a super market. This health examination was conducted by us. It is apparent also that there are two peaks, at 1 to 2 years and 3 years more working experiences.

The standard of the Ministry of Labour, for official recognition as OCD which is induced by work, regards that there is no OCD patient among workers who have fewer work experiences than 6 months. It should be stressed that as Table 14 shows OCD can be induced by the fewer experiences than 6 months.

Table 15 represents the conditions of OCD incidence at a precise machinary factory in Kyoto. The working condition in this factory were changed frequently. In this case, OCD was noticed among experienced workers who were required to introduce new work which involoved frequent muscular movements even after one week to 3 months. These OCD patients needed very long term treatments. It must be the crucial OCD inducing factors in this factory that.

(1) short-term and uniform training for new work introduction,

(2) no consideration for aptitude-work content interaction in the workers arrangement,

(3) strong neural stresses due to heavy responsibilities for work,

(4) requirements of special techniques.

Table 14. The Results of health Examination in a Super Market

Work experiences / Symptoms / No. patients		~3 mon. 96	5~11mon. 192	1 jrs.~ 102	2 jrs.~ 39	3 jrs.~ 47	Total 476
Shoulder	stiffness, lauguor	31 32.3%	74 38.6%	53 52.0%	13 33.3%	30 63.8%	201 42.2%
	pain	1 1.0	10 5.2	15 14.4	4 10.3	8 17.0	38 8.0
Neck	stiffness, languor	6 6.3	20 10.4	21 20.6	4 10.3	9 19.1	60 12.6
	pain	4 4.2	8 4.2	8 7.8	3 7.7	7 14.9	30 6.3
Arm	languor, pain	9 9.4	22 11.5	29 28.4	3 7.7	12 25.5	75 15.8
		1 1.0	5 2.6	9 8.8	1 2.6	1 2.1	17 3.6
Hand and finger	languor	1 1.0	6 3.1	14 13.7	2 5.1	10 21.3	33 6.9
	pain	2 2.1	6 3.1	9 8.8	1 2.6	4 8.5	22 4.6
	numbness	3 3.1	2 1.0	4 3.9	1 2.6	3 6.4	13 2.7
	tremor	1 1.0	3 1.6	9 8.8	3 7.7	3 6.4	19 4.0
	coldness	8 8.3	12 6.3	16 15.7	4 10.3	15 21.9	55 11.6
	disturbance of motion	2 2.1	5 2.6	6 5.9	1 2.6	3 6.4	17 3.6
Low back	languor	0	7 3.6	12 11.8	3 7.7	9 19.1	31 6.5
	pain	1 1.0	8 4.2	10 9.8	6 15.4	2 4.3	27 5.7
Lower limbs	languor	5 5.2	10 5.2	11 10.8	2 5.1	7 14.9	35 7.4
	pain	2 2.1	2 1.0	2 1.0	6 5.9	1 2.6	3 6.4
	coldness	11 11.5	13 5.8	21 20.6	5 12.8	13 27.7	63 13.2
Autonomic imbalance		5 5.2	6 3.1	13 12.7	5 12.8	6 12.8	35 7.4
Oppressive pain and induration	neck-back	12 12.5	37 19.3	41 40.2	16 41.0	11 23.4	117 24.6
	shoulder-arm	27 28.1	56 29.2	46 45.1	18 46.2	23 48.9	170 35.7
	hand	26 27.0	41 21.4	33 32.4	14 35.6	17 36.2	131 27.5
Tremor		1 1.0	9 4.7	8 7.8	2 5.1	7 14.9	27 5.7
Neural test		1 1.0	14 7.3	17 16.8	3 7.7	5 10.6	40 8.4
Neck movement disturbance		5 5.2	19 9.9	27 26.5	6 15.4	10 21.3	67 14.0
Neck movement pain		6 6.3	21 11.0	27 26.5	7 18.0	12 25.5	73 15.3
Grasp strength decrease		22 22.9	56 29.2	29 28.4	10 25.6	15 31.9	131 27.5
Persistent grasp strength decrease		5 5.2	14 7.3	11 10.8	5 12.8	3 6.4	38 8.0
Pinching power decrease		14 14.6	43 22.4	26 25.5	5 12.8	15 31.9	103 21.6
Back muscle strength decrease		27 28.1	61 31.8	30 29.4	13 33.3	23 48.9	154 32.3
Tapping test decrease		4 4.2	17 8.9	9 8.8	4 10.3	4 8.5	38 8.0
Temparature perception test		8 8.3	21 11.0	12 11.8	5 12.8	3 6.4	46 10.3
Tactile perception test		4 4.2	9 4.7	7 6.9	2 5.1	2 4.3	24 5.0
Threshold of visual recognition		23 24.0	39 20.3	18 17.6	13 33.3	9 19.1	102 21.2
Diagnosis	Normal A	73 76.0	107 55.5	34 33.6	16 40.8	13 27.9	243 51.1
	Cautious B1	13 14.0	58 30.3	36 35.2	14 36.7	13 27.9	134 48.6
	Cautious B2	9 9.0	21 10.9	22 21.9	6 14.3	12 25.9	70 25.3
	Need treatment C1	1 1.0	5 2.8	9 8.6	3 8.2	7 14.0	25 9.1
	Need treatment C2	0	1 0.5	1 0.8	0 0	2 4.7	4 1.4
Treatment before examination	Rearrangement	0	6	20	4	6	36 7.6
	Resting	0	12	13	6	6	37 7.8
	Treatment as out-patient	2	18	18	8	12	58 12.2
	Treatment as in-patient	0	4	4	2	2	12 2.5

Table 15. Examples of OCD incidence in a precision machine factory (female workers only)

Case	Age	Work experience	Kind of work at incidence and its experience	Diagnosis and treatment	Official recognition
1	24	2 mon.	Key puncher 2 months	left arm tenosynovitis Two month admittance	yes
2	32	10 yrs.	build up work 10 days	OCD One mon. rest	No
3	36	14 yrs.	parts processing 1 mon.	neck syndrome 1 mon. treatment as out-patient	Yes
4	29	3 mon.	parts processing 3 mon.	OCD 8 mon. rest	Yes
5	32	10 yrs.	soldering one week	tenosynovitis 1 week rest	No
6	40	17 yrs.	build up in conveyer system one week	OCD 14 mon. rest	Yes
7	39	17 yrs.	build up in conveyer system one week	OCD 3 mon. rest	Yes
8	40	17 yrs.	type writing 17 yrs.	OCD 6 mon. rest	Yes
9	38	13 yrs.	general office work 13 yrs.	right hand tenosynovitis 4 mon. treatment as out-patient	No
10	49	7 yrs.	parts processing 7 yrs.	OCD	No

2. Subjective Symptoms

The developing courses of subjective symptoms for 162 OCD patients who were under long-term treatments are shown in Table 16.

The primary symptoms through three stages were stiffness, fatigue, difficulty in writing, languid feeling, shoulder and neck aching, arm and finger aching, difficulty of arm movement, and painful feeling in bad weather.

3. Medical Impressions

Table 17 shows the medical impressions for 58 OCD patients.

The most prominent impressions were as follows;

(1) oppressive pain and induration in the neck area,

(2) oppressive pain and induration in the shoulder area,

Table 16. Subjective Symptsom

Symptoms	Incidental period		worsing period		recovering period	
strong/mild	s	m	s	m	s	m
	%	%	%	%	%	%
* wearisome	39.7	44.8	74.1	24.1	37.9	46.6
* shoulder stiffness	62.1	29.3	84.5	13.8	58.6	36.2
* languid feeling	41.4	34.5	74.1	19.1	22.4	56.9
* eye fatigue	43.1	34.5	60.3	24.1	31.0	37.9
* lack of patience	20.7	43.1	56.9	25.9	20.7	43.1
* sleepy	19.0	29.3	44.8	22.4	17.0	19.0
* aching (neck and shoulder)	36.2	32.8	69.0	19.0	27.6	39.7
* aching (arm and finger)	20.7	43.1	65.5	15.5	15.5	31.0
* arm pain	19.0	39.7	53.4	24.1	13.8	34.5
* headache, heavy feeling in head	32.8	31.0	56.9	31.0	17.2	43.0
* irritative feeling	12.1	46.6	50.0	29.3	12.1	41.4
* sleeplessness	22.4	34.5	55.2	17.2	17.2	32.8
* difficulty in writing	22.4	39.7	70.7	17.2	29.3	41.4
* difficulty in bed making	13.8	36.2	43.1	41.4	13.8	25.9
* numbness in hand	22.4	29.3	41.4	34.5	17.2	32.8
* coldness in hand and limbs	39.7	31.0	62.1	22.4	25.9	36.2
* dizziness, orthostatic syncope	20.7	37.9	50.0	29.3	10.3	22.4
* difficulty in dish washing	20.7	37.9	50.0	29.3	10.3	22.4
* difficeulty in handbag carrying	15.5	27.6	48.3	32.8	13.8	31.0
* sleep disturbance by pain	25.9	24.1	55.2	22.4	12.1	20.7
* difficulty in continuing to hold up arm	31.0	13.0	67.2	15.5	20.7	34.5
* pain in neck bending	32.8	27.6	60.3	19.0	32.8	34.5
* low back pain	22.4	27.6	50.0	24.1	19.0	39.7
* pain in a bad weather	19.0	36.2	65.5	15.5	25.9	34.5
* difficulty in holding telephone receiver	17.2	37.9	55.2	24.1	13.8	44.8

(3) oppressive pain and induration in the nape area,

(4) motor pain and motor disturbance in the neck area,

(5) motor pain and oppressive pain in the arm area,

(6) decrease of grasping power, pinching power, and tapping,

(7) decrease of back muscle power,

(8) motor disturbance, oppressive pain, and induration in back muscle.

The special signs noticed among advanced OCD patients were that,

(1) tremor of fingers,

(2) colour difference between hands,

(3) pain in finger bending,

(4) positive sign in the nerve extention test,

Table 17. Medical Findings

symptoms	advanced case (36)		mild case (22)	
	++	+	++	+
	%	%	%	%
1. finger tremor	38.9	25.0	4.5	18.2
2. colour difference in hands	25.0	13.9	0	4.5
3. pain in finger bending	50.0	27.8	4.5	18.2
4. oppressive pain in elbow muscles	53.9	13.9	18.2	22.7
5. oppressive pain in neck muscles	75.0	19.4	18.2	18.2
6. pinching pain in shoulder muscles	77.8	22.2	22.7	31.8
7. cramp in muscle in arm extension	58.3	33.3	9.1	13.6
8. pain in neck bending	100	0	31.8	31.8
9. difficulty to hold arm up for 10 sec.	94.4	5.5	22.7	30.4
10. difficulty to continue grasp-extension movements over 30 times	59.4	22.2	13.6	13.6
11. weak grasp strength	52.8	47.2	9.1	50.0
12. weak back-muscle strength	52.8	44.4	18.2	22.7
13. difficulty to bend back for 10 sec.	66.7	33.3	9.1	50.0

++ strong + mild

(5) motor pain in hands,

(6) disturbance of peripheral circulation (skin temperature drop etc).

Figure 11 represents the body parts of oppressive pain noticed in OCD patients. In the early stage of OCD, pains at 4, 5, 6, 8, 9, 12, and 16 are recognized and the parts of pains spread gradually over the various areas depending on the increase of seriousness.

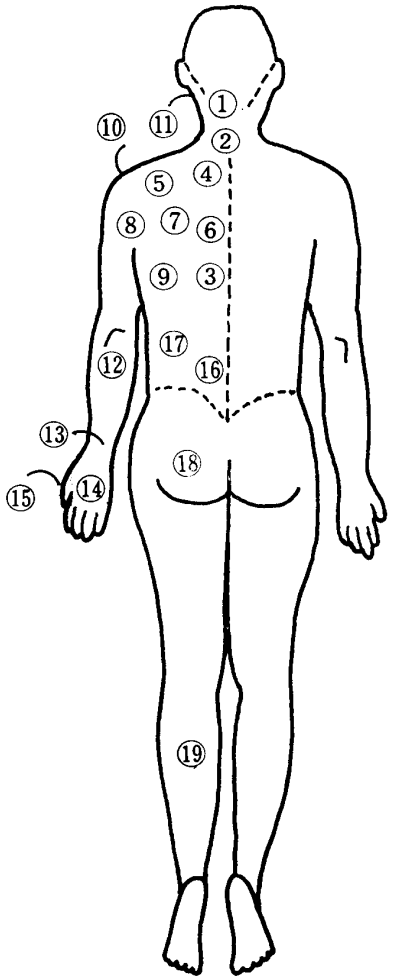
The most noticeable medical signs of OCD are tenderness and induration of muscles in the shoulder girdles and arms. In general, in the acute or progressive stages, applying pressure on OCD patient's body induces painful feeling. However, in the stable stage, applying pressure gives pleasurable not painful feeling.

According to the stages of the disorder proposed by the Japanese Committee, the symptoms in Stage I or II mainly consist of these signs.

Not only the above signs but also tenderness and swelling in the insertion, tendon sheath, and paratendon are noticed. These may be regarded as clinically distinct signs from a humeral epicondylitis or tenosynovitis. With increase of the intensity of tenderness, induration, and swelling, muscle tension accelerations are shown. As a result, mobility of the neck and shoulder joint deteriorates with the pain on exertion. These signs in stage III appear separately from each other and reaches pathological state which requires treatment and restriction of work and daily life activity.

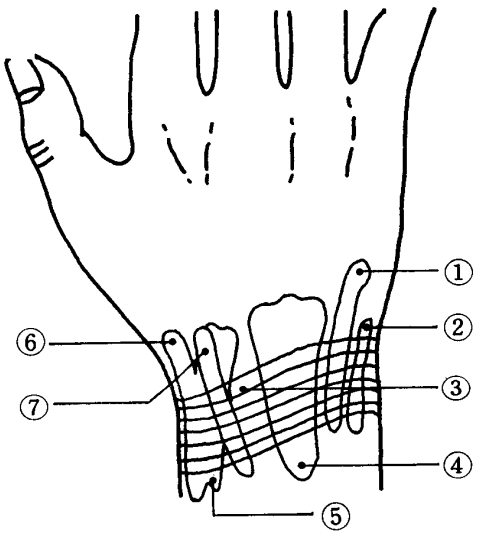
The motor disturbance of the neck can be recognized on neck extention and/or lateral

Fig 11. Muscles incident to OCD



1) Regio occiput inferior
2) Mm. nuchae
3) Mm. thoracic vertebrae
4) M. levator scapulae
5) M. trapezius
6) Mm. rhomboidei
7) M. infraspinatus
8) M. teres minor
9) M. pectoralis major
10) Processus coracoideus
11) M. scalenus anterior
12) M. extensor antebrachii
13) Proc. styloideus radialis
14) Mm. extensor digiti
15) Thenar
16) Mm. lumbar vertebrae
17) M. quadratus lumborum
18) Regio glutea
19) M. biceps surae

Body parts of oppressive pain, body parts of pain, numbness, and stiffness.



Tendon sheath and aponeurosis in carpus.

1) M. extensor digiti minimi
2) M. extensor carpi ulnaris
3) Retinaculum extensorum
4) M. extensor digitorum and m. extensor indicis
5) M. extensoris carpi radialis longus et brevis.
6) M. abductor pollicis longus
7) M. extensor pollicis longus

flexion. This phenomenon can result compressions of nearby nerves and/or arteries and therefore develop neuralgia and peripheral circulatory disturbance, which can be seen in thoracic outlet syndrome.

Percussion pain over the spinal process is frequently noticed in this disorder, which can spread over two or more vertebrae where irregular scoliosis can be identified radiographically. Tenderness and induration along the paravertebral region are also noticeable.

We recognize that tenderness of the plexus brachialis in the supraclavicular groove is a index to understand the stage of the disorder. It can be found at the beginning of the stage Ⅲ. Marked tenderness and clear radiating pain from the arm is regarded as the sign of the progressive stage.

Tenderness of the cutaneous nerve is frequently observed in the neck, occiput, shoulder, and periorbicular region where nerves penetrate the fascia. Knock pain along the nerve (Tinel's sign) indicates nerve impairment probably due to compression mechanisms such as entrapment neuropathy.

Consequently, these results in neuralgia and numbness bring about secondary muscle tention which has an influence on the central nervous system and causes headache, sleeplessness, nervousness, etc. These signs are thought as a complicated process in which a trigger is produced by tenderness and induration, and accentuated muscle tonus transfers pain to another part of the body and produces new distress. However, this view still remains contraversial and speculative.

Sensory disturbance such as numbness and/or hypesthesia are also important signs in OCD. The disorders with entrappment neuropathy in either median or ulnar nerve, and disorders with radicular neuropathy of the neck area may be occasionally seen. However, sensory disturbances often ignore common boundaries of nerve distribution and have signs such as elevated thresholds in touch, cold, and pain sensations.

Moreover, sometimes, paresthesia of the half part of the body including upper and lower extremities corresponding to the affected site appears with its boundary around the mid-line of the body. This sign is easily influenced by an overuse of the affected arm, coldness and sleeplessness. The paresthesia improves along with an improvement in the other signs. This type of paresthesia has been pointed out by some investigators, but others are not always in favour of its existence.

From the above, these sensory disturbances (except for entrapment neuropathy) are regarded as a disorder with not only peripheral origin but also central origin or reflex mechanisms related to autonomic nerves.

Peripheral circulatory disturbance developes the symptoms such as hypersensitivity to cold, coldness of hands and occasionally 'Raynaud's phenomenon. The cold provocation tests have been used to identify the delay in recovery of skin temparature. The cold-sensitiveness recovers with improvement in the other generalized syndromes. Although sometimes a positive arterial test result (such as in Allen's test) can be seen, there are usually less organic changes and this process is probably originated from autonomic nerve disturbances.

The other important signs are back and/or low back pain which are probably brought by sustained and/or unusual posture accompained by upper limb loading.

Psychological symptoms such as emotional instability, difficulty in concentration, sleep disturbance, sleeplessness, thinking disturbance, and depressive state are frequently seen at the later stage. The pathogenesis of these symptoms has been debated and has been attributed to several conditions such as; (a) resulting from cervicobrachial disorder, (b) work conditions including human relations, and (c) individual physical and psychological conditions.

These psychological symptoms are signs in the Stage IV. From the fact that these sympoms improve with development of other signs, it can be thought that these symptoms are closely related to cervicobrachial disorders.

In addition, both ophthalmologic and otolaryngologic disorders must also be taken into consideration.

4. Types and Status of OCD Symptoms

The special characteristics of OCD area;

1) the conditions of disease have wide variations, i.e., disease involves not only the areas of neck, shoulder, and arm but also the areas of low back and lower limbs,
2) the perceptual disturbance is an important symptom to make a diagnosis, however, the shown perceptual disturbances do not necessarily correspond with the nerve distribution. That is, perceptual disturbances are sometimes noticed in unilateral whole body or in the areas of right upper limbs and left lower limbs,
3) almost cases involve disturbances of peripheral circulation. Therefore, tests for peripheral circulation should be involved in diagnosing,
4) incomplete OCD symptoms in clients do not necessarily imply the client normal.

The types of diseases which are not usual are shown in Table 18.

Table 18. Types of OCD

Syndrome / Findings / Errorneous diagnosis
(1) muscle aponeurosis, inflamation yndorome/ oppressive pain, induration, hypertensyin, weak grasp strength/ myogelosis, mayalgia, rachiodynia, stiffness disease, neck arm syndrome
(2) autonomic polyneuritis/ abnormal perception, dullness in half body/ autonomic imbalance, neurocirculatory asthenia, hemiasthenia, reflecting sympathicotonia
(3) tendon. carpal tonnel syndrome/ inflamation, cramp in writing/ tendovaginitis, peritendonitis, writing cramp, ganglion
(4) abnormal angiotonic syndrome/ coldness, numbness, peripheral circulation disorder/ congestion, Raynaud's disease
(5) diencephalic syndrome/ headache, irritative feeling, lack of persistence, emotional disorder/ autonomic imbalance, psychosomatc disease, depression
(6) vestibular syndrome/ dizziness, tinnitus, difficulty of equilibration/ Meniere's symptom complex, tinnitus
(7) vasomotor nerve oppressive syndrome/ tension of scalenus, oppressive pain/ scalenus syndrome, thorax syndrome

It seems that the diseases are caused by the repetitive use of fingers and/or the sustaining posture of upper extremities.

Previous reports showed that the primary disease among office machinary workers is the OCD as a complex form. However, their work contents show that unique symptoms such as tenosynovitis, arthiritis, myositis, carpal tunnels syndrome, ulnar tunnel syndrome, disorders of independent extention of connexus intertendineus, and entrapment neuropathy can be developed. Therefore, it should be stressed that the case of incidence of these incomplete OCD should be recognized officially if the relationship between symptoms of disease and work contents is clear.

The incidental area of tenosynovitis involves tendons of flexer muscles, muscles extensor pollicis brevis, and muscles abductor pollicis longus. Symptoms of tenosynovitis involve swelling, flare, oppressive pains corresponding with tendon sheath crepitation in finger and occasional snapping phenomenon.

5. Stage of OCD

General courses of the development of this disorder is as follows. In the cases with acute onset or acute exacerbation, however, the diagnosis should be made by careful exam-

ining of the course of symptoms.

Stage I : Tempolaly feeling of pain stitch and swelling mainly subjective symptoms not necessarily limited to the region of the neck, shoulder, and arm, are shown without obvious objective findings. They are restored to health by rest.

Stage II: In addition to the symptoms in Stage I, muscular induration and/or muscular tenderness in the region of the neck, shoulder and arm are shown. On this stage the control of work and environment are necessary.

Stage III : Some of the followings are added to the symptoms in Stage II. On the stage the medical care is necary,

1) Increase of the intensity or the extent of muscular induration and/or muscular tenderness,
2) Positive neurological signs,
3) Sensory disturbance,
4) Decrease of muscle power,
5) Percussion pain over the spinal processes,
6) Tenderness over the paravertebral region,
7) Tenderness along the nerve branch,
8) Tremor of the fingers or eyelids,
9) Motor disturbance of the neck, shoulder, hand, etc.,
10) Impairment of peripheral circulatory function.
11) More severe subjective complaints.

Stage IV :

(a) Many symptoms in Stage III are presented with extended sensory disturbance, more advanced decrease of muscular power, and an increased number of positive neurological signs, etc...

(b) The following specific manifestations may develop subsequent to Stage I or II, not necessarily passing through Stage III.

(1) Organic disturbances (such as tenosynovitis, tendinitis, peritendinitis, limitation of the independent finger extension due to changes in the intertendinous juncture, etc.) may appear.

(2) Symptom complex compatible with the cervicobrachial syndrome in orthopedics may appear.

(3) Autonomic nervous disturbances (such as blood congestion, equilibrium disturbance, cardiac neurosis, etc.) may appear.

(4) Mental symptom (such as emotional instability, difficulty in concentration, sleep disturbance, thinking disturbance, and depressive state may appear.

Stgae V : Symptoms in Stage IV may appear obviously not only in work but also in daily life activities may appear.

On the stage IV and V, when they are restored, they often return. They need the occupational rehabilitation.

6. Individual Factors

OCD patients have been shown among female workers rather than among male workers. This is not due to the sex difference in muscular strength. Rather, the fact that female workers tend to engage manual works involving high speed repetition may account for this phenomenon.

OCD patients are noticed among young workers as well as middle and elder workers. However, clinical impression of cervical vertebrae generation by radiographical examination is frequently noticed among middle and elder workers. OCD is incident to the following people;

1) tall or short who work with bad posture because of the lack of adjustable equipment for their height,
2) engaged in works which need strong power even though their muscular strength are not enough.
3) clumsily engaged in works which need precise finger movements.

Further, OCD is incident to persons who have disorders in visual function and/or feeble torelance to psychological tensions or stresses.

However, it is not possible, in general, to ascertain the apptitude for the characters not to contract OCD.

7. Problems of Differential Diagnosis

In the later stages of the disorder, the following symptoms may be found in the OCD patients: 1) organic disturbances such as tenosynovitis, tendinitis, peritendinitis, etc. which can be observed if the work requires a large amount of physical strength and vibration or shock, 2) cervicobrachial syndrome as defined in orthopedics, which can be seen in workers with a long career of work with a forward bending posture and a static load,

3) autonomic nerve disturbances, which may be seen in workers who are sensitive to multiple stresses in their workplaces, and 4) mental symptoms which may be typical to neurosis. It must be noted that any of these disorders may make it difficult to prove the occupational nature of the illness with respect to the workmen's compensation.

8. Therapy

The following principles are necessary to the remedial treatments for OCD;

1) Treatments should be planned with due regard to the nature of OCD. That is, the disease is a chronic disorder by fatigue and disorders may be appeared in the whole body.
2) Patients who are diagnosed as Stage III or more should leave the workplaces and begin the remedial treatments immediately.
3) To continue a so-called "hard training" is not desirable for OCD patients.
4) Patients should receive remedial treatments actively not passively. The may feel difficulty in leading everyday life, however, remedial treatments can be done in everyday life situations. They may face various difficulties. Only active attitude for treatments overwhelme them. Passive attitude for treatments may bring no effect.
5) Ego-involving remedial treatment programs based on the patient's loss of muscular strength and personal environment should be prepared for each OCD patient. And the programs should be the one which can be checked at any time to know the patient's progress.
6) The goal of treatment should be to recover the ability to adjust to everyday life. The remedial treatment programs should be prepared to recover the lost abilities requiring in everyday life, such as knife cutting, hanging washing cloths, etc. step by step.
7) Multi-dimensional remedial treatments by paramedical staffs including doctors, physiotherapists, case workers, etc. should be considered for remedial treatments.

In the case of neuritis, tendonitis, tendovaginitis, or arthralgia where patient's complaints of pain are serious, an employment of anodyne and antiphlogistic agents can be considered. To keep rest of the affected part is indispensable until the inflammation decreases to an reasonable level. It should be avoided to use the affected part as usual even if their pain complaints reduced slightly.

In case of severe stiffness being main complaint, muscular relaxants, circular facilitation drugs, and vitamine E are prescribed. To the numbness and pain by neuritis, vita-

mine B complex drugs are prescribed.

These possess subsidary effects to reduce anxiety and sleeplessness.

As a medicine for external use, a poulitice is prescribed frequently to reduce inflammation and pain and/or to improve circulation.

When the inorder of peripheral circulation of blood and lymph are inducing pain, languid, dropsy, numbness, and chronic inflammation, thermotherapy is sometimes introduced. The therapies include hot-pack application, paraffine bathing, steam bathing, mineral mud bathing, ultra short wave radiation, etc. Then, it should be noted that thermotherapy cannot be applicable to the patients who are suffering from acute inflammation until their inflammations reduces to a certain level by cooling therapy. The low frequency wave therapy is applied to facilitate circulation by intermittent muscular contractions and to reduce nerve pain.

Massage and air bubble bathing can be facilitate circulation by the mechanical stimuli such as vibration and pressure. The traction therapy of neck or low back in the fatigue-induced disease seems to stimulate groups of muscle and/or ligament rather to affect vartebrae directly.

Further, in some cases, injections to neural blocks, treatment with acupuncture and/or moxibustion are employed and have beared effects.

The core of an exercise therapy which is a part of physiotherapy, is active voluntary movements to recover the patient's deteriorated functions by the disease. This therapy can be regarded as one of the best basic method and applicable to all kinds of OCD patients. Concretely, an exercise therapy consists of circuit training, exercise bathing, etc..

Table 19 shows the subjective evaluations of various remedial treatments by 162 long-term patients under medical treatments.

As apparent from this table, the effective remedial treatments, symptoms, and results were as follows;

1) Rest; sciatic neuralgia and general body symptoms, (good rest and total medical treatments are available),
2) Hot compress pack; pain and stiffness in the neck and shoulder areas, (feeling to be free and circulation improvement are available)
3) Hot spa bathing; pain, languid, and numbness of arm areas, (reduce of pain, good sleep, reduce of stiffness, and luxury feeling are available),
4) Massage; stiffness and pain in the low back, arm, neck, and shoulder areas, (free neck movement and comfortable body feeling are availble),

Table 19. Subjective Evaluations of Medical Treatment Effects

		Ratio of care	5	4	3	2	1
Admission to hospital		21.2%	29.4%	35.3%	17.6%	5.9%	11.8%
Drug	* vasodilator	18.3	4.8	23.8	28.6	38.1	4.8
	* pain-killer	30.8	0	28.2	30.8	28.2	12.8
	* tranquilizer	41.3	17.1	28.6	25.7	25.3	2.9
	* for headache	34.6	13.9	38.9	30.6	11.1	5.6
Injection	* hypodemically	21.2	5.6	33.3	27.8	16.7	16.7
	* intravenous	38.5	0	50.0	55.6	55.6	11.1
Compress	* hot	38.5	20.0	42.5	32.5	5.0	0
	* cold	21.2	13.3	20.0	60.0	0	0
	* mobilart	59.6	38.5	42.3	19.2	0	0
Hot pack	* neck	63.5	18.6	40.0	35.7	4.3	1.4
	* arm	42.1	20.8	33.3	37.5	6.3	2.1
Bathing	* sauna	18.3	22.2	22.2	38.9	0	16.7
	* paraffine	48.1	10.4	43.8	39.6	2.1	4.2
	* hot spa	32.7	38.7	45.2	16.1	0	0
	* exercise bath	6.7	57.1	42.9	0	0	0
Radient light	* ultrashort wave	36.5	5.6	30.6	50.0	5.6	5.6
	* infrared rays	12.5	0	30.8	61.5	7.7	0
	* low frequency	36.5	5.6	25.0	50.0	5.6	5.6
Traction		53.2	1.8	20.0	25.5	25.5	25.5
Massage		79.8	18.8	48.8	25.0	6.3	1.3
Acupuncture		77.9	66.2	14.7	10.3	7.4	1.5
Moxibustion		36.5	36.8	44.7	7.9	7.9	2.6
Exercise	* athletics	81.7	32.1	42.3	19.2	1.3	5.1
	* running	54.8	50.0	40.0	10.0	2.0	18.0
	* walking	61.5	28.6	50.0	19.6	0	1.8
	* circuit training	19.2	25.0	50.8	20.0	5.0	0
	* swimming	43.3	41.0	23.1	20.5	5.1	0

5: very effective, 4: :effective, 3: neutral, 2: not so effective, 1: ineffective

5) Acupuncture; pain and stiffness in the neck, shoulder, and low back areas, (improvements of sleeplessness, headache, general symptom, menstrual disorder, and elastic muscle are available),

6) Moxibustion; stiffness and pain in the back and low back areas, and headache, (good sleep and body warming are available. Improvement of coldness of lower extreamities is also available),

7) Athletics; general symptoms, (feeling to be free, free movement, good sleep, reduce of

neck induration, and recover of physical strength are available),

8) Jogging: general symptoms, (feeling to be free, appetite, good sleep, recreation, reduce of stiffness in the shoulder and back areas, improvement of circulation, recover of physical strength, resistivity to disease, and strong digestion are available) ,

9) Fast walking; general symptoms, (recreation, good sleep, appetite, and will power to life are available),

10) Circuit training; general symptoms, (recover of physical strengh and reduce of stiffness are available),

11) Swimming; general symptoms, (reduce of stiffness and languid feeling in the whole body, good sleep, good fatigue, and improvement of circulation are available).

The Problem of Treatment

As for treatments of OCD patients, a wide range method from local heating to massage, techniques of oriental medicine such as acupuncture, have been used. If the pains are severe, rest and medication of pain-killers are necessary. When the pains are relieved, treatments such as heating, acupuncture, moxibusition, massage, and taking a walk frequently are effective in most cases. In accordance with the decrease of the intensity of pains restricting bodily movement, various measures for mental and physical rehabilitation become necessary. In recent years, it has been stressed that patients themselves should take part in treatment. Physical exercises such as gymnastics, swimming, and running have been proved useful for treatment. In effective treatment, comprehensive measures including change of the way of life (taking a walk frequently, changing sleeping and eating habits, etc.) must be considered. Table 20 shows guide for treatment proposed by Dr. Hatanaka I. and the present author.

As shown in this table we proposed five stage remedial treatments. We had particular impressions that the treatments of the mixture of massage, anodyne, anti-inflammation drugs and heating in Stage I, mixed treatments by acupuncture and moxibustion, massage, heating, and exercise in Stage II, and mixed treatments by exercise, heating, acupuncture and moxibustion, and sports in Stage III were the most effective in almost our cases.

Table 20. Treatment guides for different stages of OCD

Stage	Purpose	Instructions	Treatment received	Remarks
Stage I	Removal of severe spontaneous pains and of fatigue feeling.	To rest and sleep adequately. For physical exercise, taking a walk in the morning is preferable.	Heating. after cooling. Medication in some cases.	Absolutely no hard training, avoiding psychological tension. Keeping warm.
Stage II	Recovery of adaptability to daily life. Gaining self-confidence to be able to do fundamental physical movements.	To make a regular program for sleeping, getting up, and eating. etc. Taking walks regularly.	Light physical exercise of the legs and lower back as well as the neck and upper part of the body. To avoid intense treatment.	Same as above.
Stage III	To be able to live flexibly and freely.	Light Jogging. Exercising the hands, eyes and head through daily conversation and hobbies.	Whole body exercise. To add loading exercises, standing on the toes, and tolerance tests. Sometimes hard training.	To be able to practice daily housekeeping. To get used to sleeping or resting effectively and going out.
Stage IV	Becoming somewhat-active in daily life. Aiming at returning to the workplace.	Adding tolerance training, ranging from going up and down the stairs to taking a pleasurable hike or trip.	Depending on the condition, taking instructed postures and doing exercise of the trunk and muscles not ordinarily used.	Getting cold, working with the arms stretched, arriving too early, being forced to hurry, bent or twisted postures, *etc.* should be avoided.
Stage V	Getting used to the workplace and commuting, and beginning of light work.	To sleep or rest effectively in a rather short time. To avoid air conditioning, noise and poor ventilation, keeping warm and doing exercise as much as possible.	Addition of swimming to physical exercise of the trunk, neck and upper part of the body. Acupuncture or Moxibustion if effective.	To practice housekeeping if possible.

Returning to Work

Returning to the workplace is still an important problem in the occupational health program for OCD patients. In reality, there are many workers who cannot return to their previous workplaces after a sickness-leave from two to more than 10 years though there are no clear statistics.

Returning to work in the same working conditions as at the time of occurrence of the

disorder can easily aggravate the disorder. Accordingly, it is essential to increase work load and working hour depending on step-by-step decipline, taking into consideration how far the patient has made progress of recovery. Needless to say, improvement in the working condition is necessary and helps the smooth return to work.

The planned (or calculated) work implies to return to the original work after the recovery of patient's physical strength and disappear of inconvenience or pain in leading everyday life.

Therefore, the following seven points should be observed without any restrictive controls in personnel management;

1) Based on the total consideration of patient's physical strength, ability to work, remaining complaints, sympotoms, and living environments, desirable, voluntarily and ingeneous new working conditions should be established,
2) To improve or avoid working factors which were regarded as responsible for OCD incidence are necessary. The improvement of working condition such as long-term continuous work and piece-work system should be considered,
3) In every case, workload must be reduced to fewer level than before,
4) Frequent and continuous use of the affected part and sustain of bad posture should be avoided. The work which needs psychological tension also must be avoided,
5) Careful watching and monitoring for worsening and recurrence should be considered. An immediate treatment is necessary even if a slight worsening sign appears.
6) Establishment or improvement of facilities, conditions and accommodations to proper remedial treatments, recovery of function, and training for returning to workplace available should be prepared,
7) Supportive environments to the patient's endeavour should be given. Special consideration not to compel disadvantage to the patient should be prepared.

Then, at an introduction of a planned work, a) working environment (bench, desk, chair, etc.), b) work content, method, and layout, c) work amount, working hour, continuous work period, d) resting time, holiday, attending hospital during working hour, e) temparature control, noise, ventilation, lighting, f) personnel management, human relationship, g) cloths, arctic cloths, h) means of attending office, time for attending office, i) rest in home, should be carefully arranged according to the degree of patient's recovery.

Table 21 shows the results of investigation concerning to the effects of works and symptoms for 58 patients under planned work.

Table 22 indicates the results of inquiry about the patients under planned work. As

Table 21. Fatigue Symptoms and Work Contents

Fatigued part	Work content
Arm, Elbow, Hand, Wrist	1. place hand on a cold bench 2. touch to a cold meterial 3. write with strong pressure 4. stretch elbows 5. press key or button continuosly 6. hold receiver 7. hold heavy materials 8. twist wrist
Shoulder, Neck, Back	1. cold wind blows against body 2. quick writing 3. work with elbow up 4. pick up materials 5. stretch elbows 6. hold up hands over shoulder 7. stretch hand and take materials 8. work with neck bending 9. work of precise operation 10. work of complicated 11. conduct work of a heavy responsibility 12. conduct pressed work 13. conduct plural works simultaneously 14. conduct work which require quick decision 15. negotiate with unknown people
Low back, Foot	1. conduct work which requires body twisting 2. continue standing work 3. continue half-sitting work 4. repeat crouching 5. repeat tiptoe standing 6. up and down the stairs
Eye	1. continue precision work 2. continue complicated work 3. continue work of heavy responsibility
Headache, Heavy feeling in head, Irrittative feeling, Nausea, Indisposition	1. conduct pressed work 2. conduct plural works simultaneously 3. conduct work which requires quick decision 4. negotiate with unknown people 5. conduct work which requires lift using 6. conduct work using vehicle 7. work in a noisy place 8. work in a bad odor or smoky place 9. instruct newcommers

Table 22. Stituations after Returning to the Workplace

* Cannot take rest freely when feel fatigue	60.3%
* Cannot control air-conditioning freely	60.3%
* Lack of understanding of colleague about disease	46.6%
* Feeble understanding of superviser about disease	60.3%
* Cannot rest enough in a resting room	43.1%
* Feel to be inspected always	43.1%

Table 23. Periods for medical treatments in the case of curred patients (officially recognized OCD only) (%)

Yrs.	0—1	1—2	2—3	3—5	5—10	10—
	6 (11.3)	6 (11.3)	7 (13.2)			
		19 (35.8)		15 (28.3)		
			34 (64.2)		16 (30.2)	3 (5.7)
				50 (94.3)		

Mean (4.6 yrs. (±) 3 yrs.)

this Table shows, many factors in actual situation of returned workplaces prevent the patients from expected rehabilitation. Further, the fact that some employees require the patients 1) to return the office after full recovery, that is, patients must perform original work as before, 2) to retire from the office as decreased work contents can not be prepared, makes it difficalt for the patients to come back to their offices,

Recovery period of OCD patient is rather short in the mild case where the patient who is given early remedial treatments. However, recovery period of OCD patient is seriously long in the advanced case where the patient is given treatments from the later stage.

Table 23 shows mean recovery periods by the 50 recovered patients who attended Department of Industrial Medicine of Nishiyodo Hospital, Osaka.

As shown in this table, 35.8% of OCD patients recovered within 3 years, 64.3% recovered within 5 years, and the average period was 4.6 years.

The standard for recognizing OCD by the Ministry of Labour, Japan describes that OCD recovers with relevant treatments within 3 months, and therefore other cases which need further treatment period should be re-examined as psychiatric or cervical vertibrae disease. The author strongly believes that the above description by the Government is absolutely

wrong. It is clear that in case of advanced OCD, long-term recupalation and remedial treatments are indispensable.

Prevention

Generally, the following counterplans are necessary to prevent the incidence of OCD among workplaces.

1. To reduce workload. Control of work amount and guarantee to keep enough staff members must be needed.
2. To shorten working hour and continuous working period.
3. Not to accumulate fatigues. Proper resting, exercise, sports, holiday, recreation, etc. should be required.
4. To control workplace environment. Proper air conditioning to reduce pain when some workers complain of stiffness of shoulder or languid feeling in the area of arms and hands.
5. To prepare a speedy guidance system. Health examination and health counseling should be prepared to find out OCD in its early stage.
6. To value worker's spontaneousness, creativity, and desire. To abolish a morale to keep working with severe pain. Rest period and holiday should be guaranteed.
7. To improve working environment. Proper lighting, noise control, ventilation, temperature control, and smell control should be prepared.
8. To be free from heavy responsibility and error stress. Reciprocal supervision or competition systems should be abolished.
9. To improve working layout. Proper bench, desk, and chair adjustable to each worker's body should be prepared not to keep a bad posture.
10. To prepare relevant training system. Education for safety and hygiene should be conducted to prevent workers from lack of experiences.

More concretely, important counterplans can be devised as follows;

a) To improve machines, stationaries, and equipments to fit each work. To adjust workers themselves to machines induces excessive and forced labour.

1) Keyboard should be located near the operator's trunk. The angles of elbow joint, wrist joint, and key board should be 90° or more, 10°-15°, and 15°-30°, respectively. Light key resistance and rebounding are desirable. Machines should be located in front. Neck bending or rotating posture in work should be avoided. The card or slip place

should be considered not to twist body trunk and not to hold up arms over head.

2) Thick-bodied ball point pen with anti-slipping is desirable. To write large scripts with light pressure and to inhibit to use triplicate copy-slip are necessary. Using felt-tiped pen is desirble.

3) Not to lift materials if you feel heavy with one hand. To avoid use of equipments with strong counter-shock or vibration and to lean the elbow on the bench are desirable.

4) Work are of around 130° ro 30-35cm distance from the center of the worker's trunk is desirble. Working postures of full stretch of arm, hold arm over head, elbow joint open, are not desirable. Work of pulling and/or pushing heavy materials should be avoided.

b) Device for movement and consume of arm and hand power

1) To avoid the work which needs full extention of hands and fingers. To avoid cunsumption of arm power with full arm extention, wrist twisting, precise movement, and complex movement is desirable.

2) The work where both hands are required different movements is undesirable.

3) To take resting break periodically particularly when the work load is heavy and to insert different task when the work load is too light are important.

4) To devise to make the discrimination or memory work easy is desirable.

c) Control of work amount and working time and guarantee of staff members.

1) Not to exceed 4 hours per day or 40000 stokes per day with one's preferred hand in key pressing work is required.

2) To control work speed and continuous work duration and rest time depending on the required task is desirable.

3) To insert exercise for reduction of fatigue is necessary.

4) To avoid overtime work particularly when shift work system is introduced is desirable.

5) To keep enough staff members not to shift the work of absentees to the colleagues is desirable.

6) To consider reasonable conveyer speed not to bring overload to the workers is necessary.

7) To take enough sleep and rest after night duty.

d) Impairment of working posture, facilities, and layout.

1) To prepare chairs even if the work is of standing posture is desirable. To prepare adjustable bench, desk, and chair for the worker's body is required. To avoid chairs too

high so that the workers' legs are swinging, and to avoid desks which prevent workers from streching legs from the inside are desirable. Too cold desk surface is not desirable.

2) Chiars of safety, comfortable, flat or tilt towards back sitting plate, not to oppress legs are desirable. And chairs with back-rest which support back bone are desirable.

3) To avoid body twisting, bowing, and bending back posture is necessary. To keep in mind to hold good posture (keep strech bach bone) in taking in and out of goods.

4) Jeans and panty hose are not desireble as work cloths. Cloths should have good thermalinsulation, permiability, and enough room.

e) Improvement of working environment.

1) Proper ventilation, airing, and lighting in workplace should be prepared.

2) To cut direct cold wind, chilly wind, and draught to the workers is required.

3) To keep 25° to 28°c temparature in workplace even in summer is desirable.

3) To devise colours of wall, floor, sizes and colours of scripts not to dark and dakkling is necessary.

4) To keep noise not so uncomfortable is desirable.

5) If the worker is oversensitive to cold, to prepare shoulder pad, muffler, elbow pad, and rug is desirable.

f) Improvement of work management

1) To avoid surface discrimination "heavy load" from "light load" is necessary. To avoid to complicated, precise, and fast works with high nervous tension is necessary.

2) Supervising from back or side must be forbided.

3) To avoid excessive competition, clame to errors, and counterplans in work is necessary.

4) To prepare counterplans in busy time is desirable.

5) To train and educate the workers for experience fully are necessary. The decipline of speedy work without regard of safety should be avoided.

6) Special attention and observation should be paid to some workers such as left-handers, sickly people, disabled people, return workers from disease, depending on desires of workers, advices from specialists, and doctors.

7) To improve workplace atmosphere cheerful and to facilitate creativity or motivation are necessary. To make monotonous work interesting is also desirable. To prepare the atmosphere which permits voluntary rest, tea-time break, and whispering is necessary.

Health Preservation

The author proposed the health preservation program for workers with OCR-risk in the enterprise. Figure 12 shows it.

1) To reduce work load and prohibitting of work are necessary in the case of physically unfit people for bench, people of weak physical strength, clumsy people, oversensitive person to cold, people suffering from circulation disorders, people suffering from rheumatism or neuralgia, people complaining of obstinate stiffness and languid in shoulder and arm areas, and disabled people in vision.

2) To notice carefully the stiffness and languid complaints in shoulder and arm areas and to prepare proper guidance and treatments are necessary. To receive advices by medical doctors in any time should be recommended.

3) Periodical health examination for OCD should be conducted at least two times per year (follow up examination is necessary for advanced patients). The results of these examinations should be reported to the client themselves and be used for the improvement of workplace conditions.

4) Early diagnosis and treatments are desirable.

6) Special cares and considerations should be paid to aged and female workers (particularly females during and after the period of pregnancy).

7) Careful consideration and special treatment for working conditions and worker's health conditions are required in the cases where worsing and increasing of OCD are noticed.

To prevent disorders by workloads of office machine workers, it is important to find OCD patients early and to treat them early by introducing health examinations. As OCD is characterized a disease of chronic progress and variable symptoms, a long-term progress observation from the beginning of employment, and proper treatments are necessary. Further, it is the most important to prepare counterplans for OCD prevention such as reducement of workload, improvement of working condition, and work environment by a proper grasping of health condition and its progress of workers.

For the above purposes, the following measures should be made;

(1) Health Examination at Employment.

This examination is necessary to grasp workers' health condition and progress. Particularly, stress should be given to find disorders, diseases to be easily aggravated, and sickliness. Therefore, in addition to usual examination items, to introduce new special

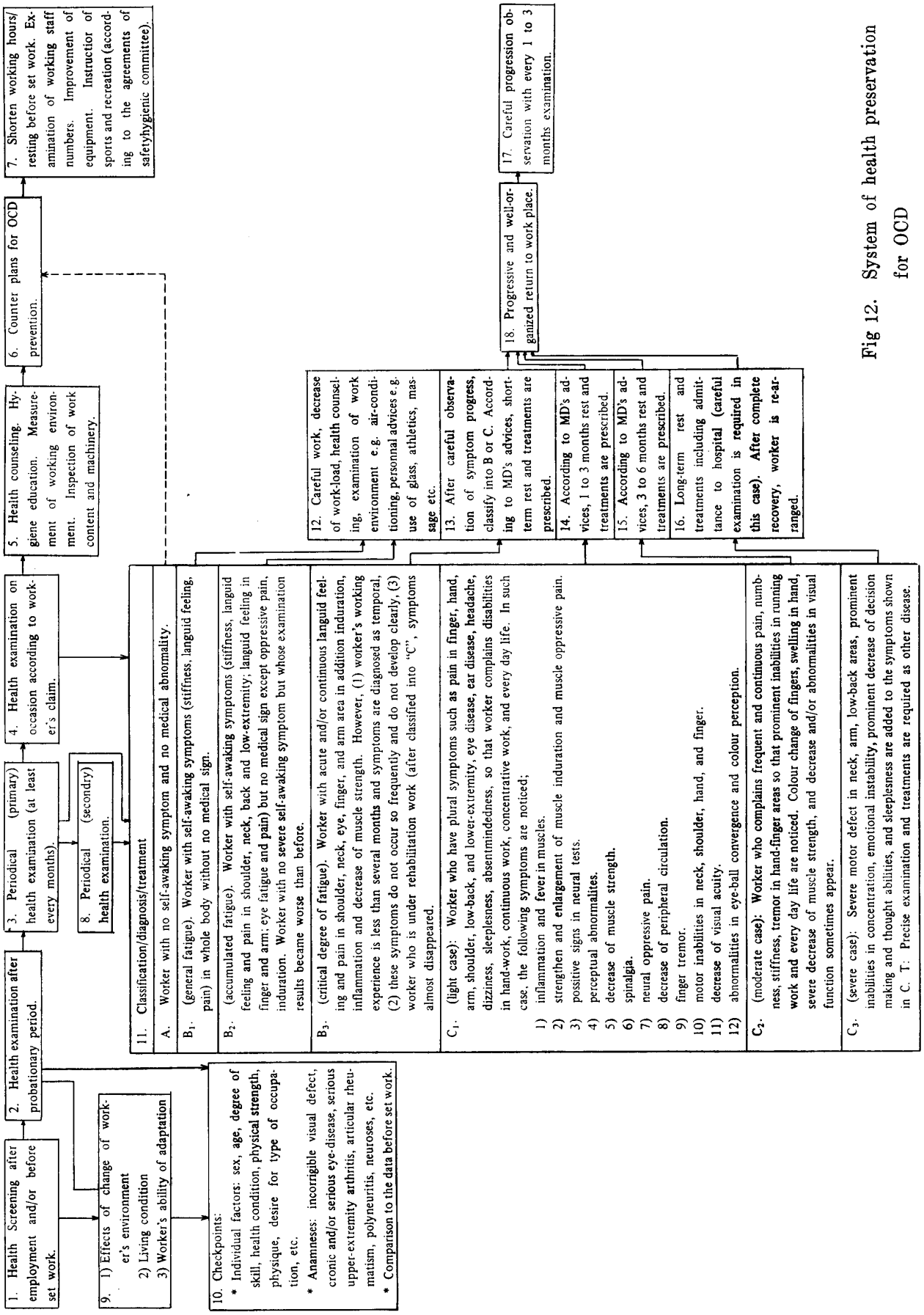


Fig 12. System of health preservation for OCD

items, doctor judged, such as test for visual function is desirable. As a result, if doctor notices special disorders in motor function, in CNS and peripheral nervous system, in peripheral circulation, and in visual function, doctor should advice to avoid continuous work which needs a heavy load of upper extremities. Concrete suggestive items for each work and for each person to keep healthy condition should be given by a doctor with careful examination of anamnesis, experience, physique, physical strength, temperament, handedness, sex, age, and desire of occupational category. It should be noticed that in some cases, symptoms are worsing after 1-3 months from the set work because of inadjustment to the work.

(2) Health Examination during Employment

It is proper that doctor gives the following advices and instructions according to the following three diagnostic categories based on the results of total consideration of these examination. The doctor should conduct periodical (at least one time per 6 months) or occasional health examination and advanced examination.

(A): Normal; Clients who have no conscious symptom and no medical abnormality are clissified in this group. Even if clients are classified into this category, health counseling and counterplan are necessary.

(B): Cautious; Fatigue symptoms, particular languid feeling, stiffness and/or pain in the areas of shoulder, neck, back, arm, hand, finger, and low back are sometimes noticed in the clients of this category. Reduce of work (in work method, improvement of posture, shortening of work time and continuous work period, increase of resting time, and holiday, etc.), increase of resting time. Change of work type, recreation, preventive medical treatment should be instructed.

In such cases, special attentions should be paid slight changes of work such as lightening of key resistance of office machine and change from machine operation work to copying slips or continuous imprinting work. These changes sometimes give worse the symptoms.

Frequent examinations, careful progress observations, and proper counter-treatments should be given in the following cases; no medical finding through clients have many increased conscious symptoms, no compliants with several medical findings, and improvement of old sympotoms is shown.

(C): Medical Treatment Required; The following clients are classified into this category; Clients whose symptoms are worse than ones in (B) group. Clients have strong pain, stiffness, numbness, feeling of all strength gone, coldness, tremor, symptoms in eyes and ears, continuous all body symptoms (autonomic imbalance), and several abnormalities or

prominent abnormalities in examination items. In such cases, doctor should give advices to stop working which is susceptible to worsing symptoms, to instruct proper medical care, and to take suitable or rehabilitation toheighten effectiveness according to the clients' symptoms such as short-term (2 weeks to 3 months for mild case), long-term (3 to 6 months or more for middle and advanced case) and/or rehabilitation.

In general, it is desirable that the clients of this category are treated as occupationally induced disease. However, in the doubtful case, in the judgement of causes, special examination and investigation for discrimination other causes should be conducted. Symptoms of the clients in this category continue very long and show variations. Then, special progress observation for health conditions is indispensable for a certain period (until complete recovery and possibility of relapse disappears) after a change of work content.

Conclusion

OCD is the worst occupational disease appeared in the modern industrialized and commercialized society. The incidence of OCD in Japan seems to be the most prominent phenomenon all over the world. The challenge to this problem among Japanese researchers began in the year of 1960's. The members of the Japan Association of Industrial Health, especially in Kinki district, began to attack this problem since the mid of 1960's. The Special Committee affiliated to this Asociation defined this disease as OCD (Occuupational Cervicobrachial Disorders), and proposed definitions for degree of symptoms and methods of health examination. The author have acted a role as a staff member of the Special Committe on Cervicobrachial Syndrom.

Definition of OCD by the Committee on Cervico-brachial syndrome in Japan Association of Industrial Health is follows; "The disorder has an occupational origin. It is defined as functional and/or organic disturbances resulting from neuromuscular fatigue due to the work in a fixed position or with repetitive movement of the upper extremities. However, the influence of mental and environmental factors in the formation of the disorder cannot be neglected. Such disease described in traditional textbooks as tenosynovitis, arthritis, or scalenus syndrome may be included in the disorder. In most cases, however, the disorder is featured with those characteristics that are difficult to be differentiated by existing criteria. Thus new diagnostic criteria are necessary,"

Since the end of 1960's the author and colleagues have conducted many epidemiological are increasing.

OCD studies for various kinds of occupational categories such as kty punch workers, typists, other office workers, telephone switchboard workers, nursery teachers, kitchin workers in feeding facilities, register workers in supermarket, conveyer workers (build up workers, packing workers, inspection workers), cloth workers, etc.

Based upon our research experiences about OCD, I can draw the followings as the conclusion.

(i) The incidence of OCD had strong relations to fatigues by repetitive and stereotyped upperlimb exertions, statically sustained and/or unnatural posture, mental stress, and visual stress.

(ii) The incidence of OCD was prominent among the workers who engaged in the works which involved the above fatigue factors.

(iii) A strong dose-response relation was recognized between OCD incidence and work output, work speed, working hours, duration of job, and length of servise, etc.

(iv) The incidence of OCD was induced by the fatigue accumulation caused by scant fatigue-recovering parameters such as lack of rest, holiday, family atmosphere. The incidence of OCD can be prevented by counterplans of improvement of work and health if they are prepared in the early stage (when stiffness of shoulder, languid feeling, and enervated feeling have just noticed) of occurrence. However if the preparation of counterplans is delayed, outbreak of OCD can not stop and symptoms become worsing.

(v) Individual functions such as sex, age, experience, physique, physical strength, health condition, and anamnesis for OCD incidence can be identified, but it is not possible to predict and select incidental people.

(vi) The incidence of OCD can be prevented by the ergonomic improvements of working conditions described in (iii) and (i).

To the above, labour agreements between labour and management and the standard for work administration by the Ministry of Labour, Japan bore certain effects.

Further, the present author examined, and treated huge amount of OCD patients and proposed various kinds of clinical diagnostic criteria, methods of examination, and methods of remedial treatment.

Based upon the results of my evaluation, the followings were found. That is,

(1) OCD is a disease with obstinate pain, stiffness, languid feeling in the areas of neck, shoulder, arm, and back which continues with variations,

(2) Symptoms are getting worse and becomes difficult to recuperate because of the various physical and mental loads,

(3) To grasp conscious symptoms and their progresses is very important, and to grasp the medical symptoms such as oppressive pain, induration, motor pain, motor disturbance, peripheral circulation disorder, perceptual dysfunction, and mental state is also necessary,

(4) Physiotherapy and exercise therapy are main forces to cure OCD, and systematic treatments (5 steps as described before) according to the symptom degree, are effective,

(5) Final purpose of OCD cure is to return to the original work place. To this purpose, planned work system which begins from light work and short period, and return to the original work and usual period gradually, is necessary.

Though we and other researchers have continued OCD study for a certain period, however, I believe that actual investigations and epidemiological studies for OCD are still lacking and the standard of work management (for prevention) by the government is not yet complete one.

The OCD patients still feel hard to apply to the government for recognition of occupational origin because of the anxiety of unemployment.

As the standard for recognition of occupational origin is too severe, the number of causes which are recognized by the government (Ministry of Labour, Board of Personnel Affairs, and Mutual Aid Fund of Commpensation for Accident on Duty of Government Employee) is still few. Many managements are apt to deny the occupational origin of OCD by the claims such as. (1) the mechanisms of OCD incidence are still not clear, (2) the primary causes of OCD incidence can be attributed to the personal factors (physique, aging), (3) work load becomes light by work mechanization and rationalization, (4) mass hysteria formed by trade union, etc.

It is apparent that these attitudes of managements prevent OCD patients from continuous and complete medical treatments. Further incomplete understanding of the managements for a desirable returning to work sometimes brings OCD patients returning and recurrence to difficulty.

As the health control counterplans for OCD by the managements are of personnel management-tinctured, many OCD patients afflictions are serious.

However, several organizations such as associations of OCD patients, and supporting-groups in various districts and work for confronting OCD to reduce the patients afflictions.

Since the first trial for the compensation of two Ohita Bank workers (the author diagnosed as OCD) in 1967, lawsuits for recognition of occupational origin by OCD patients

The author strongly believes that the managements and government should recognize the

importance and severity of OCD problem properly and offer the counterplans for prevention, health control, remedial treatment, returning to work, recognition of occupational origin, and compensation. The trade unions also should prepare their own counterplans by the aid of their own committee for safety and hygiene.

In 1980, the first International Workshop on "Occupational neck and upper limb disorder due to constrained work" was held at Tokyo. Then, OCD is called Occupational Repetition Strain Injur (RSI) in Australia, Rheumatic Disease in Industry in West Germanny, Neck and Upper Limb Disorders (NUD) in Sweden and carpal tunnel syndsome in America.

As apparent from this, the concern and study for OCD is incredibly increasing and international communication for OCD is also increasing. The author believes thatthis article is useful for researchers studying OCD in various countries and do hope it so sincerely. The international list of occvqational disease sholud include OCD as one of the disease.

Finally, the author is much indepted to many enterprises, trade unions, associations of OCD patiens for their kind cooperation in the studies cited here. And the author wish to express my special gratitude to many reseachers, particularly, to Dr. Katsuyoshi Maeda (Kurume Medical University), Drs. Rikio Tokunaga and Masaru Nakaseko (Kansai Medical school), Katsuo Nishiyama (Shiga University of Medical Science), Shigenobu Miyake, Junya Himeno (Kamigyo Hospital), Yuji Kondo (Nara Medical University), Hidetsugu Prefectural Inst. of Public Health), Takeshi Hatta (Osaka Educational University), Tainaka (Osaka Prefectural Inst of Public Health) Hideki Mito (Kinki University) Shunichiro Tajiri (Yodo-kyo Inst. Social Medicine), Masakazn Yoshida (Yoshida Hospital), Saburo Baba (Makino Hospital), and the late Ikutoshi Hatanaka (Hyogo Medical University).

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