

Secondary Injury Prevention: The Back

Secondary Injury: when one injury leads to another

It may often seem that an injury to a specific part of the body such as the ankle, knee or hip, affects nothing more than the injured site. But a localized injury could result in problems that affect another part of the body even months later. A bad knee, for example, could throw off your biomechanics in such a way that you could develop a bad back - a secondary injury.

Researchers define secondary injury as one that forces the victim to miss three or more days from work/exercise and occurs within one year of the previous injury. Often, a secondary injury goes unnoticed because of the time that lapsed since the previous, seemingly unrelated injury.

Structure of the Back

The backbone or spine is a system of bones, muscles, ligaments, tendons, cartilage and nerves. The spinal column provides the main support for your body, allowing you to stand upright, bend, and twist. The spine has a natural S-shaped curve. The curves work like a coiled spring to absorb shock, maintain balance, and allow movement throughout the spinal column.

- The spine consists of 33 bones, or vertebrae, which protect the spinal cord and nerve roots.
- The spinal cord is a large group of nerves that carry messages between the brain and the rest of the body. The nerve roots are responsible for stimulating movement and feeling.
- Between each vertebra is a "cushion" called an intervertebral disc that keeps the bones from rubbing together.
- Muscles are attached to the bones and control movement of the spine.
- Ligaments are strong fibrous bands that connect bones together, attach muscle to bone and help to stabilize joints.

Common Ag Related Back Injuries

- **Herniated disc:** Occurs when some of the softer "jelly" from one of the rubbery cushions (disks) bulges or pushes out through a crack in the tougher exterior.

Repetitive lifting, pulling, pushing, bending sideways and twisting also may increase the risk of a herniated disk. Sometimes, using back muscles instead of leg and thigh muscles to lift large, heavy objects can lead to a herniated disk, as can twisting and turning while lifting.

- **Spinal fracture/Trauma to the spine:** Spinal fractures are different than a broken arm or leg. A fracture or dislocation of a vertebra can cause bone fragments to pinch and damage the spinal nerves or spinal cord. Even minor falls or trauma can produce a spine fracture.

Examples of potential fall/trauma hazards include person factors (such as poor leg strength, deficits in balance, impaired coordination, arthritis, etc.), accessing/exiting farm equipment, navigating slippery or uneven terrain, and contact with unpredictable livestock.

- **Sprains/Strains:** A strain is an injury to either a muscle or tendon. The muscles and tendons that support the spine are twisted, pulled, or torn. A sprain is the stretching or tearing of a ligament.

Twisting or pulling a muscle or tendon can result in a strain. It can also be caused by a single instance of improper lifting or by overstressing the back muscles. A chronic strain usually results from overuse involving prolonged, repetitive movement of the muscles and tendons.

A sprain often results from a fall or sudden twist, or a blow to the body that forces a joint out of its normal position. All of these conditions stretch one or more ligaments beyond their normal range of movement, causing injury.

Back Impairment Prevention

▪ Proper Posture and Body Mechanics

Posture is the position in which you hold your body upright against gravity while standing, sitting or lying down. Good posture involves training your body to stand, walk, sit and lie in positions where the least strain is placed on supporting muscles and ligaments during movement or weight-bearing activities.

– Standing Properly

- Stand straight and tall with your shoulders pulled backward.
- Pull in your abdomen.
- Keep your feet about hip distance apart and do not lock your knees.
- Balance your weight evenly on both feet.
- Let your hands hang naturally at your sides.
- Keep your head level. Your earlobes should be in line with your shoulders. Do not tilt your head forward, backward or sideways.

– Sitting Properly

- Sit in a chair that allows you to rest both feet flat on the floor while keeping your knees level with your hips. Use a footstool if your feet don't reach the floor.
- Sit back in your chair and use a rolled towel or small pillow to support your lower back's curve if needed.
- Do not cross your legs. Your ankles should be in front of your knees.
- Keep your upper back and neck comfortably straight.
- Keep your shoulders relaxed, not elevated, rounded or pulled backward.

– Tips for the Worksite

- Move closer to a work area and minimize reach distances to reduce the need to lean forward.
- Raise or lower the task if necessary to eliminate stooping or arching of the back.
- Prop one foot on a low bar, box, bucket, or lower shelf of a workbench during standing tasks to reduce strain on the back.
- Work in standing rather than kneeling positions.
- Use a height-adjustable workstation and sit-stand stool.
- Keep tools and supplies at waist level to reduce the stress placed on the back by frequent bending and lifting.
- Use a reacher or magnet to pick up items off the floor or reach for items up high.
- Minimize the need to bend or twist at the trunk.
- Wear flat or low-heeled soft-soled shoes.
- Use shock-absorbing shoes/insoles or anti-fatigue mats if standing on hard floors.
- Keep shop/work areas clear and clean to decrease the risk of tripping, slipping or falling.
- Vary body positions and activities throughout the day to minimize repetitive activities and sustained postures.

▪ Using Correct Lifting Techniques

- Position your body directly in front of the object.
- Bend at your hips and knees so that your legs, not your back, perform most of the work.
- Keep your back upright and straight throughout the lift.
- Turn your feet toward the destination rather than twisting the trunk when lifting heavy loads.
- Keep the object as close to your body as possible.
- Lift as smoothly as possible.
- Throughout the move, the load should be as balanced and evenly distributed as possible.
- Mechanical aids (lift tables, hoists, carts, and forklifts) are safer than manual lifting for heavy items.
- Lifting above head height presents a high risk of injury and puts increased strain on the back.

▪ Strategies for Handling Livestock

Many products can help prevent or reduce back pain/injury when working with animals. Examples of these aids include:

- Squeeze chutes and gates to reduce sudden, jerking movements
- Calf carriers to decrease heavy lifting
- Lift tables/stands to eliminate bending to care for small livestock
- Support harnesses/frames to lessen back fatigue
- Motorized feed and silage carts to reduce carrying of heavy feed
- Carts to eliminate placing items on the floor and transporting of heavy items
- Multi-purpose pusher/scoops for clearing floors instead of shoveling to reduce back strain
- Modify/restructure the work environment to reduce direct exposure to animals
- Additional assistive technology can be found here: www.agrability.org/toolbox

▪ Farm Equipment Modification

Prolonged sitting, vehicle vibration, and rough terrain can increase/cause back pain. Climbing into/out of farm equipment, or jumping from a farm vehicle can cause severe shocks, awkward twisting to the back and spine, or even result in a fall. Reaching for/climbing high steps can cause straining or arching of the back. Hitching heavy implements and performing equipment maintenance can result in excessive stress and strain being placed on the back.

Equipment modification and assistive technology can help to prevent or reduce back pain/injury when operating, accessing, hitching, and maintaining farm equipment. Examples include:

- Ergonomic, anti-vibration, and air-ride seats can lessen the vibration, jolting, or swaying while operating farm machinery.
- Cameras, mirrors, and swivel seats can reduce the need to twist the trunk and neck while monitoring towed implements.
- Adding additional steps, widening steps, and hand holds can decrease fall risk and back strain when climbing into/out of farm equipment.
- Automatic gate openers can cut the number of times a person needs to get on and off a vehicle.
- Automatic hitching devices, telescoping and self-latching tongues, extension handles on tongues, and bolted-on screw jack stands are a few devices available to help minimize the stress, strain, and bending involved in hitching implements.
- Specialized equipment such as the E-Z wrench, the Dual Lift System, and hydraulic jacks can simplify machinery maintenance, reducing stress placed on the back and joints.
- Additional assistive technology can be found here: www.agrability.org/toolbox

▪ Techniques for Materials Handling

Material handling tasks often involve heavy lifting, moving bulky equipment, transporting heavy awkward objects, and twisting while lifting. The following strategies and aids may help to reduce the risk for back injury:

- Have feed, seed, or fertilizer delivered in bulk to eliminate the need to handle heavy bags.
- Use automated feeding and manure operations to decrease bending, lifting, and twisting.
- Use a tractor to move large hay bales or a bale accumulator with small bales to eliminate lifting.
- Transport heavy items with mechanical aids (lift tables, hoists, carts, wheelbarrows, cranes and forklifts).
- Monitor grain bins with grain level indicators or install spiral stairs to reduce climbing stress.
- Utilize hydraulic and electric bed hoists for trucks and utility vehicles.
- Use a ramp to load equipment or materials into a truck.
- A skid-steer, utility vehicle, or ATV may be used to eliminate manual handling.
- Add extra handles to a shovel, pitchfork, hoe, or rake to decrease the amount of bending required.
- Repackage heavy loads into smaller, more manageable packages.

Resources:

Secondary Injury

- Secondary Injury Prevention on the Farm article by Bobbie Grisso - pdf document
- <http://www.sportsdoctor.com/articles/secondary.html>

Structure of the Back

- <https://www.mayfieldclinic.com/PDF/PE-AnatSpine.pdf>
- <http://www.welcomebackcentre.com/resources/scientific-publications/basic-spinal-anatomy/>
- <http://www.andrewmoultonmd.com/spine-anatomy.php>

Common Types of Back Injuries

- <http://orthopedics.answers.com/spinal/five-common-types-of-back-injuries#slide=5>
- <http://www.mayoclinic.org/diseases-conditions/herniated-disk/basics/definition/con-20029957>
- <http://www.mayoclinic.org/diseases-conditions/herniated-disk/basics/symptoms/con-20029957>
- <http://www.mayfieldclinic.com/PE-SpineFract.HTM#.VZWKSBtVhHw>
- <http://my.clevelandclinic.org/services/orthopaedics-rheumatology/diseases-conditions/back-strains-and-sprains>

Back Impairment Prevention

- http://my.clevelandclinic.org/health/ns_overview/hic_Posture_for_a_Healthy_Back
- https://www.acatoday.org/content_css.cfm?CID=3124
- Back on the Farm, Back in the Saddle - pdf document
- Plowshares #26: Special Breaking New Ground Technical Report, Farming with a Back Impairment - pdf

- <http://nasdonline.org/document/1167/d000956/preventing-low-back-pain-in-agriculture.html>

-

http://kearney.unl.edu/documents/134982/5002970/Managing+Back+Pain+Newsletter_4+pages.pdf/303859ed-5395-4eea-ae78-94a3c5cf23b7