



# NUANCE

WHITE PAPER

## DRAGON NATURALLYSPEAKING – FROM RSI TO ROI

Increasing Productivity and Reducing Repetitive  
Stress Injuries in the Workplace

OCTOBER 2005

“ Work-related musculoskeletal disorders such as back injuries and carpal tunnel syndrome are the most prevalent, most expensive, and most preventable workplace injuries in the country. ”

Alexis M. Herman  
*Former U.S. Secretary of Labor*

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## OVERVIEW

Amy C. is a systems engineer at a large telecommunications company, where she has worked for the last 23 years. Twenty years ago, she developed chronic tendonitis, a repetitive stress injury (RSI) that causes her hands to swell and makes keyboarding painful. Over the years, she tried everything she could think of to keep working— aspirin, icepacks, an ergonomically correct office—but the only way to stop the pain was to stop using her computer. “It was getting to the point that I had to decide whether to discontinue working, or at least find a job that didn’t require that I work at the computer all day,” she says.

Her supervisor referred her to the occupational health nurse, who referred her to the company’s job accommodations manager. The job accommodations manager, who had heard about speech recognition software at a workers’ disability conference, told Amy that she had a solution. Amy now uses speech recognition software for most tasks, such as creating emails and writing Microsoft® Word documents. She still uses the keyboard to work in Microsoft® PowerPoint® and other applications. Her goal is to use the software 90% of the time. When she dictates, she is able to use her computer without feeling any pain. “Speech recognition software has enabled me to continue working at my current job,” Amy concludes.

## RSI – PAINFUL REALITY FOR COMPUTER USERS

Musculoskeletal disorders (MSDs), including repetitive stress injuries (RSIs), are the largest single job-related injury and illness problem in the United States. According to the Occupational Safety and Health Administration (OSHA), 1.8 million U.S. workers experience work-related musculoskeletal disorders annually.<sup>1</sup> RSIs, which are often incurred by employees working at computers, are the most common of the MSDs. RSIs can affect muscles, nerves, tendons, ligaments, and joints. People who suffer from RSI may experience pain in wrists and forearms, swollen hands, shoulder stiffness, or finger numbness.

Carpal tunnel syndrome, once known as writer’s cramp, is the most prevalent type of RSI. It develops gradually and can become a severe ailment that numbs hands and arms, so that even opening a jar can be painful and, in some cases, impossible. RSIs occur when muscles or tendons are repeatedly overused or forced into an unnatural position. Keyboarding, clicking, and maneuvering the mouse can strain and damage muscles and tendons in the fingers, hands, wrists, and arms. The widespread use of computers in the workplace has contributed to the ubiquity of RSI pain and discomforts. “Intensive computer use accounts for a significant number of MSDs each year, and occupational computer use is growing,” OSHA reports.<sup>2</sup> While most RSI sufferers are able to find appropriate treatment and return to their former positions, some become permanently disabled and are never able to use their hands to operate a computer again. “Workers with severe MSDs often face permanent disability that prevents them from returning to their jobs,” adds OSHA. Speech recognition software can enable many people with MSDs to regain the ability to use a computer and resume their daily work activities.

**“ It was getting to the point that I had to decide whether to discontinue working, or at least find a job that didn’t require that I work at the computer all day.”**

*Amy C.  
Systems Engineer*

1. OSHA Fact Sheet, “Ergonomics by the Numbers.”

2. OSHA Ergonomics Program, Federal Register/Vol. 65, No. 220/Tuesday, November 14, 2000/Rules and Regulations, p. 68343.

## THE IMPACT OF RSIs ON THE BOTTOM LINE

RSIs not only create pain and suffering for employees, they also have a painful impact on their employers' bottom lines. Consider the following:

- Recovery from carpal tunnel syndrome requires a longer absence from work (27 median days) than any other major disabling injury or illness.<sup>3</sup>
- MSD-related claims account for \$1 out of every \$3 spent on workers' compensation.<sup>4</sup>
- Employers save an average of \$27,700 for each severe MSD prevented.<sup>5</sup>
- Conservative estimates of the economic burden imposed by MSDs, including workers' compensation costs, lost wages, and lost productivity, are between \$45 and \$54 billion annually.

Additional costs may be involved. For example, calculate the expense associated with hiring temporary workers to replace employees undergoing surgery for carpal tunnel syndrome, who may be off the job for six months or more.<sup>6</sup>

Companies must also absorb indirect costs associated with work-related RSIs, such as:

- Lost time from work.
- Decreased productivity.
- Increased health insurance costs.
- Low employee morale.

## SPEECH RECOGNITION: THE PRODUCTIVE ALTERNATIVE

Making speech recognition software available to all computer users can help prevent employees from developing repetitive stress injuries and enable injured employees to return to work more quickly.

Speech recognition and related technologies allow users to input text and data into most computer applications by voice, as well as to navigate the computer desktop with little or no use of their hands. Talking instead of typing also helps employees to work in more natural positions, instead of being hunched over a keyboard.

Speech recognition software can be implemented in a workplace for approximately \$300 - \$3,000 per employee, depending on needs.<sup>7</sup> Compare this to the expense of workers' compensation claims, lost productivity, replacement workers, etc. The return on investment (ROI) of a speech recognition program can be measured in weeks, not months.

As an added bonus, output and productivity may actually increase, since most people can talk faster than they type. For example, a relatively fast typist who can type 50 net words per minute will produce a 300-word email in 6 minutes. Using speech recognition software, a person dictating 140-160 net words per minute can produce the same 300-word email in about 2 minutes—one third of the time. This does not include the additional time users can save using voice commands to open the email program, looking up an email address from their contact management software programs, and sending the email by voice.<sup>8</sup>

3. U.S. Bureau of Labor, Lost-worktime Injuries and Illnesses: Characteristics and Resulting Time Away From Work, 1999."

4. OSHA Fact Sheet, "Good Ergonomics is Good Economics."

5. OSHA Fact Sheet, "Small Business Benefits."

6. "Musculoskeletal Disorders in the Workplace," National Academy Press, 2001, p. 2-12

7. Nuance internal data. This estimate includes software, installation, training, and customization expenses, but does not include the cost of any additional hardware that may be required.

8. Net words per minute are determined by measuring a person's average gross speed in words per minute and subtracting the number of errors made.

**“ Speech-recognition software increases our employees’ productivity. It also helps with the rehabilitation of their injuries.**

**Walt C.**

*Assistive Technology Specialist*

## **THE AMERICANS WITH DISABILITIES ACT**

Title I of the Americans with Disabilities Act of 1990 (the “ADA”) prohibits employers from discriminating against qualified individuals with disabilities. The workforce includes many qualified individuals with disabilities who can productively use computers when equipped with speech recognition software and supporting hardware and software. Hiring and retaining qualified workers with disabilities is not only a smart employment practice for most employers, it’s the law.

Since speech recognition software can help employers hire and maintain qualified workers with RSI and other disabilities, this technology could play an important role in employers’ ADA compliance strategies.<sup>9</sup>

## **THE ABCs OF SPEECH RECOGNITION SOFTWARE**

Speech recognition software uses the human voice as the main communication mechanism between the user and the computer. Users speak naturally into a microphone connected to the computer. The software “recognizes” the spoken words, converts them into text, and displays them on screen. Relatively simple to use, speech recognition software is very sophisticated technology that uses “language modeling” to recognize and differentiate among the millions of human utterances which make up any language.

After installing the software, each user must complete a brief enrollment process. During enrollment, the user reads aloud from a choice of prepared texts for about five minutes. Based on the dictation that it captures, the software analyzes how the user pronounces each word and stores the data to prepare a unique user profile for that individual.<sup>4</sup>

As the individual uses the software and corrects recognition errors, the software becomes increasingly accurate. Using specialty vocabularies can heighten accuracy even further. Specialty vocabularies for specific professions (for example, legal and medical) or interests can be created in-house or purchased from a variety of sources. In addition to simply dictating text, speech can be used for “command-and control” of the computer desktop.

## **IMPLEMENTING A SPEECH RECOGNITION PROGRAM**

Many companies first get involved in speech recognition by purchasing the software for a few individuals who request it. Once the companies see the productivity benefits, they often decide to make speech recognition available department or company-wide. Other companies become involved with speech as part of their overall ergonomics, RSI-prevention, and ADA compliance strategies. In any case, companies that decide to implement a full-scale speech recognition program frequently go through the following steps:

- Solicit support from senior management
- Form a cross-functional committee
- Study the software

9. The information contained in this booklet does not constitute legal advice. If you have any questions regarding the Americans with Disabilities Act or any other law, you should consult a qualified attorney. Nuance cannot provide an opinion regarding the adequacy of any compliance plan.

- Conduct a needs assessment survey
- Evaluate the options
- Conduct an on-site evaluation of the software, including training and customization
- Evaluate the results
- Launch a full-scale program
- Cut and paste documents
- Insert standard blocks of text
- Create and send emails
- Browse the Web
- Create and edit budgets in spreadsheet programs, such as Microsoft® Excel

Here are some typical questions that companies ask:

**Q:** Isn't purchasing and installing the software primarily an information technology (IT) function? Why should we do this by cross-functional committee? Won't it delay the process?

**A:** Installing the software is usually an IT function, but implementing a program involves multiple departments. Implementing any new form of technology can create resistance when people don't understand the benefits. Forming a crossfunctional committee made up of representatives from the key departments involved—including human resources, IT, and purchasing, as well as, people from every level—managers, supervisors and rank-and-file employees—will help ensure that everyone understands the program's goals and has a stake in its success.

The committee's first step is to study the software and understand how it can benefit the company. The committee should make sure that the goals complement the company's other IT, productivity, ergonomics, and ADA compliance objectives. Then, the committee can develop a plan, budget, and timeline.

**Q:** What is a needs-assessment survey, and is it necessary to complete one before implementation?

**A:** Your human resources department may already have information such as the number and type of injury reports or workers-compensation claims. This information can help with a needs assessment, but an additional evaluation is required in order to implement a program.

A needs assessment survey can either be an Intranet-based or print questionnaire. It should identify the number of potential users for the software, including RSI sufferers and those at risk, people with other disabilities, and those who wish to increase their productivity. The needs assessment should also uncover the scope of the problem, hardware and software needs, training and support issues, and related needs.

The survey should be widely publicized to encourage participation. Information about the benefits of speech recognition software may be distributed and/or posted. The survey will begin to build interest and awareness in the program. In order to encourage complete and accurate answers, and to protect privacy, employees' responses must be anonymous.

**Q:** How can we get started evaluating the various speech recognition products?

**A:** Once you have analyzed the results of your needs assessment, you can identify vendors who offer the speech recognition products and services. Information for vendors and third-party reviews will help you to select the best options. Most vendors offer comprehensive demonstrations and presentations, hands-on trials, and pilot programs.

If your IT department does not have in-house expertise, you may want to bring in a speech recognition consultant or a value added reseller (VAR) to help you evaluate vendors. The consultant or VAR can help you maximize the value of your investment.

Consultants and VARs can be located through trade publications, trade shows, the Internet, and manufacturer referrals.

**Q:** What are the system requirements for implementing speech recognition software?

**A:** Depending on the type and number of applications that individuals use with speech recognition software and related hardware, the system requirements will vary. However, most companies develop a standard platform, with alternative options for employees who use speech recognition software on a laptop, dictate into a hand held digital recorder, or have special needs. Creating such a platform makes it easier for an organization's purchasing department to develop standardized pricing and ordering procedures.

**Q:** What will it cost to implement a speech recognition program at my company?

**A:** Costs will vary, depending on the vendor, the VAR or consultants, the size of the program, related hardware and software needs, and the level of customization, training, and support desired. The simplest of setups may cost as little as \$300 per employee, while a comprehensive RSI prevention and productivity program may run \$3,000 per person, excluding hardware. Most companies find that providing customization, training, and support results in greater employee satisfaction and productivity. It also provides an excellent return on investment.

**Q:** Is an on-site evaluation of the software (pilot) necessary? Who should be involved in a pilot program?

**A:** If you are only planning to provide the software to a few employees, you may not need to test the software first. However, if you are considering a full-scale speech recognition program, an on-site evaluation is recommended. The vendor or VAR can help you set up a pilot, but it is important that you determine your own criteria for evaluating productivity and participant satisfaction before the pilot begins.

Select four to eight employees who are computer savvy, want to use speech, and will have time to use the software on a daily basis during the pilot period. A typical pilot, from initial assessment through final evaluation, lasts one to three months. Before the pilot begins, someone from your IT or training department, the vendor, your consultant, or a VAR should sit down with each participant to analyze his or her daily routine.

By doing so, custom vocabularies and macros can be developed to enhance their productivity with the software. After the software has been customized for each participant's needs, provide group or one-on-one training.

**Q:** How long does it take for users to become proficient?

**A:** It depends on the user. Although the software itself is easy to install and operate, users who are not accustomed to dictating their thoughts may need practice learning

how to dictate. Doctors, lawyers, and other experienced dictators can become comfortable right away, while the learning curve for those who are new to dictation may range from two to four weeks.

**Q:** Is training and support during and after the implementation process necessary?

**A:** Although users can begin dictating and using the software after their initial enrollment session, most people increase their productivity when they receive training and the product is customized for their needs. Providing ongoing helpdesk support ensures that users continue to achieve the maximum benefit from the product.

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