



Ergonomics by OSHA... Ergo, Outgo by Business

Richard J. Mahoney and Milka S. Kirova

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Washington University in St. Louis

This booklet is one in a series designed to enhance understanding of the private enterprise system and the key forces affecting it. The series provides a forum for considering vital current issues in public policy and for communicating these views to a wide audience in the business, government, and academic communities.

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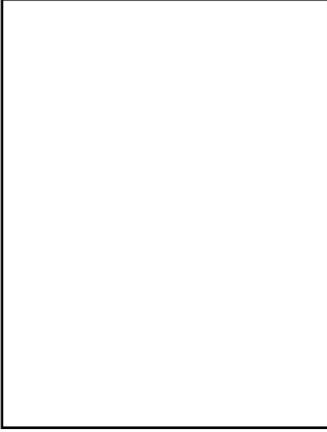
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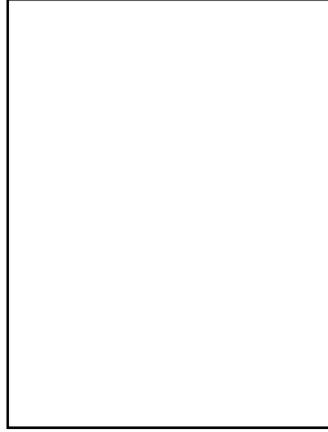
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Ergonomics: *An applied science concerned with the characteristics of people that need to be considered in designing and arranging things that they use in order that people and things will interact most effectively and safely. (Webster's Unabridged Third New International Dictionary)*

Battle lines are being drawn for what could become the new millennium's first major regulatory confrontation between government and business.

The Occupational Safety and Health Administration (OSHA), after a nearly 10-year study, has released a proposed ergonomics standard with the stated purpose of reducing the large number and severity of work-related musculoskeletal disorders (MSDs). A public comment period on the proposed rule was extended to March 1, 2000 to accommodate the flood of responses.

The Occupational Safety and Health Administration has released a proposed ergonomics standard with the stated purpose of reducing the large number and severity of work-related musculoskeletal disorders (MSDs)...It has taken OSHA some 50 pages to cite the rules, 250 pages to explain the rules, and more than 1,000 pages to enumerate the 100 or more injury categories that OSHA describes.

An array of injuries is included in the MSD grouping. Carpal tunnel syndrome (hand injuries believed to be caused by awkward or repetitive motions such as typing and computer processing) is often cited as a major reason for the proposed standard, but it has been extended to include a variety of sprains, strains, and aches caused by overexertion and other factors. It has taken OSHA some 50 pages to cite the rules, 250 pages to explain the rules, and more than 1,000 pages to enumerate the 100 or more injury categories that OSHA describes. The rules would cover 27 million workers at 1.9 million work sites based on OSHA's assumption that 50 percent of sites already have "suitable" programs in place.

Few will argue that such injuries—some permanent—are trivial or unworthy of preventive measures. Indeed, major corporations have been working on the ergonomics problem for years because of

their obvious self-interest in having healthy workers, both for reasons of workplace cost and positive employee relations. Progress has been steady, with the number of reported MSDs dropping from about 750,000 in 1992 to below 600,000 in 1997, including an accelerated decline in MSD injuries of 17 percent in the last three years of the reporting period, according to the Bureau of Labor Statistics. OSHA claims the proposed standard would reduce the number of MSD injuries by 300,000 per year averaged over 10 years, with a nearly 500,000 reduction in the 10th year.

OSHA implies in its standard that it knows how to fix the problem: enforced dedication to solutions by management, new equipment, employee training—and the threat of an expanded compensation procedure for injured employees under the rule.

While industry groups have attacked many of the elements of OSHA's proposed rule, the major issues in the ergonomics debate come down to two:¹

- OSHA implies in its standard that it knows how to fix the problem: enforced dedication to solutions by management, new equipment, employee training—and the threat of an expanded compensation procedure for injured employees under the rule.

Business groups argue that they are already on a path to fix what they know how to fix, but that many of the injury causes are not known and may not even be work-related. Congress seemed to side with that view in October 1999 when it approved \$890,000 for the National Academy of Sciences (NAS) to conduct an independent, peer-reviewed analysis of the available science on MSDs. That study is due to be completed in January 2001. Anticipating their charge to NAS, the House had already passed H.R. 987, "The Workplace Preservation Act," which would prevent OSHA from moving ahead until completion of the NAS study. The Senate did not follow with its own bill—but likely would be motivated to do so if the new rules appear headed for enforcement.

- OSHA reports that the cost of the new ergonomics regulations would be approximately \$4.2 billion per year and would bring benefits of \$9 billion from higher productivity and fewer lost-time injuries. That would be an annual average of \$14,000 spent and \$30,000 saved for each of the 300,000 injuries prevented!

The Center for the Study of American Business has long been an advocate for cost/benefit analysis in major government regulations. We undertook such an analysis of the OSHA data and the rebuttal by business groups—starting with the costs of the new rules.

OSHA's Estimates of the Costs of Compliance

To compute the total costs of compliance with the proposed ergonomics program, OSHA has estimated the costs for each of some 350 specific industries, then aggregated them for a total. OSHA estimates five categories of costs. A brief summary of the main assumptions and estimates for each cost category follows:

1) *Costs to all industry establishments for familiarization with the program* and evaluation of an MSD to determine whether it is covered. These costs are estimated under the assumption that at each establishment only one hour of managerial time is spent to review the several hundred pages of standards and determine the applicability to the particular establishment. OSHA estimates that this would cost businesses *\$25 million* per year. The costs for evaluating MSDs to determine whether they are covered are estimated under the assumption that only a quarter of an hour of managerial and employee time is spent per MSD incurred. According to OSHA these costs would be \$83 million per year for all establishments.

2) *The costs of establishing the basic program*, including training management, providing employees with information, and setting up a reporting system are estimated at the modest amount of *\$107 million* per year for all employers. OSHA's procedure uses the same assumptions about time needed to implement the basic program for all establishments. To estimate the cost for each industry they use the average managerial and employee wage rate for the industry.

3) Employers must implement the full program after the occurrence of just one recordable covered MSD. The full pro-

Table 1
OSHA Annual Cost Estimates of
Proposed Ergonomics Rule

Costs for familiarization with the program and evaluation of MSDs	\$108 million
Costs to implement the basic program	\$107 million
Costs to implement full program	\$828 million
Costs of job interventions	\$2.3 billion
Work-restriction protection	\$876 million
TOTAL	\$4.2 billion

Source: Preliminary Economic Analysis and Initial Regulatory Flexibility Analysis for the Occupational Safety and Health Administration's Proposed Ergonomics Program Standard, OSHA, www.osha-slc.gov/ergonomics-standard/.

gram includes training of managers and employees, job hazard analysis, evaluating job controls, MSD management, record-keeping, and program evaluation. OSHA estimates that the annual *costs of the full program* for this element would be *\$828 million* for all 1.9 million establishments with covered MSDs.

4) Employers that experience covered MSDs would be required by the proposed program to institute job controls. To determine the *costs of ergonomic job interventions*, OSHA defines 26 occupational groups and estimates the average cost of job intervention by occupational group. Then it converts the costs for occupational groups into costs for industries. The total annual costs of ergonomic job interventions are estimated at *\$2.3 billion*.

5) The program would require employers to provide temporary work restrictions when necessary. The employers will have to maintain the employee's current net take-home pay (90 percent of it if the worker is absent) and benefits for up to 6 months. OSHA estimates that *work restriction costs to employers* would be \$877 per case on average, or *\$876 million* per year for all establishments. This could turn out to be the most underestimated cost element if employees take full advantage of the "absent with pay" opportunity.

Thus, according to OSHA's estimation procedures, the newly proposed ergonomics rules would cost employers *\$4.2 billion* per year.

Alternative Estimates of the Costs of Compliance

In a recent study the **Employment Policy Foundation** (EPF) argues that OSHA substantially underestimated the costs of the proposed ergonomics rules.² A key point in EPF's critique is OSHA's assumption that half of all workers and employers will not be affected by the proposed rule because they have already established voluntary ergonomics programs. However, many of the establishments that have implemented some controls to reduce ergonomics hazards lack key program components that would be required under the rule. Thus the proposal would affect many more businesses than OSHA assumed in their cost analysis. EPF's corrections of OSHA's cost estimates to account for lower compliance baseline and higher costs of assessing potential MSDs, familiarization time, training, and increased MSD reports suggest that the annual costs of the program would fall between \$35 and \$99 billion—dramatically higher than the \$4.2 billion that OSHA estimated.

The **Small Business Administration** (SBA) is required by law to comment on the effect of major regulation on small business. Based on analysis by their consultant, Policy Planning and Evaluation, Inc. (PP&E), they concluded that the costs of the proposed standard could be anywhere from 2.5 to 15 times higher than OSHA's estimates, falling within the range of \$11.3 billion to \$63 billion per year. PP&E's nearly 50-page analysis rebuts many of OSHA's assumptions and provides their own estimate of cost elements. Unfortunately, it does so in an opaque methodology that does not make it clear what assumptions are behind their low- and high-cost estimates.

The **National Association of Manufacturers** (NAM) reported that SBA estimated the cost at \$18 billion. NAM singled out this number from the array of different numbers in PP&E's report. The \$18 billion estimate is said to be associated with 5.5 million establishments affected by the proposed rules (not OSHA's 1.9 million) and includes a \$17.1 billion cost for the basic part of the program and a \$600 million cost of Phase II of the program. It excludes the costs for work restriction protection and job interventions.³ NAM could have cited a higher number, as work restriction protection and job interventions would be associated with substantial costs to employers, even according to OSHA's cost analysis.

The **Association of Food Distributors International** (FDI) estimated the cost at between \$384 million and \$22 billion per year for their membership of 800 wholesale food distribution centers (DC) alone.⁴

The low estimate of \$384 million covers the annual costs of setting up and managing the program at all member DCs, or an average of about \$500,000 per DC, excluding the costs for work restriction protection and job controls. If work restriction protection and job control costs are taken into account, the projected costs rise to \$800 million for FDI's membership, or \$1 million per DC. Since these costs appear rather high, we looked at the underlying assumptions used by FDI in their estimation procedure.

The assumptions about time required to set up the program at one DC are as follows:

- 180 hours of head managerial time per month for 12 months;
- 60 hours of employee time per person per month for 6 months;
- 245 hours of compliance management personnel time per month for 8 months;
- 200 hours of safety/ergo committee time per month for 8 months;
- 20 hours of trainer time per month for 3 months;
- 50 hours of medical team time per month for 6 months.

In addition, FDI includes:

- 160 hours of legal support per month for 4 months;
- 40 hours of consulting services per month for 8 months;
- 480 hours of administrative support per month for 8 months and another 40 hours of administrative support per month for 12 months.

The cost estimate for setting up the program at one DC amounts to \$482,826. If job controls are needed, FDI estimates that an average center would have to spend an additional \$403,938. Management of MSD reports and claims at one DC is estimated to cost an additional \$111,807 per year. This would amount to a total of \$1 million per center and \$800 million for all distribution centers—or about \$6,000 per person!

At the high end of FDI's cost estimates is the forecast of \$22 billion for the membership, or \$86 million per average DC. This estimate is associated with rather extreme assumptions, which imply that 720 of the 800 DCs will have to be remodeled and all labor equipment changed, while the remaining 80 centers will have to be

Table 2
Estimates of the Costs of
Ergonomics Rule Compliance

Organization	Total Estimate
OSHA	\$4.2 billion
SBA/PP&E, Inc.	\$11.3 to \$63 billion
FDI	\$384 million to \$22 billion*
EPF	\$35.4 to \$99 billion

*FDI membership only

replaced with new ones. It is highly unlikely that OSHA's proposed standard would require such drastic changes to current facilities and equipment. The FDI estimates cannot, of course, be extrapolated to the more than 1.9 million sites covered by OSHA, but the arithmetic is instructive: using FDI's low-end range of \$384 million for 800 locations, the cost for 1.9 million locations would be \$1 trillion! Even cutting the cost to 10 percent of their estimate, the total cost for industry would be \$100 billion.

Another analysis obtained by CSAB from a major employer cited the following costs for ergonomics in offices:

- \$125 per work station for evaluation of hazards
- \$100 per session per person (groups of 25-50 people) typically for two sessions or about \$300 per affected office employee.

This compares to OSHA's estimate of \$239 to analyze an *entire* establishment and \$26 per person for training of employees (\$147 million total for training of 5.6 million workers in the first year). The source said: "Like most large companies, we have been working on ergonomics for several years. OSHA's rules would cause a diversion of effort and cost with no appreciable affect. The only people I can see benefiting are employees of companies who absolutely refuse to pay attention to worker safety—but OSHA already has procedures to police them without new scattershot rules that hit innocent bystanders."

Analysis of the benefits of the proposed program has been less extensive than costs.

OSHA's Estimates of the Benefits of the Proposed Standard

OSHA's analysis of the benefits of the proposed program covers the first 10 years of program implementation. The agency assumes that the program will start showing results in the second year, when 123,000 MSDs would be averted, and that the number of averted MSDs will increase each year, reaching 482,000 in the 10th year. According to OSHA, an average of 300,000 MSDs will be averted annually over the first 10-year period.

OSHA's estimates of the number of averted MSDs due to the proposed program seem overly optimistic. According to OSHA, ergonomics programs established voluntarily already cover 50 percent of U.S. employees.⁵ Businesses that have established programs on their own have, presumably, already been enjoying their beneficial effects. OSHA's analysis seems to omit these already realized benefits, which is a fundamental flaw in the agency's procedure—and a common failing in government "intervention" programs that take credit for continuation of trends already in motion—the so-called tardy drum major rushing to the front to "lead" the parade.

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In 1997, the most recent year for which there are data available from the Bureau of Labor Statistics, the number of injuries from overexertion and repetitive motion involving days away from work was 582,708—about 3 percent lower than in 1996. Projecting a 3 percent annual rate of decrease in the number of such injuries for the following 10 years (a somewhat conservative estimate because the average annual decrease since 1992 has been about 5 percent) implies that in less than 10 years, the number of injuries due to overexertion and repetitive motion will be less than 430,000. According to OSHA, ergonomics programs are particularly effective in preventing severe injuries associated with lost workdays. Thus,

Table 3

Estimates of the Benefits of the Proposed Ergonomics Rule

	OSHA	SBA/PP&E	EPF
Savings per Averted MSD	\$22,546	\$3,120	-
In Lost Production	\$14,763	\$2,039	-
In Medical Costs	\$3,080	\$428	-
In Insurance Admin. Costs	\$1,872	\$260	-
In Indirect Costs	\$2,832	\$393	-
Cumulative Benefits of the Program over First 10 years	\$69.5 billion	-	\$35 billion

OSHA’s estimate of 482,000 MSDs averted in the 10th year of program implementation when combined with existing industry reduction trends suggests that virtually all such injuries would be eliminated at the end of the 10-year period. This is highly unlikely, given the lack of adequate scientific knowledge about the causes and ways to prevent a number of MSDs.

OSHA estimates that employers would save \$22,546 per case of averted MSD—\$14,763 in value of otherwise lost production, \$3,080 in medical costs, \$1,872 in insurance administrative costs, and \$2,832 in indirect costs to employers. According to OSHA, the annualized direct cost savings from implementing the proposed ergonomics rules would be \$9.1 billion per year.

Longstanding industry estimates say that injury avoidance in general saves about four times the out-of-pocket medical costs per incident. Savings include avoidance of training costs for replacement workers and loss of productivity. OSHA’s savings benefit estimates are made at seven times medical costs—nearly twice the common industry assumption.

Alternative Estimates of the Benefits of the Rule

In their analysis for SBA, **PP&E, Inc.** estimate the direct cost saving associated with the prevention of one MSD. They do not estimate the total benefits of the proposed ergonomics rules. The benefits of averting an MSD, according to PP&E, are lower than what OSHA estimates by about a factor of 7. They are \$3,120 per prevented case, \$2,039 of which are savings of lost wages; \$428,

savings of medical costs; \$260, savings of insurance administrative costs; and the remaining \$393, savings of indirect costs.

The new study by **EPF** also suggests that OSHA has over-estimated the benefits of the proposed program. EPF argue that OSHA has mistakenly included lost production benefits for averted MSDs that do not involve days away from work. According to their calculations, corrections for this error alone would reduce the cumulative benefits of the program over the first 10 years of implementation from the \$69.5 billion that OSHA estimated to about \$35 billion.

Where Does This Leave Us?

No matter which formula is used, the OSHA costs seem greatly understated and benefits at least somewhat overstated. The “workers’ compensation-like” aspect itself could drive costs to the tens of billions of dollars range. But worse, OSHA has decided to impose a series of far-reaching and expensive regulations to “solve” a problem that will be partially solved by existing industry momentum—but in any case will likely not be solved by their prescription of forms, reports, and management training. The “one-size-fits-all” process has not worked in the past. OSHA claims to put “flexibility” into the system—but even a cursory reading of their requirements contradicts that assertion. In the experience of the senior author of this paper as CEO of a major corporation, a “uniform solution” could not be imposed on employees. The best results came when the decentralized managers were motivated to solve their employee safety problems with local solutions based on support for the priority from top management and information as to what had worked elsewhere. These techniques have made the chemical industry in which this author worked the safest of all major manufacturing categories. People who manage and people who work in facilities don’t want to be unsafe; they want help to let them adapt practices to make them safe.

Is there a solution to this coming OSHA-business impasse? Yes!

OSHA could provide an invaluable service by doing two things:

- Collaborating with the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health and Human Services. Serious studies could be conducted into the real causes of MSDs. NIOSH has already published excellent studies on certain MSDs. Much more needs to be done. An example is carpal tunnel syndrome. NIOSH studies have only partly helped explain cause and effect.

For example, a recent NIOSH study of computer keyboard design—long thought to be a factor in MSDs—was found inconclusive. On the subject of MSDs, NIOSH reports: “Current scientific research has provided important insights into the etiology and prevention of these disorders, but important questions remain unsolved. Research needs include better methods of exposure characterization and greater understanding of basic pathophysiologic mechanisms.”⁶ NIOSH could undertake far more studies where their own studies and industry experience and solutions are lacking. Wouldn’t it be possible for two government agencies to pool their talents and resources on this important subject? If they can’t, then at least they could do it independently, while trying to avoid competition and overlap.

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- Providing a clearinghouse for collection and dissemination of “what works” with ergonomics problems. Several industries have worked together to share experiences on this subject. OSHA is uniquely suited to do so. Indeed, OSHA has already issued five of these case studies, called “Ergofacts.” These are short (one-page), well-written papers on specific ergonomic problems and proven solutions tested in business practice. But if, as OSHA says, there are more than 100 ergonomics problems, why are there just five papers? NIOSH has also published a number of studies (“NIOSH Facts”) that are well-researched and well-written. Why aren’t there more? (See appendix, pp. 13-15, for samples.) NIOSH will also consider requests for specific company job hazard analyses. Results of these analyses are available on their web site.

Surely OSHA could take on a major role in polling industry for “best practices” and disseminating the conclusions on the internet

and in publications—with an emphasis on small business. Some of this, in rather awkward form, is currently available from NIOSH.

In the absence of these positive steps, we will invariably find a protracted battle among regulators, business, Congress, and the courts “settling the issue” while avoidable injuries continue.

If OSHA persists in its bureaucratic, one-size-fits-all form and process-laden proposal instead of using its considerable skill and resources to really help by being a reliable source of best practices, then they will reinforce the fear employers feel when they hear, “I’m from the government and I’m here to help.” Wouldn’t it be refreshing and a thrilling change to hear that same phrase and believe it?

Notes

1. Memorandum 00-18, “LPA Files Comments Opposing OSHA’s Ergonomics Proposal Based on Substantial Member Input,” Jeffrey C. McGuinness, January 31, 2000, http://www.lpa.org/lpapublic/PolicyForum/press/lpa_files_ergo_comments.htm. LPA, a public policy association of human resources executives, presents 20 well-reasoned, specific rebuttals to the OSHA standards.
2. “Critique of OSHA’s Economic and Regulatory Flexibility Analysis of the Proposed Ergonomics Program Standard,” EPF, www.epf.org.
3. *Analysis of OSHA’s Data Underlying the Proposed Ergonomics Standard and Possible Alternatives*, prepared on behalf of the SBA by Policy Planning & Evaluation, Inc., p.14.
4. *The Economics of Compliance with the Proposed OSHA Ergonomics Program Standard: An Industry Analysis for Food Distributors*, Prime Consulting Group, Inc.
5. *Ergonomics by the Numbers*, www.osha-slc.gov/SLTC/ergonomics/.
6. *Musculoskeletal Disorders of the Upper Extremities*, National Occupation Research Agenda (NORA), NIOSH, www.cdc.gov/niosh/nrmusc.html.

Appendix

Ergo facts

Lifting Operations Create Ergonomic Stress on the Back

From the U.S. Department of Labor
Occupational Safety and Health Administration
Ergo Facts No. 4

Lifting heat exchangers, part of residential boiler units, from the floor to a conveyor line resulted in low back pain and back injuries to employees working on an assembly line.

The Problem

The job involved one employee who placed the heat exchangers on a conveyor from a pallet on the floor for assembly of residential boilers. The employee brought out the heat exchangers in batches, ten at a time, with about 30 being handled each day.

The employee placed the cabinets and insulation for the boilers on the conveyor and then lifted and positioned the heat exchangers manually.

It took three moves to position the unit after the heat exchangers were brought to the work area on pallets. First, the employee lifted the unit from the pallet and placed it on the floor near the conveyor. Second, the employee lifted the unit from the floor to the conveyor. Third, the worker then had to place one hand under the unit and lift to shift the unit into its final position.

The job was evaluated using the National Institute for Occupational Safety and Health (NIOSH) lift guide, *Work Practices Guide for Manual Lifting*, Department of Health and Human Services, NIOSH, 1981. The first and third lifts were outside the parameters of the NIOSH lifting guidelines, so only the second lift was evaluated.

The units weighed from 61 to 84 pounds. After the variables of the second lift were measured and entered into the NIOSH lifting equation, the action of lifting the heat exchangers from the floor to the conveyor line fell between the Action Limit (28 pounds) and the Maximum Permissible Limit (85 pounds) which, under the guidelines, calls for engineering (mechanical) or administrative (work practice) controls.

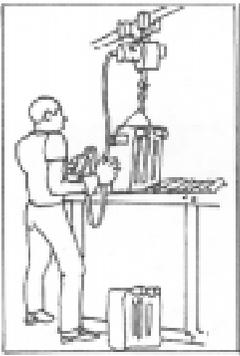
The Solution

For this situation, the company installed a hoist that eliminated the three manual lifts of the heat exchanger, and instead, mechanically lifted exchangers off the pallets and positioned them along the assembly line.

The Benefits

The workers in this job are no longer exposed to hazards of over-exertion injuries with the three stressful lifts eliminated. The employees welcomed having this easy-to-handle lifting aid installed. (SHQ)

ErgoFacts provides a brief summary of the results of an employer's recognition of the need for workplace safety and health assistance. In some instances, enforcement officials investigated these sites to clarify an inspection. Such assistance can identify and help the employer correct workplace hazards, develop, or improve an effective safety and health management system, or both. Contact the OSHA office in your area for additional information on the consultation program or visit OSHA's website at www.osha-slc.gov.



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Donna Hise

Source: OSHA Ergonomics Publications, www.osha-slc.gov/SLTC/ergonomics



CARPAL TUNNEL SYNDROME

June 1997

In recent years, reports of repetitive motion injuries have risen dramatically in workplaces across the country. These problems, frequently termed "Cumulative Trauma Disorders" are being reported at alarming rates in all types of workplaces - from meatpacking plants to newspaper pressrooms. According to the Bureau of Labor Statistics, "disorders associated with repeated trauma" account for about 60% of all occupational illnesses. Of all these disorders, carpal tunnel syndrome is the condition most frequently reported.

What is Carpal Tunnel Syndrome (CTS)?

The carpal tunnel receives its name from the 8 bones in the wrist, called carpals, that form a tunnel-like structure. The tunnel is filled with flexor tendons which control finger movement. It also provides a pathway for the median nerve to reach sensory cells in the hand. Repetitive flexing and extension of the wrist may cause a thickening of the protective sheaths which surround each of the tendons. The swollen tendon sheaths, or tenosynovitis, apply increased pressure on the median nerve and produce Carpal Tunnel Syndrome (CTS).

What are the Symptoms of CTS?

The symptoms of CTS often first appear as painful tingling in one or both hands during the night, frequently painful enough to disturb sleep. Accompanying this is a feeling of uselessness in the fingers, which are sometimes described as feeling swollen, even though little or no swelling is apparent. As symptoms increase, tingling may develop during the day, commonly in the thumb, index, and ring fingers. A decreased ability and power to squeeze things may follow. In advanced cases, the thenar muscle at the base of the thumb atrophies, and strength is lost.

Many patients with CTS are unable to differentiate hot from cold by touch, and experience an apparent loss of strength in their fingers. They appear clumsy in that they have trouble performing simple tasks such as tying their shoes or picking up small objects.

What Causes CTS?

As stated earlier, swelling of the tendons that line the carpal tunnel causes CTS. Although there are many reasons for developing this swelling of the tendons, it can result from repetitive and forceful movements of the wrist during work and leisure activities. Research conducted by the National Institute for Occupational Safety and Health (NIOSH) indicates that job tasks involving highly repetitive manual acts, or necessitating wrist bending or other stressful wrist postures, are connected with incidents of CTS or related problems. The use of vibrating tools also may contribute to CTS. Moreover, it is apparent that this hazard is not confined to a single industry or job but occurs in many occupations

especially those in the manufacturing sector. Indeed, jobs involving cutting, small parts assembly, finishing, sewing, and cleaning seem predominantly associated with the syndrome. The factor common

in these jobs is the repetitive use of small hand tools.

How Large a Problem is CTS?

In the past ten years, more and more cases of workers afflicted with CTS have been reported in medical literature. One reason for this increase may be that automation and job specialization have fragmented workers' tasks to the point where a given job may involve only a few manipulations performed thousands of times per workday. Increased awareness of work-related risk factors in the onset of CTS is reflected in the growing number of requests for health hazard evaluations (HHEs) received by NIOSH to investigate such suspected problems. NIOSH received about three times as many HHE requests related to hand and wrist pain in 1992 as compared to 1982.

Prevention

NIOSH recommendations for controlling carpal tunnel syndrome have focused on ways to relieve awkward wrist positions and repetitive hand movements, and to reduce vibration from hand tools. NIOSH recommends redesigning tools or tool handles to enable the user's wrist to maintain a more natural position during work. Other recommendations have involved modified layouts of work stations. Still other approaches include altering the existing method for performing the job task, providing more frequent rest breaks, and rotating workers across jobs. As a means of prevention, tool and process redesign are preferable to administrative means such as job rotation.

The frequency and severity of CTS can be minimized through training programs that increase worker awareness of symptoms and prevention methods, and through proper medical management of injured workers.

Treatment

Treatment of CTS may involve surgery to release the compression on the median nerve and/or use of antiinflammatory drugs and hand splinting to reduce tendon swelling in the carpal tunnel. Such medical interventions have met with mixed success, especially when an affected person must return to the same working conditions.

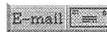
Current NIOSH Research

NIOSH continues to investigate musculoskeletal disorders, including cumulative trauma disorders (CTDs) such as CTS, in many work environments and will make its research information available as investigations are finalized.

Additional Information

Additional NIOSH information about musculoskeletal disorders is available from the toll-free CDC Fax Information Service (1-888-232-3299); request fax document # 705005. NIOSH has also developed several publications that provide a description of NIOSH research on CTDs, including carpal tunnel syndrome, and practical ways to identify and evaluate musculoskeletal disorders. Copies of these publications, *Cumulative Trauma Disorders in the Workplace Bibliography* and *Elements of Ergonomics Programs*, are available free-of-charge from the NIOSH Publications Office while supplies last:

telephone **1-800-35-NIOSH** (1-800-356-4674)
fax 513-533-8573



e-mail pubstaf@cdc.gov

For a complete listing of documents available on the **CDC Fax Information Service** call **1-888-CDC-FAXX (1-888-232-3299)** and request document #000006. This information is also

Source: NIOSH Facts, www.cdc.gov/niosh/ctsfs.html

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