

Special *Breaking New Ground* Technical Report Farming With a Back Impairment *

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INTRODUCTION

Approximately 2% of the United States population has disabling and functional impairments due to low back pain or injury of the spine. Back pain is the second leading cause of visits to primary care physicians.¹ According to Vermont Rehabilitation Engineering Center for Low Back Pain, 25% of all disabling injuries involve the back and spine. It is estimated that 80% of Americans experience back pain at some time in their life, with 10% having back pain in a given year.²

Farmers are at a high risk of developing back problems, because their work frequently involves lifting heavy objects, prolonged sitting on farm equipment while doing field work, and awkward work postures. Yet very little research has been conducted concerning farmers and ranchers in reference to back pain. Approximately 36% of workers compensation claims filed by agricultural workers in 1985 and 1986 were sprains and strains. Of the claims filed by farm workers, approximately 48% involved back injury.³ In 1989 a study conducted by the Western Farm Association showed that strains and sprains of the back were the leading disabling injury to farmers and their workers.⁴ In a 1995 study of 606 hog farmers, 71% reported chronic back problems.⁵ Dupuis reported that the age of onset of back pain was 30 or under for 48% of farmers.⁶

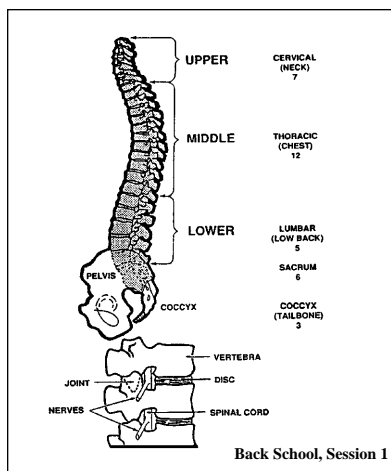
While back injuries are one of the most commonly occurring disabilities, they are difficult to manage due to a lack of physically observable signs, problems in diagnosis, and a lack of scientific support for the effectiveness of common treatment procedures.

THE BACK AND BACK PAIN

Anatomy of the Back

When we think of the “back” we often think of one singular unit, but instead, the “back” is really made up of several units. The backbone (spine) is made up of 33 bones, called *vertebrae*, stacked on top of each other. Although they are important for strength and stability, the vertebrae are seldom the causes of back impairment.

The vertebrae are separated by shock-absorbing fibrous, elastic structures called *discs*. The assembly of vertebrae and discs create the vertebral column or spinal column. The *spinal column* forms a protective structure around the *spinal cord*. The spinal cord transmits electrical signals between the brain and the nerves in the legs, arms, back and other parts of the body.



This diagram shows the structure and three natural curves (cervical, thoracic, and lumbar) of the back.⁷

The back also consists of 32 pairs of nerves, 40 muscles and many connecting tendons and ligaments running from the base of the skull to the tailbone. The impressive arrangement of the spinal column would “collapse like a tower of cups and saucers” if not for these muscles and ligaments.⁸

The back has three natural curves creating an elongated S-curve that help to absorb impact. They are the *cervical curve* located at the neck, the *thoracic curve* between the shoulders, and the *lumbar curve* in the lower back.

Defining a Back Impairment

For the purpose of this article, a back impairment is any injury, disease or problem which causes pain or limits the normal use of the back. Back impairment is often referred to as a “hidden disability,” meaning no physical signs of pain are observable by others. Individuals with

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back impairments are often misunderstood when telling others about their limitations.

Each person's back impairment is different. The severity of the back impairment varies from an acute (usually severe, but short-lived) problem to chronic (long-lasting or occurring often) pain. It can be extremely disabling, both mentally and physically. Most lower back impairments develop slowly over time.²

The lower back is the main area of the back associated with back impairments. The lower back bears the majority of the load of the body and the object being lifted or manipulated. When you bend at the waist to lift, the actual amount of load (the weight of the upper body and the object being lifted) is magnified ten times in the lower back. However, other regions of the back can also be associated with chronic or acute pain and impairment.

Back Impairment Categories

Most people never know exactly what causes their back pain. Anything that exerts pressure on your back muscles or nerves can cause pain. Illness or damage to the spine can also cause pain. Some of the common causes of back impairment are discussed below.

Sprains, Strains and Spasms

Muscle strains and spasms are often due to inactivity and poor posture. A muscle *strain* refers to excessive compression or tension on muscles (especially during weight bearing) due to overexertion. A *sprain* is tension on the ligaments due to overexertion. If the back pain is due to a strain or a sprain, an individual may feel the pain immediately or develop soreness or stiffness later. Muscle *spasms* may occur after an accident. A spasm is the back's response to injury, designed to immobilize the individual and prevent further damage.



The repetitive bending, picking, lifting and carrying associated with migrant seasonal farm workers increases their risk of back injury. (Photograph by Roger Manley)

Disc Problems

Discs have a strong fibrous outer structure, inner structural walls, and a soft gel in the center of the disc. When a disc herniates, this soft gel protrudes from the center, through the inner walls, and often bulges between the vertebrae. Pain results when the bulging area places pressure on an adjacent nerve. A ruptured disc occurs when the bulge bursts open and may cause pain and muscle spasms including sciatic pain (severe pain spreading down one leg and often into the foot).

Accidents and Injuries

Many back impairments stem from falling, automobile accidents, slipping, or repetitive motions consisting of bending at the waist and twisting the upper body while lifting an object. Most back impairments do not occur suddenly. Often the problem stems from an accumulation of injuries throughout life such as lifting heavy objects, twisting the upper body, or vibration of the back while operating equipment.

Obesity and Lack of Fitness

Back impairments are commonly due to lack of muscle tone and excess weight, especially in the abdominal (stomach) region. This loss of tone allows the lower back to sway forward, exaggerating the back's natural curve (sway back). This imbalance can stress muscles and joints, causing fatigue, injury, and chronic pain.

Poor Posture and Improper Body Mechanics

Poor posture deforms the natural curves of the spine. The importance of proper posture is discussed later in this article. Using improper body mechanics during everyday activities such as lifting, materials handling, driving and sitting for long periods of time puts excess stress on the back and may lead to chronic back pain.

Disease and Disorders

Several diseases and disorders may lead to back impairments. These include the following conditions:

- *Sciatica* is caused by nerve inflammation or compression of a nerve root in the lower back. It is characterized by low back pain radiating down the buttock and below the knee, and is sometimes accompanied by tingling, numbness or muscle weakness.
- In *spinal stenosis*, the spinal canal narrows, squeezing the nerves and putting pressure on them causing back pain. It may also cause numbness, pain and weakness in the legs. Back pain caused by spinal stenosis worsens when walking, and subsides when sitting down.
- *Osteoarthritis*, commonly referred to as arthritis, is the slow degeneration of the cartilage and protective tissue that covers the joint surfaces due to excessive use, injury, and aging. When the vertebral joints are affected, the disc become worn; the spaces between the vertebrae narrow; and bony outgrowths called spurs develop. The spine gradually stiffens and loses flexibility. The vertebral joints then rub together causing the joint surfaces to enlarge and deform. As a result, the cartilage tissue becomes inflamed causing chronic pain often due to nerve pressure.
- *Ankylosing spondylitis* is a form of arthritis in which the joints in the spine become stiff and swollen. The most common symptoms are pain and stiffness in the buttocks and lower back, particularly in the morning, that continue for more than three months.
- Other diseases which may lead to a back impairment include: *osteoporosis* (the bones become thin and weak due to calcium loss), *polymyalgia rheumatica* (a rheumatic disorder causing muscle pain, aching and stiffness in the neck and shoulders, lower back, thighs and hips), *fibromyalgia* (pain and stiffness in muscles and tendons, especially in the neck and upper back which is often related to sleep problems), *Paget's Disease* (a disorder in which the calcium in the bone spreads unevenly) and *facet joint syndrome* (facet joints become poorly aligned resulting in pain, stiffness, and difficulty moving).

- The back impairment may originate from a problem somewhere else in the body such as prostate trouble in men; problems with reproductive organs in women; kidney diseases; diseases of the intestine or pancreas; cancer that has spread to the spine; multiple myeloma, a form of cancer of the bone and bone marrow; curvature of the spine; or rarely, a tumor on the spinal cord.

In any case of back pain, see your family doctor. He or she may suggest you see an orthopedist, rheumatologist, neurosurgeon, neurologist, or other medical specialist for diagnosis.

Risk Factors

- lifting objects heavier than 50 pounds or repeatedly lifting lighter objects
- awkward body posture while working
- prolonged driving of such vehicles as tractors, trucks, and other farm equipment that cause whole body vibration
- slips and falls and other traumatic injuries associated with adverse working conditions

Fundamentals of Back Impairment Prevention

Many people do not think about their back until the pain starts. There are several strategies that can be used to avoid a back impairment. The prevention tips below are common suggestions. However, you should consult a professional (family physician, physical therapist, or occupational therapist) about how to prevent injury to your back while doing your specific tasks. They can provide you with information on safe lifting techniques, strength and fitness conditioning and on where to find a back school in your area. Back schools teach spinal mechanics, exercise, and fitness to individuals with a back impairment.

Proper Posture and Body Mechanics

Poor posture makes the back more vulnerable to injury and means poor balance resulting in fatigue and pain in the neck, shoulder, and lower back. Posture also affects your overall appearance and can influence your attitude as well. You should think about the way you move (your balance, posture, and body mechanics) during everyday activities to keep your back healthy. This applies to:

- **Standing.** Standing for long periods of time aggravates low back pain, especially on concrete. In general, stand straight, keeping your head and chest high, neck straight, stomach and buttocks tucked in, and your knees slightly bent. Moving closer to the work area may also help keep the back straight. If you stand for long periods of time, wear flat or low-heeled soft-sole shoes. While standing, alternate propping one foot on a stool, bucket, or the bottom shelf of the workbench.
- **Sitting.** A good sitting posture (upper back straight and shoulders relaxed, stomach muscles pulled in) maintains the proper curve in your lower back. You can do this by tightening your stomach and lower back. A small cushion behind the lower back can help maintain the natural curve of the back. When sitting, keep your knees slightly higher than your hips with your feet flat on the floor or other surface. Use a footstool or book under your feet if necessary. Don't sit in the same position for a long period of time. Stand up or change positions every thirty minutes to stretch tight muscles and give them a chance to relax.

- **Sleeping.** When you lie in bed the ideal position is on your side with your knees and hips pulled up. A pillow in-between the knees can improve alignment and help lessen back strain. If you sleep on your back, placing a pillow under your knees may help your lower back pain. Sleeping on your stomach puts the most strain on your back.

Lifting Techniques

There is not one proper way to lift. However, there are some general guidelines which are important when lifting.

- 1) Remember, two backs are better than one. Ask for help when moving heavy or bulky items.
- 2) Plan the lift. Survey the work area for potential hazards such as tripping or slipping. Be sure you know exactly how much the object weighs so you know what to expect. Know how you will move the object and where you will place it.
- 3) Keep the load as close to the body as possible.
- 4) Try and keep the back as straight as possible. Make sure to turn the lower body towards the destination instead of "twisting" with a heavy load. Lift as smoothly as possible.
- 5) Keep the load as balanced and even as possible. Using mechanical assistance (lift tables, hoists, and conveyors) is recommended whenever possible. Try to avoid lifting above your head, with your arms extended, or with the load off balance.

Backbelts

There is no conclusive evidence that backbelts or supports will reduce the likelihood of back injury. Some researchers (NIOSH) suggest that the use of these devices may in fact increase the risk of injury or may disguise injuries during the early stages.⁹ Consult your physician prior to using such devices.

Back Impairment Treatment

More than 85% of people with lower back pain improve with minimal treatment in a matter of days.¹⁰ However, if the pain persists, it is important to see your family physician or primary care provider. Doctors may prescribe: proper exercise, rest, heat and cold, posture training, weight loss, stress management and relaxation exercises, medication, spinal manipulation and/or surgery.

When the pain starts, stop what you are doing. If you think you have hurt your back, you are much better off stopping immediately. If you have injured your back, make some adjustments to your daily routines: sit and drive less, avoid lifting, avoid soft furniture and use a rolled-up towel to support the lower back. When getting up or down from the chair, use your legs and arms to get up.

Heat and Cold

Applying heat and cold is helpful for some back impairments. Heat and cold should both be applied for no more than 20 minutes at a time, but they can be applied several times a day. The general rule is to use ice for 48 hours and then heat. Cold is usually applied initially to "numb" the soreness. Then heat is used to relax the muscles, increase blood flow to deep tissue, and soothe painful areas. Heat can be applied using heating pads, warm compresses, hot showers, baths or heat lamps. Cold can be applied using ice, a frozen package of vegetables, or a commercially made cold pack. Do not leave the ice on after it becomes numb because it could lead to frostbite. Heat and cold are not for all types of back injury. Ask your physician before applying heat or cold to the back.

Rest

In many cases, a few days of bed rest followed by an exercise program is all that is needed to ease your back pain. Studies on acute back pain show that two or three days of bed rest is all that is needed to allow the strained muscles to unbind and relax. If the pain continues after bed rest, the person should consult his or her physician. Extended rest has not proven effective. The best thing to do is to be as active as your back allows you to be.

Exercise

Many strategies for reducing low back pain limit movement of the lower back. However, limiting activity to the lower back can weaken the back, abdominal and leg muscles. Strengthening these muscles takes pressure off the spine, stabilizes the spine and keeps it aligned.

Exercise stimulates the body's natural painkillers, accelerates healing and prevents future injury. Before starting an exercise program, consult a doctor, physical therapist, or occupational therapist to help design an exercise program to fit your needs. There are numerous books and pamphlets on stretching and strengthening exercises for the reduction of back pain. These can be found in hospital libraries, book stores, and rehabilitation clinics. Walking, cycling, horseback riding, and swimming are good exercises for a person experiencing back pain.

Stop and take time to stretch. Whether you are sitting, standing, or working in the field, take the time to stretch the low back muscles, hamstrings, and the sides of the waist every hour. This will help initiate proper blood flow to pressured areas and help relieve tension and stressed muscles.

“Exercise is like WD-40 for the spine. It lubricates the joints and stretches muscles so they are less prone to straining and tearing.”

[Stephen Hochschuler, M.D.,
USA Today, March 4, 1991]

Exercise along with a balanced diet is also the best way to lose excess weight which may be putting stress on the back.

Medication and Surgery

During an acute bout of back pain, medication can help. Since remaining active is important, try to use medications that don't cause drowsiness. Pain relievers, muscle relaxants or anti-inflammatory drugs may be prescribed.

Less than 10% of back impairment patients require surgery.¹¹ Most people are treated successfully with rest, exercise and medication. An orthopedist can help you decide if a back operation is necessary. It is recommended that you also seek a second or third opinion.

Alternative Treatments

Chiropractic management of low back pain can be helpful for patients with acute low back problems. In some cases, chiropractic adjustments can restore joint function and mobility and relieve irritation of pain-sensitive structures. Other alternative treatments such as acupressure, herbal medications and therapeutic massage have also been used as treatments for low back pain.

A treatment or medication that promises “a quick cure” or “miraculous relief” can sound wonderful. But remember, these unproven treatments usually are expensive and may not be helpful. They may even be harmful and often keep you from getting the medical care you really need. If you hear about a new treatment, discuss it with your doctor.

ACCOMMODATING A BACK IMPAIRMENT ON THE FARM

Many necessary farm chores and activities are also activities that increase the risk of injuring the back. However, there are a wide range of modifications to the farm site, equipment, and work strategies, that can make chores less dangerous for the back. In making modifications, it is generally best to focus on the simple, less costly solution. Then consider higher tech solutions if that doesn't work.

Consider how a task can be done differently. Restructure the workplace to eliminate the need for risky postures and lifting patterns. Some general work strategies to follow are: rotate jobs with other family members; support the lower back when sitting and driving to maintain normal curves of spine; try not to lean forward or downward to reach work; alternate between tasks that require standing or sitting; get up, move around and stretch; and avoid standing on concrete, bending, or stooping for long periods of time. Next consider what types of devices or equipment could help you accomplish the task. Another option may be to hire part-time help.

Below are some farm activities that may lead to a back injury, along with strategies for compensating or preventing a back impairment during those activities.

Handling Livestock

Livestock are unpredictable. Tasks such as handling and carrying calves, especially over uneven ground and unsure footing; shearing sheep; checking hooves; clipping teeth; and castration of hogs can be very difficult and dangerous for someone with a back impairment. The “Warrie” Back-Aid, a preloaded sling, is designed to reduce the back strain of the farmer during sheep shearing. A calf carrier, such as the Caf-Cart,* Kalf Kradle or Moo-Glee Calf Carrier, can be used to transport a calf or hold it still while dehorning and performing medical treatment.



Caf-Cart made with a counter balance axel and ball bearing wheels help reduce back strain.

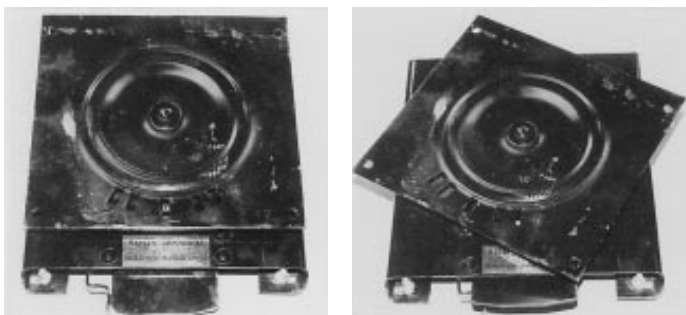
* See the “Resources” section for ordering information for all products.

Also consider job restructuring and modifications that reduce direct exposure to animals. In dairy barns, for example, sunken dairy parlors help eliminate back pain. By lowering the work area for milking, the activity can be performed below the cattle, thus eliminating bending. The vertical level difference between the milker and the cow should be about 3 feet.¹² If you do not have a sunken dairy parlor, the “Donkey” stool can be used as a milking stool. It straps on with a belt and allows the person milking to sit comfortably.

Farm Equipment Operation

Prolonged sitting and the vibration of the vehicle coupled with poor posture while performing fieldwork can be harmful for a person with a back impairment. Twisting the upper body while monitoring implements and simultaneously operating controls; sudden and intense jerks or bouncing while operating the equipment; and attaching implements to equipment by oneself may also increase problems for a person with a back impairment. Anytime you have to get off the tractor or other farm vehicle, take the time to stretch. It is recommended that the farmer get off the tractor every 1/2 hour to hour, and do stretching exercises.

Consider upgrading the seating on older equipment. Even a rolled-up towel in the small of the back can make a difference in a person’s posture. The “ideal” seat would be an anti-vibration, side-swivel seat with arm rest, high back support, and adjustable lumbar support. The seat pad should be short enough to allow a few inches of space behind the knees to prevent pressure from being placed on blood vessels and nerves on the back of the legs. The arm rests should be close enough so that you do not have to lean to the side to reach them. The seat back should be able to tilt back ten degrees to take pressure off the back and generous enough to support the length and width of the back up the shoulder blades, and slightly wider than the torso with slightly curved sides.¹³ See the Resource section for suppliers of shock absorbing, ergonomic seats for agricultural use. The BackCycler is another useful product. It uses continuous passive motion to reduce stiffness and discomfort while sitting.



Swiveling seat mount can convert original equipment seats and provide more comfort for looking behind the machine.

Wide angle rear view mirrors and swivel seats permit viewing the implement without twisting the back thus placing less stress and strain on the back. A swivel base can be purchased which can be mounted underneath the existing tractor seat. Often, for a person with severe back pain, operating foot pedals can also aggravate the lower back. Adding hand controls to the clutch and break pedal or relocating controls can decrease stress to the lower back.

If the back is already aggravated, straining to reach that first step can continue the onset of pain. By lowering the first step a few inches, adding extra steps, or hand holds the need

for back involvement is decreased. If ground clearance is a problem with field equipment, flexible but sturdy steps can be constructed which fold up out of the way. Extra steps and hand holds can also be added to grain bin ladders. Using a CB radio to communicate and using automatic gate openers can reduce the number of times a person needs to get on and off the tractor.

Often when hitching implements independently, problems arise such as not positioning the tractor close enough to the implement and struggling to inch the connections closer by tugging and pulling. Telescoping and self latching tongues help minimize the stress and strain in this situation. Other back saving devices include: extension handles on the tongue to decrease the need to bend; bolt or weld on screw jack stands; automatic hitches; and spring loaded tongues. Some remote hitching devices are listed in the Resource section.



The E-Z Wrench removes and tightens stubborn lug nuts with less stress on the back and joints.

Equipment can also be purchased to simplify mounting dual tractor tires and to remove or tighten lug nuts. The Dual Lift System allows one person to mount both the hub and the band style duals. The hydraulic jack device clamps on the end of the rear axle and only requires 1/2 inch of exposed axle to operate. Lugs which are deeply recessed within the hub are often difficult to remove or tighten with conventional ratchet and socket or heavy impact wrenches. E-Z Wrench or the Nutcracker Supported Lug Wrench are two devices that can limit the shock to the back when a lug nut suddenly breaks loose.

Making equipment slip proof also reduces the risk of injury to the back. Clean compacted dirt from steps and mounting areas. A high pressure sprayer is a good tool for performing this task. Place anti-slip tape or weld expanded metal on areas that are frequently mounted. If the equipment has a damaged step, repair it.

Materials Handling

Lifting a heavy object such as a bale of hay; repetitive joint movement; the stress of moving bulky equipment; handling seed or fertilizer bags; and lifting heavy awkward objects while twisting the upper body can be harmful to the back.

Whenever possible, eliminate the need for lifting or other activities that increase the risk to the back. Carrying milk can be eliminated or reduced with a pipe line or dump station. Having feed and fertilizer delivered in bulk eliminates the need to

handle heavy bags. Automated feeding and manure operations eliminate many of the risk factors for back impairment by decreasing activities such as bending, lifting, and twisting. Converting to large round hay bales and using a tractor to lift the bales eliminates the risk associated with handling square bales of hay. Even using a knife to cut bale strings instead of jerking them off the bale helps reduce the chance of injury to the back. Equipment is also available to handle small square bales. Hoelscher, Inc. carries a line of bale handling equipment.



Dennis Herr uses a bale fork attachment to handle hay and avoid further injury to his back.

The best way to accommodate a back impairment when handling materials is to limit the amount of lifting, bending, and shoveling you do. Use lifting devices and carts to transport material. Two-wheel carts, dollies, and hand pallets are useful handling devices. If available, old shopping carts make handy small item carriers. The Ayre Feed-Cart is a multi-purpose two wheel cart that can be used to haul feed, water, fertilizer, manure and many other things. Sav-Y'R Back is a device designed to lift heavy objects with minimal effort (up to 400 lbs.). A shop vac with long attachments can be used to remove feed or seed from tall standing feeders or planters instead of bending over to reach in the feeder or hopper. Installing grain level indicators, such as the E-Z Eye, reduces the need to climb ladders.

If you must lift the object by hand, think before you lift. Lift with skill and intelligence instead of using brute strength. Repackage heavy loads into smaller easier to handle packages. Get help if the items are heavy. A wheelbarrow can be used to better distribute the weight of a heavy object (if it must be lifted alone). If the shoveling must be done by hand, modify your shoveling technique.

An auxiliary handle can be added to the shovel to decrease the amount of bending required. The Upper Hand and the Scoop-Eeze Handle are two attachments that can be used on hand tools, such as scoop shovels, pitchforks, snow shovels, hoes, and rakes. These extensions minimize back stress by decreasing bending at the lower back. Keeping the shovel clean and sharp also reduces stress on the back by reducing the amount of force it takes to insert the shovel.

Mechanical lifting devices should be used to move or transport heavy, awkward and irregular shaped objects. Power lifts, cranes and chain hoists can be used. There are also many

hydraulic and electric commercial truck bed hoists available such as the Stow-A-Crane, the Pic-Up Hoist or the Westcrane. Ramps, like the Hide-a-Ramp or the Versa-Ramp, can also be used to load equipment into the back of a truck. Using a dump bed, like the Sure Dump which works off the engine's exhaust pressure to inflate an air bag under the dump box, can eliminate shoveling and other material handling.

One of the best back savers on the market is the skid steer loader. It is available with many attachments, such as a bucket, adjustable forks, post hole auger, concrete mixer, and a bale loader. An improved seed conveyor, seed vacuum, auger or pneumatic system can be used to eliminate some of the grain shoveling.

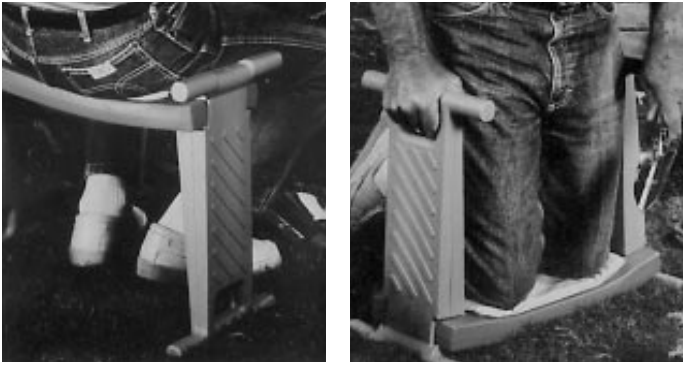


The Scoop-Eeze handle allows the user to stand in a more upright position, reducing back strain.

Lawn, Garden, and Orchard Work

Traditionally, gardening and vegetable and fruit harvesting required continual bending and stooping. There are work stools available which reduce the need for the kneeling, squatting and stooping that is often involved with garden work and hedge trimming. The Garden Scoot is a mobile stool used to eliminate repetitive bending when performing tasks which are 18-24 inches from the ground. They come with two or three wheels and the person uses his or her feet to maneuver it. The reversible gardener's bench from Joan Cook, Inc. is designed to aid a person with a back impairment in kneeling and to serve as a bench to sit on while gardening. The Balans Craftseat back support system is designed to allow a person to work in a kneeling position comfortably padded where it counts and properly supported to reduce fatigue, stress, and the chance of injury to the back, knees, ankles, and heels. Raised garden beds such as the Stand-Up garden bed can also be used to eliminate bending. The Leaf Grabber allows a person to rake and pick up leaves without stooping. The rake could also be used in cleaning stalls and preparing bedding areas.

The Tye Jr. Garden Planter can be pulled behind a garden tractor or small farm tractor to do the planting without repetitive bending and stooping. A seeding tube can be constructed to do planting as well. The unit is made of plastic tubing with a funnel at the top. It can also be fitted with a handle made out of PVC pipe, "tee" fittings and "elbow" joints. Other back saving gardening tools, such as the Earthway Vegetable Seeder and the Easy-Plant Jab-Type Planter, are available from Johnny's Selected Seeds.



The reversible gardener's bench can be used for sitting while gardening (left) or as a kneeling pad, when flipped over (right).

The Vegetable Harvesting Aid eliminates walking and bending down normally required of vegetable harvest workers. One to four stations can be installed on it, and it has places to carry the produce containers.



Vegetable Harvesting Aid reduces the strain of bending.

Shop

In the shop, it is good to have adjustable work stations and to create a new scheme for parts arrangement to decrease reaching. Keeping tools and parts at waist level reduces stress to the back by minimizing the need to bend while lifting. The waist area is the body's center of gravity and allows the most stability and strength. To accomplish this, construct wall shelves, hangers, and bins, or construct free standing wood or metal shelves at about waist level.

Sit-stand stools help when doing tasks that require standing for long periods of time. These can also be used in the farrowing house while taking care of pigs or by the workbench in the shop. Industrial work seats are also available. Eidos offers several seats that provide proper back support while working in awkward or cramped positions, such as working under equipment and machinery. Rubber mats in front of work benches or drill presses where considerable time is spent standing can also be helpful. Rubber mats can also be installed on frequently traveled concrete flooring to reduce the shock to the body. Wearing high quality shock absorbing shoes when standing on concrete for long periods of time will also reduce the impact to the back. A reacher or even a long pole with a magnet on the end can be used to pick things up off the ground or to reach things that are up on high shelves without straining the back.

Posture stands like the Eric Stand and the Mech-Aid or products like the Back Saver provide a support when working. It adjusts to enable the person to work in awkward positions and take some of the stress off the back. It is a helpful device when working under the hood of equipment. A jack can be used to help lift heavy implements when working on them in the shop.



Back-Saver provides a secure object to lean against and adjusts to enable working in awkward positions.

The flooring in shop areas should be kept clean to decrease the likelihood of slipping or falling. When a person slips on a muddy or oily surface the body reacts to regain balance. This reaction can send a shock wave of pain to the lower back due to body overcompensation and slow muscle reaction in the lower back. Keep all oil and grease spills removed from flooring with oil absorbing products such as sand or sawdust or clean the area with solvents.

CASE STUDIES

The following case studies will provide insight, practical tips and resources to assist farmers and ranchers with back impairments.

Dennis Herr, Kendallville, Indiana

Dennis Herr runs a family farm with his brother, sister-in-law, father, mother, and son-in-law. The farm consists of about 1,000 acres on which he grows corn, soybean, and hay. The Herts also have over 350 head of dairy cattle.

Dennis was diagnosed with two ruptured discs in the lumbar (lower back) region about 15 years ago. He had surgery a little over a year ago to remove portions of the herniated discs which were applying pressure to adjacent spinal nerves. Dennis has since been diagnosed with partial bulging of two other disc just above the affected area. Dennis had been experiencing back pain for several years, but the "straw that broke the camel's back" was simply walking up a concrete ramp. He had been experiencing stiffness in his back for three years prior to that incident.

Like most farmers, Dennis had been involved in activities that were stressful to his back throughout his life. For example, he had been handling large bags of fertilizer since the age of 14 or 15, and he was involved in pouring most of the concrete for the barns on the farm. He often lifted heavy objects, but stated that he never took his back into consideration. He is now only allowed to lift a maximum of 20 lbs. Since his back impairment, Dennis has involved himself more with the managing aspect of

the farm, and limits much of his activities that could aggravate his back. He also handles the feed operation. The main accommodation Dennis has made is to hire additional help to do the milking and field work. Hiring additional help provided an extra benefit for the Herrs by allowing them to expand their farm operation.



Dennis Herr (second from right) with his brother and hired help.

Dennis now lifts with his legs instead of the back muscles and uses equipment for transporting items instead of physically moving them by hand. He has changed the feeding system from a center isle trough to bunkline feeder. This allows him to use a scraper attached to the skid-steer loader to do cleanup instead of getting in the trough and shoveling and scraping by hand.



Using bunkline feeding system (left) instead of a center isle trough (right) allows Dennis to clean up with the skid-steer loader instead of by hand with a shovel.

The Herrs have made several accommodations around the farm to prevent further back injury for any of the farm workers. They use a skid-steer loader to feed the cattle instead of carrying buckets. The skid-steer loader has attachable buckets, forks and a hydraulic lifting device. The skid-steer loader, as well as the ATVs, are used to do much of the materials handling around the farm. They have also installed rubber mats in the dairy parlor and have a sunken work area in the dairy parlor to limit bending. The Herrs purchased a mechanized square hay baling system and a hay bale accumulator to limit the lifting, bending, and twisting that is usually required. The Herrs also use a device which turns the cow on its side to enable them to check the cow's hooves.

Dennis' advice to other farmers with back pain is to "remember you can't do everything. You will feel guilty not doing it, but you have to have other people there to help."

Rick Blackwood, Bozeman, Montana

Rick was diagnosed with spinal stenosis early in 1990. Then in 1992 he had a ruptured disc and had surgery to trim the disc. Before the surgery, Rick had been working as a roofer. Before he started roofing, Rick had been a farmer and rancher. After the surgery he decided to return to full-time farming, against his doctor's advice. He now owns 650 acres and runs a wheat and barley operation. He farms about 370 acres and leases the rest. He also has a small calf operation. Rick can only do a limited amount of bending. He finds it awkward to do work overhead or at his feet. He finds pulling calves and carrying calves around to be difficult.



Rick uses a long-handled clamp to grasp the irrigation pipe and reduce the stress on his back.

His operation requires the use of irrigation. He has switched to using "wheel lines" wherever he can, but does still use "hand lines" to water some areas. With the "hand lines," sections of the pipe must be moved once or twice a day. Bending over to pick up the pipe was difficult for Rick with his back impairment. He now uses a long-handled clamp to grasp the irrigation pipe. He stated that Tom Scott from the Montana AgrAbility project, who designed the clamp, helped him a lot in making accommodations around the farm. Some of the other changes he made were to purchase a comfortable swivel seat for his tractor and to use a loader to lift things. He also uses automatic hitches.

Rick uses round bales instead of square bales to eliminate the need to handle the bales. He uses a tractor mounted hay fork to move the hay and to do feeding.

Rick was on pain medication, but found that it made him feel better than he really was. He would then go out and do tasks which hurt his back more. Rick has found that exercise, especially walking, helps his back. He also found physical therapy to be helpful. The therapist taught him proper body posture and to listen to what his body was telling him.

Charles Gogel, Dale, Indiana

Charlie suffered a stroke in September, 1994, and fell from his combine to the ground. The fall resulted in injury to his lower back and a fractured scapula (shoulder). Charlie, his wife, and son own and operate a farm that consists of 180 acres of soybeans, 75 acres of corn, and a turkey operation.

Much of the equipment Charlie uses to accommodate his stroke also decreases risk for back pain. To enable Charlie to manipulate the augers on his grinder mixer, a hydraulic cylinder and a valve control body were attached to the auger to lift the loading auger. This reduced the amount of effort required. A vertical auger was mounted on his planter to eliminate the need to manually shovel the fertilizer into the planter fertilizer boxes.



A vertical auger was mounted on the planter to enable fertilizer to be loaded with minimal effort.

Charlie limits the amount of tractor work he does at one time. He works six to twelve acres and then rests for a while. He also has a platform lift on his tractor. He has installed swivel bases on his tractor seats to allow freedom of movement and to eliminate the need for twisting while viewing implements and getting on and off the tractor. Charlie has a Kawasaki Mule which he uses to transport heavy items.

Charlie does exercises to strengthen his back. He has found a chiropractor, reflexologist, hot tub, and pain medication to be effective means of decreasing back pain.



Charlie utilizes a platform lift to access his tractor.

Fender Four Star Meats, Spencer, Indiana

Steve and Louis Fender operate Fender Four Star Meats, a custom meat processing business outside Spencer, Indiana. The method used to process the meat requires a lot of repetitive tasks and handling heavy pieces of meat. The Fender brothers experience chronic lower back pain and both have had vertebral disc surgery.

The Fenders have implemented several modifications in their operation in an attempt to reduce back pain and other chronic disorders such as carpal tunnel syndrome.

The Fenders' operation also involves five other employees. The processing is performed year-round, with the bulk of their business occurring in the spring and fall. Their primary business is beef and hog processing. During the deer hunting season the Fenders will also dress deer brought in by local hunters.



Lifting heavy pieces of meat while leaning over the table can aggravate back pain.

Recently the Fenders have made a variety of modifications in order to ease the stress on their backs and those of their employees. A roller conveyor is used to move heavy boxes and cuts of meat from one operating station to another. Previously the boxes and cuts were manually lifted and carried to the next station. The Fenders also expanded the amount and flexibility of the overhead track system used for moving carcasses from the cooler to the cutting room. Manual switches on the overhead track were added so that the carcasses can be routed from nearly anywhere directly to the desired cutting table. This adaptation has made processing faster and less labor intensive.

Raising the working tables to a convenient height has alleviated some stress on the workers' backs by eliminating the need to bend over while cutting. Footrests have been added to the tables for the workers to support their feet. This allows the workers to shift their weight while working. Cushioned mats have been laid on the floor at each of the worker's stations. These mats help avoid the problems associated with standing and



Footrests and mats have been added to reduce back strain.

moving on the concrete floor for extended periods of time. In heavy operations, such as breaking down quarters of beef, the Fenders have two workers instead of one perform the task. The Fenders have also purchased casters for the bottom of the waste barrel so that when full it can be rolled rather than dragged.

Overall the efficiency of the process line was improved and the amount of stress and potential for back injury was reduced. By simply arranging the various stations in sequence to reduce repetitious movement and handling of heavy loads, the amount of manual labor required was reduced.

David Moesner, Dale, Indiana

David, a full-time farmer, was diagnosed with a herniated lumbar disc, arthritis and degenerative joint disease in 1991. David farms R.E.D.D. Farms, Inc. with his father, Richard, and his brother, Dan. The Moesners own and operate a 1,200 acre farm. Part of the acreage is used to grow corn and soybeans, and the rest of the land is used for grazing. The Moesners have 80 head of dairy cattle and also have some beef cattle.

David participates in all the farm activities. David's backpain is aggravated by calf handling, changing dual tires on tractors, sitting for long periods, and performing tasks that require bending forward, such as working on equipment.



David has found using the skid-steer loader eliminates manual tasks which aggravate his back.

David has found using supports in his shoes has made the biggest difference for him in alleviating back pain. He now avoids lifting heavy objects. When lifting is required, he tries to bend and lift with his legs while keeping his back as straight as possible. He uses equipment, such as a skid loader with a detachable bucket and fork, which eliminates much of the manual shoveling. He uses ATVs to haul material instead of carrying in manually. Around the shop he uses dollies, carts, and chain hoists to lift and transport items. In addition, he uses a FM hand radio to minimize leg work. His children also help out more around the farm to offset

their father's back impairment. David indicated that stretching and strengthening his back muscles by exercising has decreased the onset of pain. He uses pain medication, muscle relaxants, and hot baths to relieve pain. David also received cortisone shots into the herniated disc two years ago to help with pain.

David advises other farmers with back impairment "to watch what you lift and how you lift it, and to use your head not your back."

SUMMARY

Back injuries are one of the most common forms of farm-related injuries and are difficult to manage. Each person's back impairment is different and the severity varies from acute to chronic. There are many strategies for prevention of back injuries including proper posture, lifting, exercise, and restructuring job responsibilities. Many low cost assistive devices can also prevent or accommodate back injuries. Nearly all of the individuals interviewed stated that they would recommend not lifting so many heavy and awkward items throughout their lives. You may find the list of resources and organizations at the end of this article helpful for preventing and accommodating a back injury. Before attempting any of these accommodations, it is recommended that you seek the advice of appropriate professionals and your physician.

ADVICE FROM ONE FARMER TO ANOTHER

- 1) Obtain appropriate assistive technologies or labor-saving devices to assist in performing tasks that exceed your physical abilities.
- 2) Add additional steps and hand holds made out of non-slip material to farm machinery to assist in mounting and dismounting safely.
- 3) Make sure the seat of the tractor has the highest level of suspension possible to prevent vibrations that hurt the back. An independent suspension seat can be installed in some tractors to help absorb shock vibration.
- 4) Use outdoor mobility aids to decrease fatigue and further deterioration of your back. (Note: these may reduce fatigue, but may cause additional problems because of lack of suspension while riding around bumpy or rough terrain.)
- 5) Automatic hitching devices and automatic gate openers can reduce the frequency of mounting and dismounting a tractor.
- 6) Direct access to livestock should be avoided due to their unpredictable behavior and your decreased mobility.
- 7) If you cannot afford an automated feed system, use a feed cart so that you don't need to carry feed.
- 8) A combination sit/stand stool can be used when you perform tasks that require standing for long periods of time.
- 9) Use lumbar curve supports while sitting on the tractor. There are several available through durable medical equipment dealers as well as through your doctor. Consult your doctor before choosing one.
- 10) Keep back supported and straight while working on equipment, when possible.
- 11) Remember to use proper lifting and body mechanics if you have back problems. You should also maintain your exercise program as recommended by your physician.
- 12) Use your head before you use your back.

Adapted from Safety Tips for Farming with a Back Injury or Back Problem by the Easter Seal Society of Iowa's Farm Family Rehabilitation Management (FaRM) Program.

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RESOURCES

Equipment

Ayres Feed-Cart
2081 W-US 6
Wawaka, IN 46794
(800) 421-4596

Back Saver
Soren Specialty Products
635 Custer Ave.
Ogden, UT 84404

Balans Craftseat
Amcraft, Inc.
P.O. Box 3335
Idaho Springs, CO 80452
(303) 567-4877

Bale handling equipment
Hoelscher, Inc.
312 South Main
P.O. Box 195
Bushton, KS 67427
(316) 562-3575

Caf-Cart
Raytec Manufacturing
1381 Division Highway
Ephrata, PA 17522-9310
(800) 233-0198

Carts
Hawthorne Industries, Inc.
905 N.E. Cleveland
Gresham, OR 97030
(800) 533-3192

Dual-Lift
Collins Hill Enterprises, Inc.
Rt. 1, Box 149A
Dassel, MN 55325
(612) 275-3010

E-Z-Eye
Dahl & Schwankl, Inc.
Box 96
Kennedy, MN 56733
(800) 537-1465

E-Z Wrench
P.O. Box 126
613 Taylor St.
Clarksville, AR 72830
(501) 754-7788

Ee-Zee Hitch
Implement Sales Co., Inc.
ATTN: William Clayton
2203 Plantside Drive
Louisville, KY 40299
(502) 491-4775

Extend-A-Floor
Tri-R Innovations, Inc.
628 South Sangamon Ave.
Gibson City, IL 60936
(217) 784-8495

Garden Scoot
Master Manufacturing Co.
P. O. Box 3806
Sioux City, IA 51102
(712) 258-0108

Gardening supplies
Johnny's Selected Seeds
Foss Hill Road
Albion, Maine 04910-9731
(800) 437-4290

Grammer Seats
6963 North 55th Street
Oakdale, MN 55109
(800) 367-7328

Hide-a-Ramp
Ralph Walters, RPM Products, Inc.
P.O. Box 4420
Meridian, MS 39304
(601) 483-3643

Industrial Work Seats
Eidos
2255 "W" Street
Lincoln, NE 68503-0592
(402) 435-3601

Kalf Kradle
Koehn Marketing Company
P.O. Box 577
Watertown, SD 57201-0577
(800) 658-3998

Leaf Grabber Rake
Allen and Allen Products
P.O. Box 8046
Longview, TX 75607
(800) 242-3010

Moo-Glee Calf Carrier
Gerald Funk
Box 475
Dinsmore, Saskatchewan
S0L 0T0 Canada
(306) 846-4833

Nutcracker Supported Lug
Wrench
Spectrum Manufacturing, Inc.
116 First Avenue West
Osseo, MN 55369
(612) 425-6881

Pic-Up Hoist System
WCCO, SD
P.O. Box 713
2309 Shur-Lok Street
Yankton, SD 57078
(800) 437-4172

Power Hitch Specialty Product
Sales, Inc.
Box 503
Humeston, IA 50123
(515) 877-3141

Replacement seats and
additional steps
K&M Manufacturing
Renville, MN 56284
(800) 328-1752

Reversible Gardener's Bench
Joan Cook, Inc.
P.O. Box 21157
3200 S.E. 14 Avenue
Ft. Lauderdale, FL 33335
(305) 761-1600

Sav-Y'R Back
Bionic Tools Inc.
Rt. 1, Box 63
Henry, IL 61537
(309) 364-3024

Scoop-Eeze
R & D Enterprises, Inc.
325 Fairview Drive
Aurora, NE 68818
(402) 694-3628

Sears Manufacturing Co.
Davenport, IA
Deluxe tractor seat (through your
local Case-International dealer)

Speer Cushion Co.
431 S. Interocean
Holyoke, CO 80734-1597
(303) 854-2288

Stand-Up Gardening
Rt. 1, Box 54
Millville, MN 55957
(507) 753-2358

Stafast Hitches, Inc.
R.R. 2, Box 60
Milford, IN 46542
(219) 773-3397

Stow-A-Crane
Tiger Line Equipment, Inc.
P.O. Box 121
115A North Ohio Street,
Minster, OH 45865-0121
(419) 628-3388

Sur-Lock
M.D.S. Manufacturing Co., Inc.
R.R. 1, Box 2-C
Parkston, SD 57366
(605) 928-7951

Sure-Dump
Simplex Manufacturing Co.
13340 N.E. Whitaker Way
Portland, OR 97320
(503) 257-3511

Swiveling Seat Mount
Apollo Sales & Service, Inc.
P.O. Box 1113
Bismarck, ND 58502
(800) 283-4521

Tye Jr. Garden Planter
The Tye Company
P.O. Box 218
Lockney, TX 79241
(806) 652-3367

Upper Hand
Nelstan Limited
5808 Gettysburg Circle
New Hope, MN 55428
(612) 533-8827

Vegetable Harvesting Aid
Four Star, Inc.
Box 97
College Grove, TN 37046
(800) 251-8051

Versa-Ramp
Best Diversified Products
P.O. Box 4017
107 S. Flint St.
Jonesboro, AR 72401
(800) 327-9209

"Warrie" Back-Aid
W. D. Hambley, Ltd.
47 Hassell Street
Mount Barker, Western
Australia 6324
(098) 511-475

Westcrane
Western International Products
P.O. Box 23865
7700 W. Tower Ave.
Milwaukee, WI 53223

Publications

*Back in Shape: A Back Owner's
Manual*
6210 Campbell Road
Dallas, TX 74248

*The Guide to a Better Back: A
Back Pain Sufferer's Handbook
for Exercise and Daily Living.*
by Dee Massengale
Susan Hunter Publishing
Atlanta, GA

Organizations

Back Association of Canada
83 Cottingham Street
Toronto, Ontario M4V 1B9

Back Pain Association
P.O. Box 135
Pasadena, Maryland 21122-0135
(410) 255-3633J

Job Accommodation Network
West Virginia University
918 Chestnut Ridge Road, Suite 1
P.O. Box 6080
Morgantown, WV 26506-6080
US: (800) 526-7234
Canada: (800) 526-2262

National Safety Council
Customer Service Department
1211 Spring Lake Drive
Itasca, IL 60143
(800) 621-7619

Texas Back Institute
3801 W. 15th St.
Plano, Texas 75075
Back Pain Hotline:
(800) 247-BACK

Vermont Rehabilitation
Engineering Center for Low
Back Pain
1 South Prospect Street
Burlington, VT 05401
(800) 527-7320