

## The Meaning of Comfort Ergonomic Tips for Microscope Users

By Doug Giszczynski, *Leica Senior Marketing Manager*

Imagine your most comfortable space. Is it a favorite chair or an evening stroll? Comfort is highly subjective, depending upon the person, his or her body type, activity level, and time of day. We all hear the term "ergonomic" to describe workplace tools; from computer mouse pads to power tools.

One goal of ergonomics is: *to reduce the stress on the human operator while improving the performance of the entire work system. These goals are achieved by analyzing the task, the working environment, and the inter-play between human and machine.* (Schmidtke, 1993). But I define it like this: **You can't do your best work if you are uncomfortable.**

Workstations equipped with microscopes are essential in the medical field, making it possible to diagnose disease. But when used continuously for many hours a day, they place enormous demands on the eyes, musculoskeletal system, and the powers of concentration.

### People are different

There is no single microscope that is comfortable for all users. If the viewing height is too low, the observer will bend forward while working, with resulting muscular tension in the neck and shoulders; too high and the person will strain the neck and eyes to see. In the ideal microscope, the viewing height and angle are adjustable to the build of the user. Variable viewing height is the best way to prevent a sedentary posture and permits the observer to shift around from time to time. Our bodies were made to move, and dynamic sitting minimizes the stresses placed on the back muscles, puts a stop to decreased performance, and staves off the onset of fatigue.

### All controls at hand

Frequently used controls such as the stage and focus controls should be as far down as possible on the microscope and close to the table



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## The Feel Good Lab Ergonomic Tips for Histology Lab Procedures

By Jan Minshew, HT, HTL (ASCP), *Leica Marketing Manager*

I have a question for those who have been in the field of histotechnology for a while, but it probably applies to new folks, too. Doesn't it seem like almost everything has changed since you started? Workplaces are more stressful now because workloads have increased, turn-around times are shorter, and there aren't enough workers. We've advanced from manual to computerized data entry, but there usually isn't a comfortable spot to put the keyboard. Marvelous equipment is available to automate repetitive tasks, but much of it is big, which crowds the workspace even more. To top it off, the age of the average laboratory worker has increased, and though we don't like to admit it, aging causes changes. It affects our height, quality of vision, physical strength, tolerance levels, and the ability to recover quickly from an accident or injury. Many of these changes impact the delicate ergonomic balance in histology labs and send workers home at night with aches and pains they never had before. Let's take a look at some practical ideas for making ergonomic improvements in the histology workplace.

### The histology work area

Workstations are designed for the "average" person (i.e., sitting workbenches are typically designed for individuals between 5' 8" and 5' 10" in height). Take a good look at yourself and your coworkers. Do you have the same bone structure, weight distribution, limb length, body contours, and propensity for right or

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# Make the Most of Your Microscope

## Proper Ergonomics Promotes Healthy Mohs Surgery for the Surgeon

According to Dr. Henry W. Randle of the Department of Dermatology at Mayo Clinic, Jacksonville, FL, repetitive strain or motion injuries are the result of prolonged work involving repetitive or forceful movements and awkward body postures. Dr. Randle, along with his colleagues, Drs. Adam C. Esser and James G. Koshy, surveyed current Mayo Clinic Mohs surgeons. The purpose of this study was to determine if Mohs surgeons are at risk for repetitive strain/motion injuries. 94% of the surgeons surveyed reported symptoms of repetitive strain injuries caused or made worse by Mohs surgery activities.

The symptoms in order of reported occurrence:

Symptoms	% of Respondents Reporting
Neck Pain	59%
Shoulder Pain	53%
Low Back Pain	41%
Eye Fatigue	29%
Headaches	24%

**Neck Pain:** Aggravated by the need for the surgeon to position his or her neck at odd angles. This is largely due to the distance between the surgeon and the patient brought on by:

- Bulky operating tables
- Patient tables too low for standing surgeons
- Shorter surgeons, who are more likely to have neck pain

**Shoulder Pain:** Aggravated by the need to reach over patients with no elbow support for the surgeon. Again, the main culprit is a low, bulky patient table with no support structures for a standing surgeon. Ideally, the table should be 5 cm above the surgeon's elbow height and provide elbow support.

**Lower Back Pain:** Aggravated by the static position of a standing surgeon. Most of the Mohs surgeons surveyed operated from a standing position without any support. Changing to a seated posture during surgery or the use of sit-stands may help to alleviate this discomfort. The use of foot rails or foot rests can provide additional relief.

### Summary

- Many Mohs surgeons suffer from repetitive strain injuries.
- Even young surgeons are at risk.

- Early intervention is recommended.
- Proper training, setup, and intervention may promote long and injury-free careers.

*Thank you to Dr. Henry W. Randle, Mayo Clinic, for providing the information.*



## Ask Mari Ann . . .

Dear Mari Ann,

**I am having pain in my right shoulder and the back of my neck after cutting for an hour or two. What can I do to help eliminate the source of the pain?**

Here are a few things you can try. First, you need to adjust your microtome and water bath to a comfortable height and reaching distance for you. The microtome should be in front of you and the water bath should be placed on a slight angle facing you or, even better, on an "L" extension of the counter on either side of you. Next, check the height and fit of your (hopefully ergonomic) chair. Make sure you are able to sit straight and comfortably without compromising your leg space. Use a footrest if your feet don't reach the floor. Also, be sure to redirect any air flow that might be hitting you in the back or neck (and blowing your ribbons as you take them to the water bath).

### Thank you for your question.

Please send your questions to Mari Ann at:

[pathologypartners@leica-microsystems.com](mailto:pathologypartners@leica-microsystems.com)

Mari Ann Mailhot, BA, HT(ASCP), Leica product application specialist with over 37 years of experience in the field of histology, will choose one question to answer each issue.



## Upcoming Events

### 54th Annual Scientific Meeting of the American Society of Cytopathology

November 4-6, 2006, Toronto Canada

### American Society for Mohs Surgery

November 8-12, 2006, Sheraton Hotel, San Diego, CA

To find additional exhibitions Leica will attend, visit:

[www.leica-microsystems.us](http://www.leica-microsystems.us) and click Company → Events.

# Need to Know

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## Stress Relief: Real-time Application Support and Service for the Leica ASP300 S Tissue Processor

By Andreas Kaepplein, *Leica Marketing Manager*



Tissue processor downtime dramatically impacts laboratory efficiency and tissue quality. To maximize uptime and the performance of the critical work step of tissue processing, Leica now provides remote service and application support of your instrument's performance to predict possible system failures.

### Proactive, real-time monitoring of system status

RemoteCare™ is Leica's first step in the creation of a broad portfolio of remote support and service product offerings and is available to customers who have purchased a Leica RemoteCare support package or service contract. On a regular schedule, RemoteCare monitors and collects information about the electro-mechanical functions and system parameters of the instrument, and provides detailed information on system status including:

- Online program monitoring
- Instrument lifetime information
- Reagent and paraffin temperatures
- Preventative maintenance schedule
- Filter changes
- Rotary valve and pump status
- Error and Run logs
- Electro-mechanical integrity

Through analysis of this data, Leica technical service engineers can predict system issues and determine the fault conditions to monitor, such as reviewing the pump hours to determine when to schedule preventative maintenance. This can help your laboratory avoid "in run" failures that can lead to specimen loss. RemoteCare support staff can capture and analyze instrument data, and maintain HIPAA compliance. Remote problem diagnosis with reasonable accuracy helps laboratories avoid potential issues that cause downtime and specimen loss. RemoteCare blocks Leica from access to customer or patient data. The direct, remote monitoring is designed to allow access to ASP300 S diagnostic system information only and includes the following security measures:

- Conceals data from unauthorized parties
- Requires system user authentication
- Limits each user to specific data, views, and actions

For overnight tissue processing, you can choose to be notified about instrument issues via e-mail or cell phone. In addition, you can access instrument status online and review information such as runs completed and reagent management system updates.

### About RemoteCare™

RemoteCare service can be established during product installation or during a routine service engineer visit. You can upgrade the ASP300 S to include RemoteCare at any time. The only onsite requirement is that, either directly or through a proxy server, the computer on the ASP300 S must be able to connect to the internet.

Leica Microsystems developed the RemoteCare service in partnership with Axeda® Corporation, a leading provider of Device Relationship Management solutions. The core of the system is the sophisticated, patented, enterprise software of Axeda® Corporation, which runs in the protected environment of Leica server centers that connect to the ASP300 S software. The Leica RemoteCare program is designed to add value for our customers with proven technology. If you are interested in more information, call 800-248-0123.



## Your Local Leica Team

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# The Feel Good Lab

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left handedness? These and other physical differences cause each worker to experience a different level of comfort (or discomfort) when sharing a workstation.

To maximize comfort, work should be positioned directly in front of you, and frequently used objects should be within easy reach. The height of the work (not counter height) should be elbow height for routine tasks. Precision work can be performed slightly higher, and heavy work requiring physical strength should be performed at a slightly lower level. Adjustable workstations are ideal, but an alternative is to reposition the worker, with adjustable ergonomic chairs or platforms, or adjust the work using workbench cut-outs or tilted work surfaces. Lighting, noise levels, temperatures, and vibration are also important ergonomic considerations.

## Balance of people and equipment

Automated equipment is finally gaining acceptance in histology laboratories, but human interaction is invaluable for performing multiple tasks simultaneously and making quick decisions. Automation of repetitive tasks relieves workers of biomechanical stresses that can lead to musculoskeletal disorders, especially those requiring force or speed. Automation is typically accurate and reproducible so it is also excellent for tasks requiring standardization.

## Evaluate your postures and positions

One of the greatest gifts you have is the ability to make positive changes in your life, so start by making yourself feel better. Have someone who understands ergonomics evaluate the movements you make while working. Your Risk Management or Human Resources department may have a recommendation. You can also use a mirror and watch yourself.

## Pay close attention

Pay close attention to what your body tells you. The trick is to listen closely to subtle signs because when your body really starts screaming, you have probably caused a big problem. Avoid “biomechanical risk factors”, including exposures to excessive force, awkward posture, repetitive movement, and vibration. Each factor becomes more hazardous depending on how often you perform the movement, how many times you repeat it, how long it takes to perform it each time, and how much time per day you spend doing it. Typically, spending more than 50% of the work day performing repetitive motions that take 30 seconds or less to complete is considered extremely high risk. Also, remember that your body can’t tell whether you are at work or home, so if you participate in sports or hobbies that involve risk factors on your off hours, your body will add it right on to what you did at work.

## More tips

Try to work with your joints in a natural or neutral position, which is near the middle of the full range of motion. Rotate tasks often. Don’t do the same thing for long periods of time without taking short breaks to move around. You should plan a rest break every 20 to 30 minutes, even if the break is only for 15 seconds. This will help your muscles relax and renew your circulation. You will actually be more productive if you take mini-breaks because you will be able to work longer without slowing down or injuring yourself.

## Motions to avoid

The most common motions in histology work are the ones that can cause the most problems:

- **Wrists** are commonly injured from repeatedly bending them up and down (trimming by rocking the handwheel of the microtome) or inward and outward (embedding, coverslipping, and keyboarding).
- **Shoulder** and arm injuries can be caused by holding the upper arms out to the side or above shoulder level or if the elbows are winged-out away from the body. These are common movements when performing microtomy, cryotomy, coverslipping, embedding, and keyboarding.
- The **neck**, which supports the weight of your head, will tire quickly if you work with your head tilted backward. This is a common position for people who wear bifocals, glasses or progressive lenses when they look at a monitor or do close work. Having your head bent to the side (holding a phone while working) is also hard on the neck. Working with the head bent slightly forward is the easiest position for the neck.
- The **lower back** does not like a lot of bending and twisting at the waist (laying ribbons on the water bath and staining), and it gets particularly angry if you bend or twist when you lift something or if make sudden jerky movements.

## Summary

There are many more ergonomic tips that we will publish in our future editions. Until then, pay attention to your work habits and see if you can make a few changes that will add to your comfort.



# The Meaning of Comfort

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top. They should be evenly spaced so they can be operated with supported forearms and the shoulders relaxed and squared to the instrument. Your shoulders should be aligned with your hips to avoid lower back stress brought on by a rotated torso. The drive knobs should be neither too slack nor too tight; ideally, their ease of movement should be adjustable to your requirements.

## The chair and the table

The ideal in terms of relaxed and comfortable sitting is a microscope table with adjustable height that offers a large surface on which to rest the hands, combined with a chair that adapts to the user's build with a tall backrest tiltable backward by up to 30°. If the task requires the user to lean forward, this forward tilt should not exceed 20°.

## Arm and hand support

To carry out the fine movements required to position, manipulate, and prepare specimens, support should be provided by arm and hand rests that have no sharp edges. The base of the microscope stand can provide this support. The elbow joint should not be supported. Arm and hand supports should be of a "warm" material that does not transfer heat quickly from the arms as this could lead to muscle fatigue and cramping.

## The optical system

A full discussion of eyestrain resulting from microscopical observation, outside the scope of this article. However, one important fact is this: a high-quality lens system is more expensive, but pays off because it protects the eyes and reduces fatigue. High-quality microscopes have optical and mechanical properties such as parfocality, which eliminates the constant need to refocus; and plano objectives, which produce an image that is sharp to the edge of the field of view. Light intensity should always be adjusted to a comfortable level, and the color of the light should be neutral (as daylight).

## The eyepieces: up close and personal

Microscope eyepieces represent the visual interface to the user. Widefield eyepieces for eyeglass wearers having dioptric correction and adjustable eyepieces are recommended. Widefield eyepieces show a larger area of the specimen at any one time, which makes long-term observation more effective with easier navigation. Eyepieces for eyeglass wearers have a high eyepoint, and present the option of working with glasses or without. The eyecups keep out stray light from the side, and prevent reflections on the eye lens.

## The work environment

Performance and work satisfaction also depend on the location of

the workstation. Temperature, humidity, light, noise, vibration, and pollutants all have an immediate effect on well-being and productivity. For example, matching room brightness and microscope-field brightness helps reduce eye strain. The illumination provided by these sources should be uniform and moderately bright. Avoid reflections, and flickering and dazzling light; as these can result in premature fatigue.

## Pause for thought

Variety is the spice of life, and job rotation is a good way of avoiding muscular problems. It is a good idea to alternate frequently between various microscopical tasks and, if possible, to intersperse these tasks with others which do not require the microscope. If these options are not available, restricting daily hours at the microscope and taking frequent breaks can help eyes and muscles to recover quickly. If deliberate breaks in work are accompanied by physical exercise, work takes on a new dimension.

## Summary

Thorough instruction for working with the microscope should include ergonomic aspects, work planning, and optical considerations. Continuous monitoring and advice from the field of occupational medicine are also important. The key to minimizing bodily and optical difficulties is to arrange and organize a workstation as well as possible and to repeatedly practice routine microscope adjustments such as dioptric setting, focusing, and the resetting illumination until they become second nature.



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