



PB90179250



CONGRESSIONAL TESTIMONY

TESTIMONY OF

LAWRENCE J. FINE, M.D.

DIRECTOR

DIVISION OF SURVEILLANCE, HAZARD EVALUATIONS, AND FIELD STUDIES

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

CENTERS FOR DISEASE CONTROL

PUBLIC HEALTH SERVICE

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Before the

EMPLOYMENT AND HOUSING SUBCOMMITTEE

COMMITTEE ON GOVERNMENT OPERATIONS

U.S. HOUSE OF REPRESENTATIVES

June 6, 1989

REPRODUCED BY:
U.S. Department of Commerce
National Technical Information Service
Springfield, Virginia 22161

NTIS

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	3. PB90-179250
4. Title and Subtitle NIOSH Testimony on Repetitive Trauma Disorders by L. J. Fine, June 6, 1989		5. Report Date 89/06/06	
7. Author(s) NIOSH		8. Performing Organization Rept. No.	
8. Performing Organization Name and Address NIOSH		10. Project/Task/Work Unit No.	
		11. Contract (C) or Grant(G) No. (C) (G)	
12. Sponsoring Organization Name and Address		13. Type of Report & Period Covered	
		14.	
15. Supplementary Notes			
16. Abstract (Limit: 200 words) This testimony concerned the activity of NIOSH in the field of repetitive trauma disorders. Such disorders were a class of musculoskeletal disorders involving damage to the tendons, tendon sheaths, and the related bones, muscles, and nerves of the hands, wrists, elbows, arms, feet, knees, legs, neck and back. Diseases associated with such disorders included carpal tunnel syndrome, tendinitis, tenosynovitis, DeQuervain's Disease, low back pain, and vibration induced Raynaud's syndrome. Such injuries have occurred as a result of repeated harm, not isolated accidents. Since 1984 the numbers of such reported injuries have doubled, exceeding 72,900 cases in 1987, and accounting for up to 39 percent of all occupational illnesses reported to OSHA in 1987. Manufacturing industries had the highest rate, with the five highest manufacturing industries being meatpacking, manufacturing and household appliances, rubber and plastic footwear, office and furniture fixtures, and motor vehicles and equipment. A manual was developed by NIOSH which identified cumulative trauma disorders (CTDs) of the upper limbs and identified risk factors, evaluated jobs and records and surveyed workers to determine if a problem was occurring, and provided guidelines for protecting workers in jobs that pose a serious risk. Current research programs in this area were described.			
17. Document Analysis a. Descriptors			
b. Identifiers/Open-Ended Terms NIOSH-Publication, NIOSH-Author, NIOSH-Testimony, Fine-L-J, Repetitive-work, Musculoskeletal-system-disorders, Cumulative-trauma, Cumulative-trauma-disorders, Carpal-tunnel-syndrome, Construction-industry, Mining-industry, Epidemiology, Vibration-disease			
c. COSATI Field/Group		REPRODUCED BY	
18. Availability Statement		U.S. DEPARTMENT OF COMMERCE NATIONAL TECHNICAL INFORMATION SERVICE SPRINGFIELD, VA. 22161	
		19. Security Class (This Report)	21. No. of Pages 7
		22. Security Class (This Page)	22. Price

I am Dr. Lawrence J. Fine, Director of the Division of Surveillance, Hazard Evaluations, and Field Studies of the National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control. I appreciate this opportunity to report to you on the problem of repetitive trauma disorders and NIOSH activities in this area.

Disorders associated with repeated trauma, also known as repetitive motion or cumulative trauma disorders (CTD), are a class of musculoskeletal disorders involving damage to the tendons, tendon sheaths, and the related bones, muscles, and nerves of the hands, wrists, elbows, arms, feet, knees, legs, neck and back. The more frequently occurring occupationally-caused disorders in this class include carpal tunnel syndrome, tendinitis, tenosynovitis, DeQuervain's Disease, low back pain, and vibration-induced Raynaud's syndrome. Cumulative trauma disorders are distinguished from injuries because they do not arise from a single or acute traumatic experience. Instead, they develop as a result of chronic exposure of a particular body part to repeated biomechanical stress, which, by cumulative effect, produce a debilitating physical condition. The term "traumatogen" was coined by NIOSH to identify the types of work factors that contribute to these disorders. The most important traumatogens include: frequent repetition of particular tasks or body movements (in certain work hand motions may be repeated more than 20,000 times a day), awkward body postures, use of high muscle force, and vibration from tools or equipment. These traumatogens, in combination with a lack of sufficient recovery time between repeated movements or tasks, constitute high-risk working conditions for CTDs. In general, they cause wear and tear on the body exceeding the body's ability to repair itself, which with continued exposure, can result in a CTD. According to the NIOSH National Occupational Exposure Survey (1981-1983) approximately 27% of all workers are potentially exposed to traumatogens.

There are no completely reliable estimates of the number of CTDs occurring each year. The Bureau of Labor Statistics (BLS) Annual Survey serves as a general index. The limitation of this data is that "hearing loss from repeated noise" is included together with musculoskeletal disorders in the definition of repetitive trauma disorders. However, using these data as a general indicator of the problem, since 1984, the number of reported "disorders associated with repeated trauma" have more than doubled, exceeding 72,900 cases in 1987, the most recent year for which complete data are available. These disorders accounted for 39% of all occupational illnesses reported to OSHA in 1987, up from 28% in 1984. They accounted for over 52% of all recorded occupational illnesses within manufacturing, which had a rate of approximately 36 cases per 10,000 full time workers, the highest rate of any industry sector. Among manufacturing industries, the five with the highest rates were:

	Rate Per <u>10,000</u>
meatpacking	392
manufacturing and household appliances	172
rubber and plastic footwear	127
office and furniture fixtures	113
motor vehicle and equipment	105

The industry sector with the second highest incidence, mining--reported a rate of approximately 8 cases per 10,000 a fivefold increase from 1984.

Worker compensation figures provide another general index of the problem of CTDs. Back injury cases coded as "sprains/strains" constitute about 20 percent of all worker compensation claims. While not all back injuries included in this category are the result of cumulative trauma, more than half are attributable to CTDs. In addition, among 23 States reporting worker compensation data to the BLS in 1986, they reported 6,645 cases of diseases of the nerves and peripheral ganglia in the upper extremities, excluding the fingers. Almost all of these would be cases of carpal tunnel syndrome.

Without broad application of measures to prevent CTDs, we can expect them to continue to grow in number. Two changes in the workplace may be especially important factors in their increase. One, there is great increase in computer and semiautomated technology, and rapid growth of service and manufacturing industries using these technologies. Although tasks in new industries may not be as physically strenuous as in older heavy industries, they tend to be more constant and repetitive. Many jobs in these industries have been reduced to the performance of tasks requiring single, repeated (machine-like) acts. Two, the workforce is aging; as a person ages the body's resistance to chronic wear and tear is reduced.

NIOSH has been conducting research and dissemination efforts to address the CTD problem. In the early 1980's, we supported a three-year worksite study of CTDs. The researchers studied 652 workers performing 108 different tasks involving repetitive work to evaluate the role of repetitiveness and muscle force and other factors required by a task in the development of CTDs. They found 140 of these workers to have CTDs, based on both the workers' responses in interviews on the physical examinations. Jobs requiring high force and high repetitiveness were found to dramatically increase the risk of CTDs.

Based in part on the findings of this study, and with the assistance of national experts, NIOSH developed a manual, Cumulative Trauma Disorders. It provides information for: 1) identifying CTDs of the upper limbs and identifying risk factors; 2) evaluating jobs and records, and surveying workers to determine if the problem is occurring; and 3) guidelines for protecting workers in jobs that pose a serious risk. These guidelines are based on ergonomic principles for redesigning tools, work stations, and work procedures. The manual was designed to be used by nonmedical persons.

Approximately 2,000 copies have been requested since its release in 1988. In addition, the manual is available through the National Technical Information Service.

NIOSH has also disseminated limited information regarding CTDs of the lower limbs. In 1986, NIOSH published the findings of a Health Hazard Evaluation of morbidity and disability from the use of a "knee kicker" by carpetlayers. This publication, which has been widely disseminated, describes the types and extent of knee injuries among carpetlayers, and describes a safe alternative method of laying carpet to eliminate this problem. NIOSH is also disseminating information to prevent low back pain caused by repeated trauma to the spine and supporting structures in repetitive low force lifting tasks. This information is included in the revised NIOSH Work Practices Guide for Manual Lifting, which will be available in December 1989. More than 30,000 copies of the original guide, published in 1981, have been disseminated to persons in management, labor, and others working in occupational safety and health.

NIOSH has contributed technical experts to the OSHA Meatpacking Task Force. The task force is developing a comprehensive strategy to prevent CTDs and acute injuries in this high-risk industry in which approximately 40% of workers have incurred CTDs.

In another dissemination effort, in response to the increasing number of inquiries we have received regarding carpal tunnel syndrome, we have produced a compilation of excerpts from selected references, describing the results of important research in this area. In the last 18 months we have received approximately 1000 requests for information on carpal tunnel syndrome through the NIOSH toll-free information number and other communications. We receive more requests for information on this subject than we receive on any other specific health or safety concern.

Presently, NIOSH is conducting three research projects on CTDs:

- 1) We are conducting the first comprehensive effort to investigate the causes of CTDs of the lower extremity among workers at highest risk, such as miners who kneel while working and construction workers who install floors and carpets. Nearly 50% of these workers report CTD symptoms during their careers. To conduct this research, NIOSH has developed new technology and methods to measure forces acting on the knee and leg and physiologic responses to these forces. We expect to complete this research by 1990. The findings will enable us to develop recommendations to improve work practices and suggest new ergonomic designs for tools to prevent CTDs of the lower limbs.

- 2) At the end of 1988 we began a four-year study to identify biomolecular markers of chronic trauma, in order to develop a biomolecular method of detecting the presence of joint disease in its earliest stages. Early detection of joint disease among workers at risk would make possible the application of measures to prevent irreversible tissue damage caused by continued exposure to hazardous levels of musculoskeletal stress.

3) We are evaluating work and rest durations for certain tasks to establish work practices to prevent CTDs in the neck, shoulders and arms. These medical conditions are most common among workers performing manual tasks for which their arms are extended and shoulders abducted. They are often debilitating and frequently cause lost work days.

NIOSH is planning a study for 1990 to develop interventions to prevent low back pain among workers in the health care industry. Low back pain is prevalent among workers in this industry, who are frequently required to lift patients and equipment, often while in awkward lifting positions.

Over the last 18 months, NIOSH has also been conducting 15 health hazard evaluations and technical assistance projects in response to requests to investigate working conditions that may be causing CTDs. These include three technical assistance requests from OSHA to investigate conditions in the meatpacking and food industries, and health hazard evaluations in other industries including publishing, food retail, and a variety of manufacturing areas. Investigators have conducted medical and ergonomic evaluations, employee medical record reviews, and employee surveys to identify CTD problems and associated working conditions, and to provide recommendations addressing problems found. These evaluations have revealed a high risk of CTDs in manufacturing, construction (among floor and carpet layers), meatpacking, poultry processing, retail supermarkets (checkout clerks), moving and storage, and information processing.

Finally, NIOSH has been conducting two surveillance projects that address CTDs. In the first project, NIOSH is supporting a surveillance program called Sentinel Event Notification System for Occupational Risks (SENSOR). This is a State-based reporting system for selected job-related conditions that provides active intervention in response to reported cases. Four of the ten participating States -- California, Colorado, Massachusetts, and Wisconsin -- include carpal tunnel syndrome in their reporting/intervention system. In preliminary data from one of these States, from just one county, there were 7214 cases of Carpal Tunnel Syndrome (CTS) in 1987 of which 3413 (45%) were work-related and of the 27,666 cases of CTD, 12,030 (43%) were reported to be work-related. For the county, only 71 occupational CTS cases had been officially reported for that same year. This data is evidence of the substantial underreporting of this disorder through current systems and the need for training and education aimed at the identification and reduction of workplace risks for CTS. In the second project, NIOSH has collaborated with the National Center for Health Statistics, now also a component of CDC, to include CTDs of the hand and wrist and lower back in the 1988 National Health Interview Survey. Data from this Survey should be available in December of this year.

This concludes my prepared testimony. I will be pleased to answer any questions.

REPORT DOCUMENTATION PAGE		1. REPORT NO.	2.	3. PB90-179250
4. Title and Subtitle NIOSH Testimony on Repetitive Trauma Disorders by L. J. Fine, June 6, 1989		5. Report Date 89/06/06		
7. Author(s) NIOSH		6.		
9. Performing Organization Name and Address NIOSH		8. Performing Organization Rept. No.		
12. Sponsoring Organization Name and Address		10. Project/Task/Work Unit No.		
		11. Contract (C) or Grant(G) No. (C) (G)		
15. Supplementary Notes		13. Type of Report & Period Covered		
		14.		
<p>16. Abstract (Limit: 200 words) This testimony concerned the activity of (NIOSH) in the field of repetitive trauma disorders. Such disorders were a class of musculoskeletal disorders involving damage to the tendons, tendon sheaths, and the related bones, muscles, and nerves of the hands, wrists, elbows, arms, feet, knees, legs, neck and back. Diseases associated with such disorders included carpal tunnel syndrome, tendinitis, tenosynovitis, DeQuervain's Disease, low back pain, and vibration induced Raynaud's syndrome. Such injuries have occurred as a result of repeated harm, not isolated accidents. Since 1984 the numbers of such reported injuries have doubled, exceeding 72,900 cases in 1987, and accounting for up to 39 percent of all occupational illnesses reported to (OSHA) in 1987. Manufacturing industries had the highest rate, with the five highest manufacturing industries being meatpacking, manufacturing and household appliances, rubber and plastic footwear, office and furniture fixtures, and motor vehicles and equipment. A manual was developed by NIOSH which identified cumulative trauma disorders (CTDs) of the upper limbs and identified risk factors, evaluated jobs and records and surveyed workers to determine if a problem was occurring, and provided guidelines for protecting workers in jobs that pose a serious risk. Current research programs in this area were described.</p> <p><i>The National Institute for Occupational Safety and Health</i></p> <p><i>U.S. Occupational Safety and Health Administration</i></p>				
17. Document Analysis a. Descriptors				
b. Identifiers/Open-Ended Terms NIOSH-Publication, NIOSH-Author, NIOSH-Testimony, Fine-L-J, Repetitive-work, Musculoskeletal-system-disorders, Cumulative-trauma, Cumulative-trauma-disorders, Carpal-tunnel-syndrome, Construction-industry, Mining-industry, Epidemiology, Vibration-disease				
c. COBATI Field/Group				
18. Availability Statement		REPRODUCED BY U.S. DEPARTMENT OF COMMERCE NATIONAL TECHNICAL INFORMATION SERVICE SPRINGFIELD, VA. 22161		21. No. of Pages 7
		19. Security Class (This Report)		22. Price
		22. Security Class (This Page)		

