

ERGONOMICS IN OPERATION THEATRE - PART-1

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Introduction

The high rate of musculoskeletal disorders, especially back injuries, among health care workers involved in direct patient care has been well documented. Traditionally, this problem has been addressed through body mechanics training programs that have limited effectiveness. This article describes workplace conditions, the environment, and activities that may contribute to musculoskeletal injuries among nurses, as well as identifies solutions to decrease these risks and improve work-related conditions.

These injuries can be related to providing direct patient care, such as lifting patients, or working in awkward postures or positions. Steps must be taken to not only identify tasks and activities that can result in work-related injuries, but also develop and implement solutions to avoid risk. Workers should be involved in identifying these risk reduction strategies and evaluating the success of interventions.

Health care Ergonomics

Ergonomics is the science of fitting the physical and cognitive demands of the job to the worker to prevent injury, human error and improve worker and patient comfort. Ergonomics is used to design an environment (layout, work methods, equipment, noise, etc) which is compatible with each individual's physical and behavioral characteristics. Ergonomics looks at the behavior of the person performing the job. Good ergonomic design makes the most efficient use of worker capabilities while ensuring that job demands to not exceed those capabilities.

A muscle's ability to perform is affected by the way it is used or another way to say it is the activity the

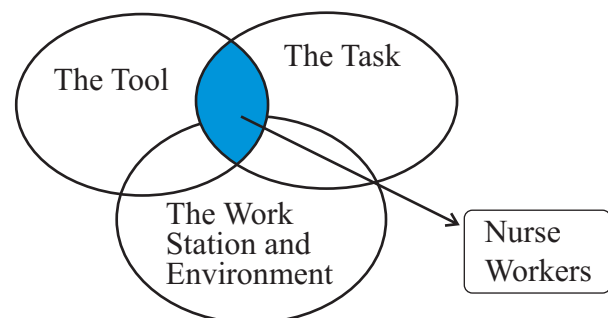
muscle is performing. The activity can be either Static or Dynamic.

- **Static Positions:** Holding one object or body part in one position for an extended period. For example, standing for a long period of time and performing the same tasks in the Operation Theatre (OT). Muscles fatigue faster when they are held in one position.
- **Dynamic:** An activity created by the rhythmic contraction and relaxation of the muscles. Dynamic work positions are positions that change, allow muscles to rest during the relaxation phase.

Focus of Ergonomics.

Focus on the tool, the task, and the environment which finds the best combination for the worker. If the right combination is not achieved then ergonomic problems may arise when the workstation, equipment, tools, or environment do not fit the workers well.

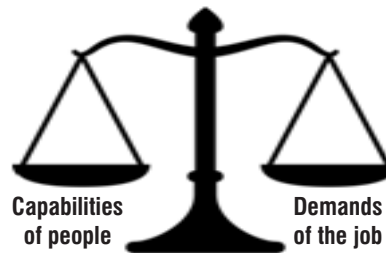
Fig 1. Focus of Ergonomics



This stress can cause immediate or long-term damage to muscles, nerves, tendons, and joints. Most of these ergonomic problems/injuries are caused

specifically by forceful or repetitive motion activities or because workers must assume awkward positions because the workplace does not fit the employee.

Fig 2. Work place balance.



Fitting the job to the worker NOT fitting the person to the job.

When equipment and job tasks are designed to fit the worker's physical capabilities, the worker is less likely to get injured.

Benefits to both staff and organization include:

- Reduced staff turnover.
- Less training and administrative costs.
- Reduced absenteeism.
- Increased productivity.
- Improved employee morale.
- Increased comfort, dignity, independence and feelings of security among staffs.

Process of Ergonomics in OT.

1. Provide management support.
2. Involve employees in the following ways:
 - Submit suggestions or concerns.
 - Discuss work methods.
 - Participate in design of equipment, procedures, and training.
 - Evaluate equipment.
3. Identify problem jobs.
 - Use systematic methods
4. Implement solutions.
 - Eliminate hazards.

- Improve work environment.
5. Analyze and review reports of injury.
 - Injury and illness logs.
 - Workers' compensation reports.
 - Accident and near-miss reports.
 - Employee interviews.
 - Workplace observations.
 6. Provide training.
 - Recognize potential hazards in each job.
 - Understand possible solutions.
 - Schedule regular refresher training.
 7. Evaluate ergonomic efforts.

Identifying Job Problems

- Observe employees performing the task.
- Ask employees which activities and conditions are difficult.
- Check injury records.
- Identify problems.
- Implement solutions and improvements.

Solutions to job problem.

- A. **Engineering solutions:** Physically change the way to do a task or make physical modifications to the workplace. Engineering controls act on the source of the hazard and control employee exposure to the hazard without relying on the

employee to take self-protective action or intervention. Poor ergonomic design of workstations can increase stresses in the body of employees.

Solutions:

1. **Adjustable workstations:** Expenses put in for ergonomic workstations when getting bids for new furniture. Consider the tallest and shortest employees. We can change the workstation, but not the employees' heights or reach. Platforms can be used to raise shorter employees to proper work height or the workstation raised. Employees' arms should rest at the employee's sides and the employee's back/neck should be kept straight.
2. **Adjustable chair:** All kinds, the seat adjusts, the back may adjust, the arm rests, Make sure the chairs are adjustable to fit you correctly. **Ergonomic chairs are not all the same.**
3. Footrests can be purchased and are adjustable to different angles.
4. Some monitors are adjustable
5. Document holder: Position the document holder close to screen and at the same level and distance from the eye to avoid constant changes of focus. Rotate the position of the holder to opposite sides of the screen periodically.

Awkward positions: Could be reaching for items. Keep supplies and frequently used items within a comfortable reach.

Facilities: lighting, temperature, noise, should be considered.

- B. Work practice solutions:** Change the process without making a physical change to the workplace. Work Practice Controls are controls that reduce the likelihood of exposure to hazards through alteration of the manner in which a job or physical work activities are performed. Work practice controls also act on the source of the hazard.

1. **Safe, proper work techniques & procedures** for performing the job tasks that are understood and followed by the employees. The work techniques could include proper positions and angles while standing at OT and performing tasks.
 2. **Training** to recognize hazards and work techniques that can reduce exposure or ease task demands and burdens. Use written procedures to train. Workers acquire certain behaviors over a long period of time. This affects the way they work, their posture, lifting techniques, etc and could create potentially hazardous situations. Regular ongoing training is an essential part of the program.
 3. **Physical conditioning period** for new or reassigned employees to learn the work techniques and procedures. Supervise the employees performing the tasks to ensure the training and task is performed correctly. If not provide additional training.
- C. Administrative controls:** Controls are procedures and methods, typically instituted by the employer, that significantly reduce daily exposure to ergonomics hazards by altering the way in which work is performed. Administrative controls are modifications in the way work in a job is scheduled that decrease the duration, frequency, or magnitude of exposure to ergonomic risk factors.

This includes the following:

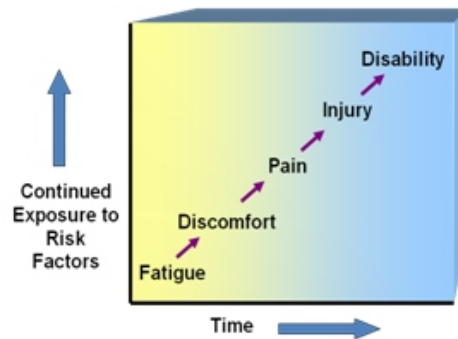
- **Employee rotation/job task expansion:** If possible rotate employees between job tasks so that an employee is assigned to perform one task then moved to another.
- **Physical adjustments to the work place:** Hard to do. But if possible slow it down a little. Affects piece work more than a situation. work at a reasonable pace, don't stress employee.
- **Redesign of work methods:** Find a better way to do the task with less stress, strain, is there a tool or piece of equipment that could be used to help perform the task.

- **Alternative tasks:** Whenever possible have employees' alternate their tasks frequently throughout the day. Rotate heavy and/or repetitive tasks with lighter, less repetitive tasks.
- **Breaks:** Encourage employees to change position, stand up or stretch whenever they start to feel tired. It is also recommended that every few hours, get up and move around.

Cumulative effect of poor ergonomics: When the musculoskeletal system is exposed to a combination of these risk factors (too quickly, too often and for too long) without sufficient recovery or rest time, damage occurs.

- **Affected by:** Working through breaks.
- Overtime.
- Task variability.

Fig 3. Cumulative effect of Poor Ergonomics



Prevention: Employee Safety = Patient Safety

The most common hazards reported by nurses and nursing aides are strains or sprains and injuries due to overexertion (lifting, pushing or pulling) associated with patient handling tasks.

Factors affecting nurses are:

- **The Physical Demands of Work.**
 - a. Patient.
 - Weight (heavy load).
 - Shape (bulky and awkward).
 - Behavior (unpredictable, confused, fragile, in pain).
 - b. High repetition of tasks.
- **Equipment and Facilities Design.**
 - Constricted work space.
 - Poorly maintained equipment.
- **Poor Work Practices.**
 - Adjustments on equipment (e.g., bed) not used.

- **Personal Factors.**
 - Off the job activities.
 - Previous Injury.

Fig 4. The physical effort required to repeatedly lifting and moving a patient manually is greater than your musculoskeletal system can tolerate.



Continued in Vol. 10/Issue 2/May - Aug 2019: Injuries due to Poor Ergonomics.