Performing Effective Ergonomic Evaluations

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by Craig Chasen

My interest and attention to ergonomics began as the consequence of managing workplace injuries within the Risk Management division of a large high-tech company 10 years ago. Ergonomics was still relatively new and unproven to our immediate industry, and I was extremely skeptical of how injuries could be reduced by placing monitors on phone books or putting a piece of foam rubber in front of a keyboard. Still, our upper extremity injuries were an increasing component of our worker's compensation costs, and as the EH&S manager, I embarked on an aggressive plan to counter their impact.

I noticed that occasionally, our occupational medicine provider would send a therapist to our work site to perform an examination of the injured worker's work area. Because I maintained an active dialogue with the injured employee, the insurance carrier, and the medical provider, I was positioned to monitor and observe the execution and import of these workstation examinations. After watching two or three of them, I realized the basic objective seemed to be taking measurements and making observations of the way the workstation was configured, while watching how the employee moved to perform his job.

These straightforward examinations were among the first implementations of occupational medicine on-site programs to measure the influence of workers' postures and motions on their injury causation and recovery. This treatment component was clearly beneficial because it could identify and change aspects of an individual's job that appeared to be the source or an aggravation to their symptoms.

I realized I was positioned to get to the employees much faster for such evaluations and could, thereby, eliminate a $200 to $300 addition to the claim cost. Likewise, worker's comp insurance carriers started to provide loss control representatives who could perform ergonomics interventions at the company's facility to keep our claim severity down. The benefits from doing these evaluations internally were many. For example, I could take immediate action on any changes I recommended, as well as control the prospect of modifications that might be financially impractical. Additionally, when you are an internal employee, you have an opportunity to "sneak up on" employees and observe them in the way they actually do their work.
As an escorted outside consultant, I miss the occasions where I could see an employee in his or her "natural state." I find that when employees know they are going to be "observed," especially by an outsider, they will engage very proper posture at the outset of the evaluation. Getting them to relax and fall into their "real" positions takes a bit of psychology and a graceful "deskside manner."

**Handle with Care**

Once you begin to conduct your evaluation, whether as co-worker or consultant, it is important to proceed with a plan. It is very easy for enthusiastic and well-meaning ergonomists to make modifications as soon as they observe them. There may be a clearly egregious posture that calls for an immediate adjustment to "make it right," but this is not the time to make *any* adjustment.

For example, the subject's chair might be much too low, and the evaluator will merely raise it to a "better" level--but then, better for what aspect? One hopes the chair adjustment was done to place the lower extremities in a neutral position, because that chair height change will affect her wrist position and head position to view her monitor.

No matter what the reference point was for raising the chair, you have modified all other related postural aspects by changing it. If you did not make notes about the measurements or body positions for the other related aspects, you have lost your baseline position; your subsequent modifications may be necessary only because of the chair modification. Those other aspects cannot be measured or properly assessed without returning the chair to its initial position.

On the whole (literally), you must acknowledge each adjustment you make for one body part will affect another body part, relative to its postural relationship to some aspect of the workstation. A common example of that relationship is when a work surface is raised or lowered to attain a better keyboard height, and it subsequently alters the position of the monitor height relative to the user's eyes. If the individual is wearing bifocals and the work surface was raised to attain neutral wrist posture or have him sit back, you may have caused him to bend his head back to view the monitor. If the monitor is placed directly on the work surface, it can't be lowered. Therefore, solving his wrist extension from a low keyboard may have consequently incurred cervical flexion because the monitor is too high for viewing through the lower lens of his bifocals.

Another reason for not making any changes until all observations are noted is that as you casually talk with the subject while taking measurements and notes, you can engage in conversation that may be very revealing. Discussing her hobbies will often point out physical stressors that are not demonstrated in her work area but may be more causal to her symptoms than the work-related elements.

The term cumulative trauma is a fitting phrase to acknowledge the impacts of all activities and positions a person attains, day and night. As you examine the entirety of a workstation's configuration and movements, your knack for observation will be enhanced, which is a beneficial skill. For me, as a professional ergonomist, it is important to make rapid assessments of the potential stressors for an individual, in order to minimize the time I spend. I have performed many evaluations where the employee was having pain or discomfort that seemed inconsistent with his work postures and habits.
I always begin by asking about the frequency and timeframes of the symptoms. Job-related injuries typically develop during the day and through the week, then subside during the weekend. When an individual reports that his symptoms are constant, even during a long weekend, there is a greater likelihood that a contributing cause may be a non-work activity--sleeping posture, a hobby, or even his car.

**Multiple Impacts, Frequently Missed**

The most common sleeping postures that contribute to upper extremity issues are when people "fold" their wrists or hold their elbows in a tightly flexed posture. These flexed and static sleeping postures can be as damaging as the dynamic postures during work. Together, they multiply the impacts. Similarly, individuals who do computer work during the day and then do crochet or knitting or play pool regularly are prime candidates for cumulative trauma symptoms. Often, they do not, themselves, recognize the connection.

For example, I worked with a woman who had a wonderfully designed workstation but was having shoulder and wrist pain on her dominant side. As I looked around her office, I noticed framed photographs of three very different but very well-groomed dogs. I offered a compliment about these well-cared-for creatures and she lit up with pride. She willingly described her daily routine of energetically brushing and grooming these dogs. I asked if those actions were also painful and she agreed, at which point I brought up the impact of that activity. She instantly realized the primary source of her discomfort.

After that enlightening experience, I remember receiving a call from a customer employee who needed me to "come over right away" because she was suddenly having horrible right shoulder pain. I called her immediately and, because most ergonomics-related symptoms develop over time, asked some questions about her recent activities. She recounted her activities during the previous few workdays and replied that "nothing had changed." I then asked about "outside activities," and she said nothing new had happened after work, either. Suddenly, she stopped for a moment, then mentioned she had gone bowling two nights before, which was the first time she had bowled in six years. She said her team won.

I was still asked to perform the evaluation. You learn a great sense of tact as you make notes in your report's Subjective History about the "contributing stressors" from her bowling five games after many years of not bowling at all.

I frequently ask how long is an employee's commute to work. If he has a right arm or shoulder complaint, I always ask whether his car has a stick shift or is an automatic. Employees who carry a laptop computer home and fully extend their right arm to toss it and associated papers onto the passenger seat are also surprised such an activity is connected to right shoulder pain at their desk.

**Fundamentals of Successful Evaluations**

All of this is to say the various components that comprise a successful evaluation are many and can all be called upon within a 30-minute visit with an individual you have never met, in an unknown work environment. To organize your basic evaluation strategy, I offer information on two elements that are fundamental to an exacting and efficient evaluation. They are the Report Format and the Tools you use.
Report Format and Evaluation Sequence

Have your report organized under the following headings, which also delineate the general sequence you follow during the evaluation. I have included basic examples.

- **Subjective History.** How long has she been at this job, at this desk, and how many hours does she work per day? What are her reports of discomfort, when did they start, and which activities aggravate them? How tall is she, and does she wear corrective lenses?

- **Observations.** Make observations and take precise measurements of work surface dimensions, chair height, computer components, etc. Measure the angles of pertinent postures and movements, such as wrist angles, head position, or an extended arm reach. Ask about any activities outside of work, including hobbies, recreation, and the car the person drives.

- **Recommendations.** What did you change? Specifically note the new measurements that reflect any adjustments you made. Report how her body parts have been repositioned as the result of your modifications and why the new positions are beneficial or will mitigate her symptoms. Do not write "monitor raised to a better position," but explain what postural improvement arises from the higher monitor placement. What recommendations are you making for after the evaluation, and what specific benefits will they provide?

**Tools**

For the last 10 years, the only tools I used were nothing more than a seamstress' tape-measure, a 12-foot tape measure, a goniometer, and a portable scale. These are the primary tools needed for ergonomic evaluations; however, I have been using a digital camera for the last year. This latest tool has become invaluable for these reasons:

- **Photos help you remember what you saw.** Sometimes my notes are not complete because I'm talking with the client while making the notes. Photos often remind me of things such as what kind of keyboard they use. I have used photos to help me "measure" the depth of a particular work surface after the fact, based on a few 8.5- by 11-inch papers lying on it in one of my photos.

- **Photos are worth 1,000 words to medical providers.** Physicians and physical therapists appreciate an opportunity to observe the exact situation in which their patients are working; a picture is worth a thousand words, in fact.

- **Photos help the employee see his own posture.** Employees very often, especially in manufacturing environments, really do not recognize the abnormal postures they are in as they do their work. Neck postures are often the most revealing, because people cannot otherwise see their own neck positions.

Beyond the guidelines I have noted here, your education and training in body mechanics and anatomy are critical to eliminating and reducing physical stressors. Still, for the EH&S employee who wants to perform in-house evaluations, these strategies will allow you to progress fast with very beneficial results.