

## Remote Ergonomics Evaluations in the Office

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**Resumen:** Existe una prevalencia de trastornos musculoesqueléticos, tales como el Síndrome del Túnel de Carpo en el medio ambiente de oficinas, debido a la presencia de factores de riesgo de lesión. Muy a menudo, los factores causales de incomodidad pueden ser detectados a través de una evaluación del lugar de trabajo realizada por un individuo calificado, como lo es un ergonomista. Gran cantidad de compañías y empresas no cuentan el personal con la experiencia para realizar estas evaluaciones en forma interna, de tal manera que recurren a contratar ergonomistas calificados. El creciente uso de la tecnología disponible en los lugares de trabajo y la disminución de tiempos de entrega al realizar evaluaciones de lugares de trabajo, ha producido que el ergonomista adopte nuevos abordajes para la solución de problemas relacionados con la ergonomía. Este documento plantea la aplicación de evaluaciones ergonómicas de oficina realizada a distancia (remotas) a través de un ergonomista virtual.

**Abstract:** In the office environment, musculoskeletal disorders such as carpal tunnel syndrome are prevalent due the presence of injury risk factors. More often than not, the factors causing discomfort can be accessed through a workplace evaluation performed by a qualified individual, such as an ergonomist. Many companies do not have the expertise to conduct evaluations in-house and hire a qualified ergonomist. The increasing use of enabling technology in the workplace and shrinking delivery times for workplace evaluations has necessitated that ergonomists adopt new approach to solving ergonomics related problems. This paper discusses the application of remote ergonomic evaluations of office workstations through a virtual ergonomist.

**Keywords:** ergonomic evaluation, remote, office ergonomics

## 1. BACKGROUND

The repetitive nature of office work (long term keyboard and mouse use) or inappropriately adjusted office equipment (i.e. chair and desk) could cause discomfort or injuries. Injuries often begin as discomfort and are caused by exposure over a period of time to the repetitive nature of work (long term keyboard and mouse use) or inappropriately adjusted equipment (i.e. chair and desk). More often than not, the factors causing discomfort can be accessed through a workplace evaluation performed by a qualified individual, such as an ergonomist.

When the ergonomist visits the workplace, he/she interviews the client, collects measurements of the client and workplace, and makes recommendations. During the on-site evaluation, the client must host the ergonomist by meeting them, escorting them to their work area, and spending undivided attention while the ergonomist is there. This time away from their work decreases productivity. From the ergonomist's perspective, there is time spent commuting, and collecting measurements at the workplace. In both of these cases, the cost is transferred to the client. The speed of business today leads clients to expect a shorter delivery time for the evaluations. Due to these factors, there is a need for a cost effective approach to solving office ergonomics related problems.

One approach is to provide ergonomic evaluations through a virtual ergonomist (i.e. not on-site). The evaluation is initiated by client contacting the service provider and concludes with the virtual ergonomist following up with the client after recommending the necessary modifications. This paper outlines the process employed by a virtual ergonomist for conducting an ergonomic evaluation of an office workstation.

## 2. PROCESS AND DISCUSSION

The evaluation of the workstation includes all of the same basic elements of an in-person evaluation along with the same deliverables. This process was initially implemented in paper / electronic form using email for data transfer. The evaluation process flow is shown in Figure 1.

The first stage of the process is the initial contact with the client. The assessment sequence is generally triggered an employee or other individual (e.g. health services, management) requesting an evaluation of the workstation in response to a perceived issue such as discomfort or pain (reactive).

The next stage includes obtaining background information, workstation and anthropometric measurements (as shown in a pictorial diagram that is provided), body part discomfort rating, and digital data from the client. The still photos and /or video clips of the work area and the activities being performed is the additional piece of data that is critical to the successful completion of a remote ergonomics evaluation. The still images should be of the client in their work environment simulating work tasks from different angles and locations to adequately demonstrate the postures obtained during work. When possible, video footage should also be obtained of the real-time performance of work (or simulated work) to demonstrate frequency information. A good rule of thumb is that video data should be 5-10 minutes in length and include all significant tasks performed by the client.

During the time the ergonomist reviews the data provided by the client, there might be a need to contact the client to clarify or obtain more information about the discomfort, tasks, or workstation setup. During the evaluation, at least three opportunities for information exchange via phone call or video conference should be provided. The initial interaction should be to clarify the initial background information provided and educate the client on proper ergonomic setup. The second interaction should be to review the work related risk factors identified through the evaluation. At this time, the ergonomist will review the recommendations and discuss possible options for modification to a setup. The third interaction should occur after the workstation modifications have been made by the client. This interaction may be visual (e.g. include photos or video) in addition to verbal. This final stage of the evaluation is a very important element of the process. A follow-up is essential to ensure that the end-user neither experiences any discomforts similar to the ones before the workstation modification nor does he/she develop any additional discomforts. At this time, the virtual ergonomist reviews the worksite for completeness of the recommendations and to ensure that no other risk factors are present. Additional follows may be scheduled as per need.

The output of a remote ergonomic evaluation will be very similar to those generated with a traditional, on-site evaluation. The output in a written report should include a review of the current status, a listing of the observed risk factors, and a list of recommended changes both short term and long term.

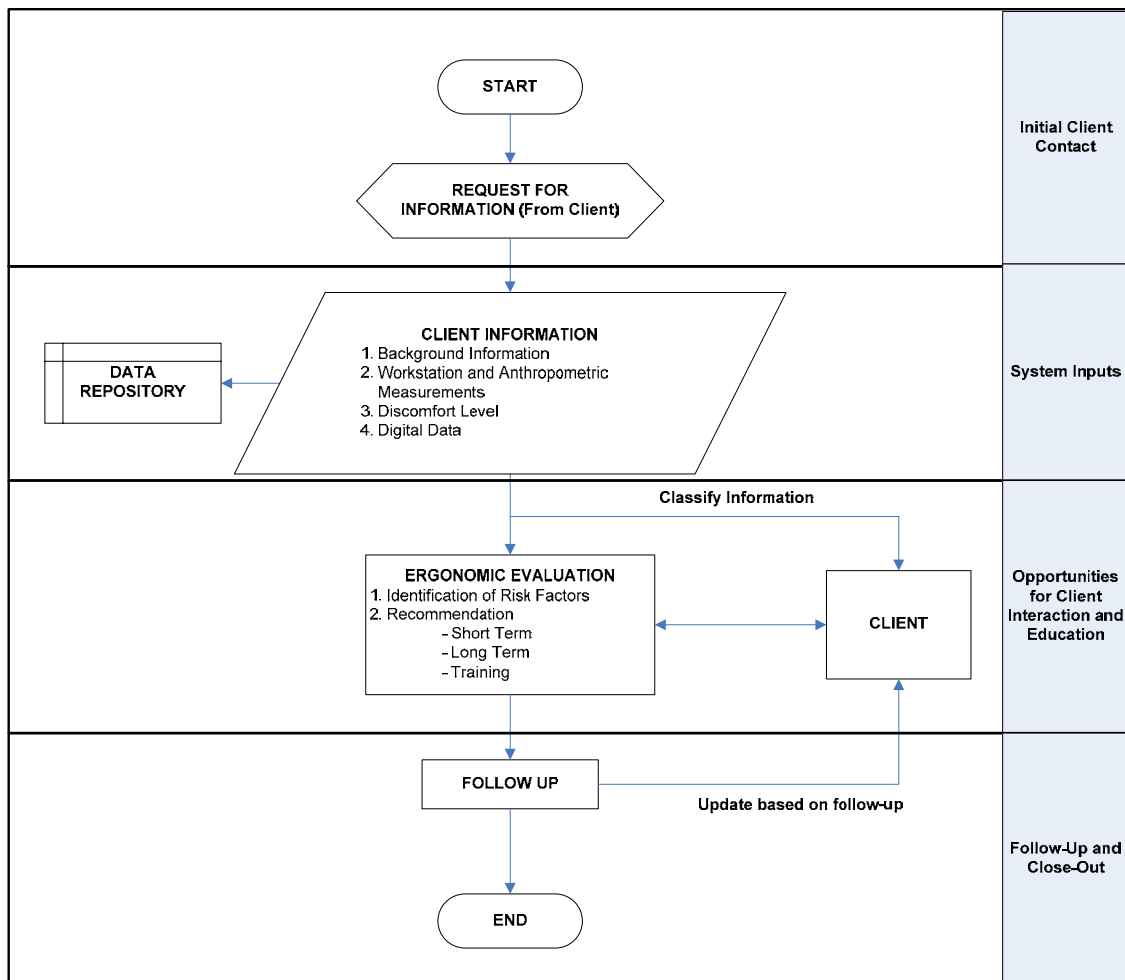


Figure 1. Process Flow for an Ergonomic Office Evaluation through Virtual Ergonomist (Fernandez et. al, 2009)

A remote system requires an understanding of the information needed, comprehensive mastery of the fundamental office ergonomics principles and their application, and an appropriate interpretation of the data provided by client. In most cases, only a certified and qualified ergonomist(s) is an appropriate choice for these evaluations. The affect of such remote evaluations could save clients money, decrease carbon footprint, and improve the transfer of ergonomic information to remote locations.

The most advanced application of a virtual ergonomist involves the use of the internet as a platform for providing the aforementioned services. A website with interactive screens is required to solicit information. Additionally, the website should provide the user with the capability to upload pictures and videos for review. The interactive screens of the web site should parallel the flow of the remote evaluation.

### **3. TESTING AND IMPLEMENTATION**

This process has been tested in the U.S. A. and Mexico. The testing involved the participation of clients in the same manner as the end product was intended. Throughout the testing, input was received on the nature of the questions that were asked and the appropriateness of the directions given. As a result of the testing, refinements were made to the processes and checklists to improve usability and ensure comprehensive collection of relevant data.

### **4. REFERENCES**

Fernandez, J.E., Ware, B.F., Kumar, A., and Subramanian, A. (2009). Office Ergonomics Assessment Through Virtual Ergonomist. *Proceedings of the 14<sup>th</sup> International Conference on Industrial Engineering, Theory, Applications and Practice. Anaheim, CA.*