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Back injuries are arguably the most prevalent and costly source of injury to American workers. A reported 372,683 back injuries occurred in 2001 (most recent data available), accounting for 27% of all lost time cases. (US Bureau of Labor Statistics). Twenty-two percent of these back injuries are involved more than 31 days lost from work. Using the figure of just 31 days per case, that accounts for 6,964 years of lost time! (since BLS only reports 31 days or more lost, it can be safely assumed that this figure is even higher !)

Back injury costs are staggering; The US Army Center for Health Promotion and Preventative Medicine reports that the average cost of a lost-time back injury is over \$24,000, and cases involving surgery average \$180,000. Once a back injury occurs, the patient is 90% more likely to suffer recurrence of a back injury than the general population.

From an individual standpoint, few injuries are as debilitating, or painful as a serious back injury. Affecting not only work, but sleep, eating, playing, and every other facet of an individual's life are all negatively impacted by a back injury.

Of course, the best treatment of a back injury is to avoid having the injury in the first place. There is great incentive to find techniques, devices, training regimens, and other "quick fixes" to address the back injury problem. A variety of organizations are involved in research to address the problem, including universities, federal and state OSHA programs, The National Institute of Occupational Health and Safety (NIOSH), and a number of private concerns.

The Magic Bullet

To date, no one has come up with a magic bullet, a simple, inexpensive, universally applicable preventative for the back injury, although there is great incentive to do so. Because of the great variety of workplace situations, materials, and tasks, multiplied by the variables involved with each and every worker on the job, it appears unlikely such a fix will ever be found.

APPROACHES TO BACK INJURY PREVENTION

Currently, there are 4 major approaches to back injury prevention which will be discussed below:

1. Modify the Job or Task to Minimize Back Injury Risk Factors

To effectively minimize the risk factors, they first need to be recognized and evaluated. The National Institute of Occupational Safety and Health (NIOSH) has published a manual for evaluating lifting tasks, which considers each of the risk factors in a formula that yields the maximum safe weight that can be lifted, in a give task.

Click [here](#) to see the NIOSH Lifting Equation Manual

In many cases, the formula is difficult to apply, due to changing or non-routine changes in a task's demands.

Summary of Lifting Task Factors: (from NIOSH Lifting Equation Manual) Rules of thumb for Lifting Factor control are in parentheses and italics.

- **Horizontal Location**-the distance away from the body, the object is at origin, and when set down. (*The closer to the body, the better.*)
- **Vertical Location**-the distance above the floor the object is at origin and when set down. (*Optimal vertical location is approximately waist height of the employee*)
- **Vertical Travel Distance**-how high the object is lifted up, or lowered, vertically, in the course of the lift. (*Generally, the less vertical travel distance, the better*)
- **Asymmetry Angle**-how far the object is displaced, in degrees, from the front of the worker's body. (*The object should optimally be directly in front of the worker*)
- **Lifting Frequency**-how often the lifts are made in a 15-minute period. (*The fewer, the better*)
- **Lifting Duration**-how much of each work day is involved in lifting. (*Again, the less, the better*)
- **Coupling**-quality of hand-to-object connection, how securely the object is held (*Best is a formed handle, then cut-outs in the side of a carton, worst is a grasping sides of a carton*)
- **Significant Control**-when precise placement is required to carefully place or guide the object, or the object must be held before setting it down. (*The less Significant Control needed, the better; it requires less strain to simply drop or allow an object to fall into place, than to guide with precision, or hold in place.*)
- **Load Constant**-the maximum weight any person should lift, under optimum conditions. (*Optimum conditions are described in the italics above. The NIOSH formula prescribes a Load Constant of 51 pounds (23 kilograms). Completely optimum conditions rarely exist. **This means that under no circumstances, should a person lift more than 51 pounds.***)

While it may be impossible to control all of these factors, the more of them that can be controlled, the less likely a back injury will be.

2. Eliminate the Lifting From the Job

a. **Redesign the job / task so lifting doesn't occur**

b. **Mechanize or Automate the lifting jobs / tasks**

In addition to eliminating the back injury potential, installing mechanized equipment can often help pay for itself in increased productivity, more consistent performance, and less spoiled materials.

Here is a list of links to various manufacturers and vendors of materials handling devices

that have been successfully used to replace manual materials handling.

**Palletizers and Depalletizers
Manufacturers Directory**

Work Positioner

Miscellaneous Materials Handling Items

Mobile Scissor Lift Table

Pallet Handling Tables

Pallet Lift Tables

Palletizers & Bagstackers

Palletizers

Vacuum Lifts-1

Vacuum Lifts-2

Pallet Lift-Floor-to-Floor

(Note: The Covenant Group does not recommend a particular device, supplier, nor manufacturer. These examples are provided for illustrative purposes only, numerous others may be found on the Internet, or in industrial supply catalogs, and other sources)

3. Training

Although training of workers is important, and is recommended, it must be remembered that a worker cannot be trained to safely perform lifting tasks that are patently unsafe. (for instance, picking up 90-pound bags from floor level, twisting 125 degrees, and placing them on a shoulder-high conveyor.)

A good starting place for materials handling (lifting) training is with the Lifting Task Factors in item #1, above.

Here are some additional materials handling training resources:

Facts About Backs is, a simple, one page, poster format document which can be used as a poster, or for conducting "Tool-Box Safety Meetings".

Eight Steps To Lifting Correctly is a simple, one page, poster format document listing 8 important steps to avoiding back injuries.

Here is a simple graphic **poster** illustrating proper lifting technique, from the University of Md.:

4. Back Belts

A great deal of controversy has sprung up concerning the efficacy of back belts in preventing back injuries. Several large companies' research and experience has shown very positive results, while NIOSH and other researchers efforts have turned up inconclusive results.

While properly used, back belts probably do no harm, but misunderstanding their function and capabilities may create unrealistic expectations about their benefits, and the capabilities of workers wearing them. Like any tool, they must be used properly, and workers new to any tool must be trained in proper use. You cannot expect to just hand out back belts and expect back injuries to go away. Likewise, back belts do not increase the lifting or materials handling capacity of an individual.

Some links are provided below to help you make your own decision about back belts:

NIOSH booklet regarding back belts

Information on back belts from the University of California at Davis

A summary of NIOSH and other studies of back belts

Lifting Isn't The Only Hazard

Although it is the most common source of back injury, manual materials handling in general can be hazardous, if it is repetitious, or involves excessive force, caused by very heavy weights, resistance to movement, or other factors.

The "Hierarchy of Materials" handling is somewhat surprising, in that pulling a load is even more hazardous to back health than lifting, but the weight limits for pulling are generally recognized to be 10-20 pounds lighter than lifting.

Here are the weight/resistance limits of the common materials handling tasks:

Push-100 pounds*
Lift-51 pounds
Pull-35 pounds.*

*For pulling or pushing, the pound figure refers to horizontal resistance, not the weight of the materials being moved. For instance, material on a well-designed cart, with free-rolling wheels or casters, on a level, clean, smooth floor, can exceed well over 100 pounds in weight-it's the force needed to get it moving, and keep it moving that we're concerned with.

Because of the low resistance limit, and other factors (such as not being able to see where you're going as well), generally, pulling a load

(backwards) is to be discouraged.

**Some Additional Resources To Assist You
In Preventing Back Injuries**

This **booklet** outlines the "how-to's" of developing a Back Injury Prevention Plan:

"Steps To Safe Lifting" from the National Association of Convenience Stores:

"Three Keys Components in Back Injury Prevention", emphasizing the importance of posture, and conditioning for workers who routinely lift in their jobs:

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