

# BACK on the Farm, BACK in the Saddle

*A Guide to Back Health in Agriculture*



 **AgrAbility**

Cultivating Accessible Agriculture

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## A Guide to Back Health in Agriculture

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### INTRODUCTION

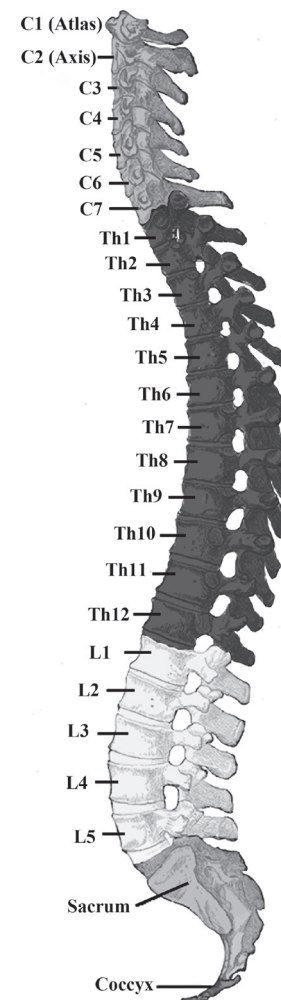
This booklet is for anyone involved with agriculture who experiences, or is at risk for, back problems. You might be a farmer, rancher, migrant/seasonal farmworker, or a gardener. In any case, it is important to know the main risks for back problems and ways to reduce those risks. Information is also provided on how to manage existing back problems. This material is not a replacement for professional medical advice; if you have other health questions, you should ask your health care provider.

### STRUCTURE OF THE BACK

The back is a system of bones, muscles, ligaments, tendons, cartilage, and nerves.

The backbone or *spine* normally consists of thirty-three bones known as *vertebrae*, stacked in an S-shaped column. It extends from the base of the back to the top of the neck. The vertebrae are separated by shock-absorbing structures called *intervertebral discs*.

As the figure shows, the normal spine has three curves. The cervical curve (C-1 to C-7) is generally referred to as the *neck*. The thoracic curve between the shoulders (Th-1 to Th-12) corresponds to the *upper back*. The lumbar curve (L1 to L5), is generally called the *lower back*. The *sacrum* connects the lower back to the *coccyx*, or *tailbone*.



## TYPES OF BACK PROBLEMS

Back problems can be divided into two main groups. *Acute* problems occur suddenly but stop within a few days or weeks.<sup>1</sup> *Chronic* problems continue for months or years. The length of the condition will depend largely on the structure(s) affected. These conditions can be divided into three main areas:

- **Muscle, tendon, and ligament problems**, such as muscular fatigue, strains, and sprains. These problems are generally acute.
- **Nerve compression problems**, such as sciatica. These problems are usually chronic.
- **Spinal problems**, such as bulging or herniated discs. These problems are generally chronic.

For more on these issues, see the *Glossary of Back Problem Types* at the end of this booklet.

If you are unsure about the source or nature of your back pain, ask your health care provider. Back pain may be a symptom of other serious health problems.

## CAUSES OF BACK PROBLEMS

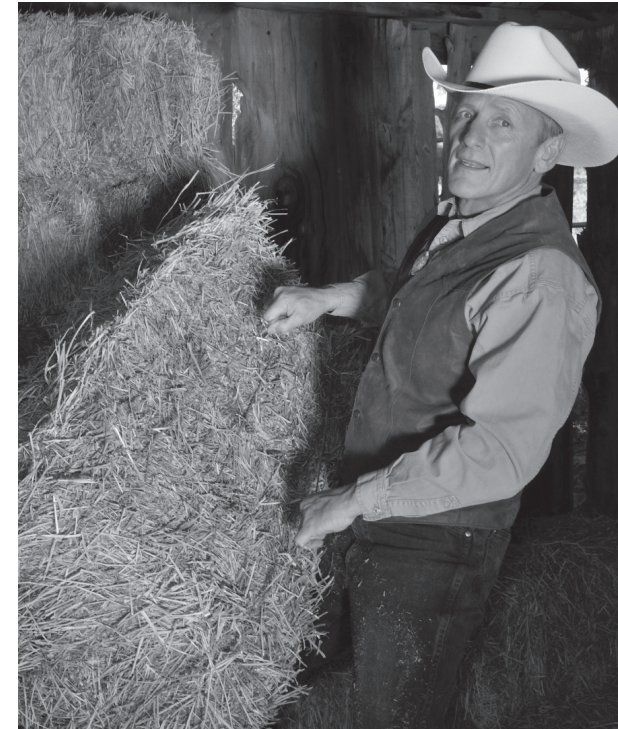
Often, the exact cause of many back problems is unclear. Back pain can result from damage to the vertebrae themselves. However, most problems involve the intervertebral discs, muscles, nerves, tendons, or ligaments. The most common problems affecting agricultural workers are those involving the lower part of the back. It carries a heavier workload than other parts of the spine.

### *Occupational Risk Factors*

Agricultural workers are at a high risk for back problems. This is because their work often involves:

- **Lifting, pushing or pulling heavy loads.** Examples include machine parts, chemical, seed and feed containers, and bales of hay.<sup>2</sup>

- **Whole body vibration.** This often occurs when operating vehicles and machinery, particularly during field work. Both regular vibrations and sudden jolts can cause injury to the back.<sup>3</sup> Operating machinery on rough ground or for long periods of time can make this worse.
- **Awkward working postures.** Bending, stooping, reaching, and twisting can lead to back problems. This includes manually planting, cultivating, or picking crops.<sup>4</sup>
- **Slips, trips and falls.** Working in wet, slippery, uneven, or elevated conditions increases the risk of injury.<sup>5</sup>
- **Repetitive tasks**, such as milking and handling small hay bales, can cause back problems.
- **Direct contact with unpredictable livestock** may cause traumatic injuries to the back.
- **Incidents involving machinery or vehicles.** These include overturns, collisions, being struck by a vehicle, or being entangled in a machine.



*Repetitive manual handling tasks can lead to back problems.*



## Lifestyle Choice Factors

Lifestyle choices can have a big impact on back health.

### Obesity

Researchers are still exploring the exact connection between excess weight and back impairments. However, there is evidence that being overweight can lead to back pain and damage intervertebral discs.<sup>6</sup>

### Exercise and Fitness

Appropriate exercise can help in preventing and managing back problems. Due to mechanization, many workers fail to get enough exercise on the job to maintain good back health. If you are experiencing back pain, check with your health care provider before starting a new exercise program.

### Posture

Poor postures may deform the natural curve of the spine. Also, awkward sitting or standing postures are more tiring than “neutral” or relaxed postures. Unsupported postures are more uncomfortable and tiring than well-supported postures.

## Individual Risk Factors

Not everyone is at equal risk for back problems. Inherited conditions may reduce the load-bearing capacity of the spine and increase risk for back pain.

These include:

- **Scoliosis** (side to side curving of the spinal column)
- **Hyperlordosis** (too deep a curvature in the lumbar region, commonly called “swayback”)
- **Hyperkyphosis** (an excessively arched spine, giving a hunched appearance)



*Awkward working postures can increase back strain.*

## PREVENTING BACK PROBLEMS

Many people do not think about the health of their backs until they experience pain. However, a few simple strategies can be used to reduce the risk of back pain and injury. Advice on back health and safety is also available from physicians, physical therapists, and occupational therapists. They should be able to provide guidance on safe lifting techniques, muscle endurance conditioning, and other back issues. If you wait until back pain becomes severe, it may be too late for preventative measures to be effective.

## Proper Posture and Body Mechanics

To protect the back from injury, consider balance, posture, and body mechanics during everyday activities:

### Standing

Standing for long periods of time, especially on hard floor surfaces such as concrete, can aggravate the lower back. If you must stand, adopt a relaxed posture, keeping the head and trunk upright. Moving closer to a work area will reduce the need to lean forward. Some other tips:

- Wear flat or low-heeled soft-soled shoes.
- Use anti-fatigue insoles or anti-fatigue matting if standing on concrete floors.
- Alternately prop one foot then the other on a low bar, box, bucket, or lower shelf of a workbench.
- Use a stool or chair at an appropriate height for the task, if possible.
- Raise or lower the task if necessary to eliminate stooping or arching of the back.
- Vary body positions and activities throughout the day to minimize repetitive activities and sustained postures.
- Limit your time standing or walking on uneven or hilly terrain if it aggravates your back.

## Sitting

A good sitting posture entails supporting the natural curvature of the back. The weight of the trunk should rest slightly backward against a suitable backrest. The seat should be deep enough to support most of the buttocks and thighs. However, it should not press against the soft tissue at the back of the knees or against the top of the calves. Suitable armrests should be provided, if possible, since arm support can significantly reduce spinal joint pressure in the lower back.<sup>7</sup> Change positions or stand for short periods when possible.

## Sleeping

Different sleeping positions create different levels of stress on the back. The Mayo Clinic has extensive information on sleeping positions and back pain:<sup>8</sup>

- Spinal joint compression is minimized when sleeping on the back with the lumbar and cervical curves of the spine supported. A pillow under the knees can also help.
- When sleeping on your side, keep a pillow between your knees and lower legs to help maintain better spinal alignment.
- Sleeping on the stomach puts the greatest level of strain on the back and often involves turning the head to either side. This increases strain on the neck and adjacent muscles, tendons, and ligaments. Reduce strain with a pillow under your pelvis and/or try sleeping without a pillow under your head.
- Invest in a good mattress that provides enough support to prevent sagging or bending of the spine. Memory foam beds and mattresses with adjustable firmness can be helpful.

## Manual Handling

There is no entirely “safe” way to manually lift and move heavy or awkward items. Every manual lifting action involves a degree of risk for injury. However, there are some guidelines which will reduce such risks when lifting.

## General Lifting Principles

- Every manual handling task requires some planning.
- Check the area for potential hazards that might cause tripping or slipping.
- Clear a path to reduce the risk of twisting and other awkward postures.
- 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, and forklift trucks) are better than manual handling for heavy items.
- Lifting above head height presents a high risk of injury. The risk is further increased when your arms are extended or the load is unbalanced. Some examples include stacking bales of hay or seed bags.



*Bend at your hips and knees, not your back. Keep the load close to your body.*

## Team Lifting

- Two or more backs are better than one. When moving heavy or bulky items, the lift should be postponed until help is available.
- Those involved in the lift should agree in advance how to lift the object and where to place it.
- Be prepared to coordinate putting the load down safely if any of the lifting team requests it.
- At all stages of the lift and move, those involved should hold the load as close to the body as possible.

## Back Belts

These devices have become widely used in many industries, including fruit and vegetable production. However, there is no evidence that back belts or back supports reduce the likelihood of back injury. They may even increase the risk of injury, disguise injuries during the early stages, or cause decreased muscle strength.<sup>9</sup>

## Storage Considerations

Heavy items should never be stored in tight spaces. Allow enough space around and above them to adopt a safe lifting posture. A good rule of thumb is to arrange items to suit someone with a severe back injury, rather than someone with a healthy back. In general, when designing storage spaces (such as shelving or racks) at “head height,” use a maximum height of approximately five feet.

## MANAGING BACK PROBLEMS

A wide range of changes to the work sites, equipment, and tasks can make agricultural work safer for the back. It is generally best to initially try simple, low-cost solutions before investing in complex ones that may cost more but prove no more effective.

Reorganizing the workspace may reduce or eliminate the amount of time spent in awkward postures or performing heavy lifting. With “job rotation,” repetitive, physically demanding, or

heavier tasks are shared between several workers. This can reduce overall injury risk to workers since each person does each task for a shorter period of time.

Below are some farm activities that may cause or aggravate back problems, which are presented with strategies and technologies for reducing risk. Visit *The Toolbox Assistive Technology Database* at [www.agrability.org/toolbox](http://www.agrability.org/toolbox) for hundreds of back-saving technology products.

## Handling Livestock

Workers may need to handle and carry calves, shear sheep, check hooves, clip teeth, and castrate hogs. These tasks can be difficult and painful for someone with back problems.

Job restructuring and modifications may reduce risk to back injury when working with animals. For example, stanchion barns usually entail a great deal of stooping and bending. In such situations, a strap-on milking stool may be used to reduce stooping. If resources allow, conversion to a milking parlor could enhance worker performance and welfare.

Many other products can help prevent or reduce pain from back problems when working with animals, including:

- Squeeze chutes and gates to restrain livestock when medicating, branding, trimming hooves, etc.
- Calf carriers to transport young cattle by truck or utility vehicle instead of carrying by hand.
- Support harnesses/frames to reduce back fatigue when shearing sheep.



*Many types of equipment can reduce the strain of animal handling.*



- Motorized feed and silage carts to reduce carrying and shoveling feed.
- Carcass cart dollies to make removal of dead hogs less stressful on the back.

### *Farm Equipment Operation*

Prolonged sitting, vehicle vibration, and rough terrain can increase pain for workers with back problems while performing field work. Back pain can also come from:

- Twisting the trunk and neck while monitoring towed implements.
- Sudden, intense vibration, jolting or swaying while operating equipment.
- Attaching implements to vehicles.
- Servicing and adjusting equipment.

Jumping from a vehicle or machine can cause severe shocks and awkward twisting motions to the back and spine. Operators should always climb from the lowest step to the ground one foot at a time.

Most newer-model tractors and farm equipment are supplied with well-designed, supportive, anti-vibration seats, complete with armrests. Older equipment is often lacking in terms of such seating. They may have unpadded or thinly-padded steel seats with no



*An ergonomically-designed tractor seat can reduce back stress.*

back or arm support, no shock-absorbing suspension system, or damaged seats in which the padding is no longer effective. A comfortable seat is a good investment since you will likely be spending many hours in the tractor. Still, you may need to get out of the cab periodically to avoid stiffness.

The seat should be positioned to easily reach the controls. Over-reaching with the arms or bending from the waist will increase spinal joint pressure and tension in back muscles.

Wide angle rear-view mirrors and swivel seats allow viewing a towed implement without twisting the back. This reduces stress and strain on the back and neck. A swivel base may be mounted under an existing tractor seat. Cameras and monitors can also eliminate the need to turn.

Straining to reach a high step can cause back pain or aggravate an existing injury. By adding extra steps and hand holds, the risk for back pain is reduced. If ground clearance is a problem, flexible but sturdy steps may be constructed that flex out of the way. Extra steps and hand holds can also be added to grain bin ladders, truck beds, and grain transport vehicles.

Automatic gate openers or radio communication with a co-worker on the ground may reduce the number of times a person needs to get on and off a vehicle.

Automatic hitching devices help minimize the stress and strain of hitching implements. Other back saving devices include:

- Extension handles on tongues to decrease the need to bend.
- Bolted-on or welded-on screw jack stands.
- Telescoping or spring-loaded tongues and adjustable drawbars.

Many types of devices can help with machinery maintenance. For example, specialized equipment can simplify changing tractor tires and removing/tightening lug nuts.

## Handling Materials

Many material handling tasks can be harmful to the back. These include lifting heavy objects, handling bales of hay, moving bulky equipment, and handling seed or fertilizer bags. The back is especially at risk when the trunk is twisted.

To reduce risks:

- Feed, seed, and fertilizer delivered in bulk eliminate the need to handle heavy bags.
- Automated feeding and manure handling remove many of the risk factors for back problems.
- Large round or square hay bales and a tractor to lift the bales eliminate the risks associated with handling small square bales of hay. Small bale accumulators can also reduce manual handling.
- Lifting devices and carts can be used to transport material. Two-wheel carts, dollies, and hand pallet movers are useful.
- Grain level indicators on grain bins reduce the need to climb ladders. Spiral stairs can also be installed to reduce climbing stress.

If shoveling must be done by hand, be careful of lifting heavy scoops, and avoid twisted or stooped postures. When turning with a loaded shovel, turn with the feet, not the back. An extra handle may be added to a shovel to decrease the amount of bending required. Extra handles can also be attached to pitchforks, snow shovels, hoes, and rakes. If possible, avoid shoveling wet material because of the added weight.

Mechanical lifting devices should be used to move heavy, awkward, and irregularly shaped objects. Powered lifts, cranes and chain hoists can be used. Hydraulic and electric bed hoists for trucks and utility vehicles are widely available. Ramps can be used when loading equipment or materials onto a truck.



*Equipment such as skid-steer loaders can be used to significantly reduce back strain.*

A skid-steer loader, utility vehicle, or ATV may be used to perform many tasks otherwise carried out by hand. Attachments are available for moving bulk material, lifting pallets and bales, drilling post holes, mixing concrete, moving snow, etc.

A seed conveyor, grain vacuum, portable auger, or pneumatic feed handling system can be used to reduce manual grain handling.

## Shop

Height-adjustable workstations allow each person to work at the best height for them and the task. Parts and tools should be located where they may be reached without bending the trunk or overstretching. Heavier and most frequently accessed parts and tools should be kept closer to the worker than others that are lighter or needed less often. Keeping parts and tools between waist and shoulder height reduces stress to the back caused by bending and lifting. Use adjustable wall shelves with hangers and parts bins, or construct free-standing wood or metal shelves at about waist level. A gripper/reacher or a pole with a magnet attached to the end can be used to pick items off the floor or from high shelves without straining the back.

Sit-stand stools help when doing tasks that require standing for long periods of time. These can be used by the workbench in the shop. They may also be useful in the farrowing house when taking care of piglets.

Retractable air hoses and extension cords can make tool use easier and reduce trip hazards.



Anti-fatigue mats in front of work benches or machinery can reduce discomfort for the back, legs, and feet. Wearing shock-absorbing shoes or insoles can also help reduce back and leg discomfort.

The flooring in shop areas should be kept clear and clean to decrease the risk of tripping, slipping, or falling. When a person slips or trips, major muscle groups react by contracting quickly and strongly to help restore balance. This reaction can send a wave of pain through the lower back. Strain injuries may also result.

## TREATMENTS FOR BACK PROBLEMS

Most people with lower back pain initially have mild symptoms that improve with minimal treatment in a matter of days. However, about a third of sufferers experience a recurrence of pain within six months of the initial pain.<sup>10</sup>

In general, normal activity can be maintained when back pain is noted.<sup>11</sup> However, avoid tasks that may have contributed directly to the back problem. These include heavy lifting or working in awkward positions. If the back problem may be due to static working postures, every attempt should be made to vary postures frequently.

According to the Mayo Clinic, if you do not notice some improvement in your condition within 72 hours of self-care, you should see your doctor.<sup>12</sup> However, you should see a health care provider immediately in certain cases, such as when back pain:

- Causes new bowel or bladder problems.
- Is associated with pain or throbbing in the abdomen or with fever.



*Health care providers may recommend a variety of treatments for back problems.*

- Follows a fall, blow to your back, or other injury.
- Is constant or intense.
- Spreads down one or both legs.

Doctors may prescribe medications and a regimen of light activity initially. If the problem continues, a doctor may refer patients for tests and examination by specialists. They may also refer the patient for physical therapy or spinal manipulation. Diagnostic tests rarely reveal the cause of low back pain.<sup>13</sup>

## Self-Management of Back Pain

Workers with back problems may need to make some adjustments to their daily routines. Sitting, standing, or driving for shorter periods, with more frequent posture changes and movement, may tend to aid recovery.

Heavy or awkward lifting should be avoided at all times, but especially when a worker is recovering from back pain. Team lifting during this phase may be feasible, but check with your health care provider to be sure. However, as mentioned earlier, mechanical aids should be used wherever possible.

When sitting at home, support the natural curvature of the spine with back support extending the length of the back. If the seat is so deep that there is a gap behind the back when sitting, cushions or specially-made devices may be used to fill this gap. Elevating the legs can increase comfort if the back is fully supported.

## Heat and Cold Therapy

In some cases, heat and cold may be helpful in reducing back pain. Both heat and cold are capable of reducing pain and muscle spasms. Cold therapy, such as the use of ice packs, is often used to soothe or numb acute injuries, such as sprains and strains. It can also reduce swelling due to inflammation. Heat therapy, such as the use of a heating pad, may be used to stimulate blood flow to the injured area and to relax stiff muscles. Heat should not be applied to inflamed areas.

If in any doubt regarding the effectiveness of any treatment, consult your health care provider.

### **Stretching**

According to the Arthritis Foundation, stretching can help lubricate joints and promote range of motion. Stretching appears to be especially effective when done after 5-10 minutes of warm-up activity.<sup>14</sup> Check with your health care provider or physical therapist for more information. In addition, taking regular breaks from machinery operation can enhance blood flow and reduce stiffness.

### **Rest**

In many cases of back pain, a short period of rest (usually not more than a day) may be helpful. This can be followed by an exercise program designed to keep the back flexible. Extended bed rest is not only ineffective – it may significantly increase recovery time.<sup>15</sup> The best course of action is generally to return to normal daily activities as quickly as possible. However, avoid tasks with a high risk of re-injury.

### **Exercise and Diet**

Maintaining muscle tone is important to back health.<sup>1</sup> It can reduce pressure in spinal joints, stabilize the spine, and keep it aligned. Exercise stimulates the body's natural endorphins, which are chemicals that can reduce pain. Exercise can also promote metabolic activity, increase healing, and prevent further injury.



*Proper exercise can have a positive effect on back health.*

Before starting any exercise program following injury, it is important to consult a health care provider. They can recommend an exercise program that will be safe and effective. “Low-impact” exercises, such as walking, cycling (not off-road), and swimming are normally fine for a person suffering from back pain.

Weight loss programs for any overweight person should follow the advice of their health care provider. It is unclear as to whether losing weight improves outcomes for low back pain. However, overweight and obese persons are at greater risk for other serious health problems. In general, being overweight may indicate a lack of overall fitness and poor muscle tone.

### **Medication and Surgery**

Medication may help with back pain.<sup>16</sup> Muscle relaxants, pain relievers, or anti-inflammatory drugs, such as acetaminophen, naproxen, and ibuprofen, may be prescribed by a health care provider or purchased over-the-counter. Be sure to follow dosage instructions.

Very few back problems warrant surgery. However, there are situations where an orthopedist or neurologist may recommend surgery, such as a spinal fusion or the removal of the bulging part of an intervertebral disc. Surgical procedures may not result in improved outcomes for every back pain sufferer.<sup>17</sup> For this reason, patients considering surgical interventions are advised to seek second and third opinions.

### **Alternative/Complimentary Treatments**

Chiropractic treatment may be helpful for patients with low back problems.<sup>18</sup> In some cases, chiropractic adjustments can restore joint function and mobility and relieve irritation. Other treatments such as acupuncture, herbal medications, and therapeutic massage have also been used to treat low back pain.

A treatment or medication that promises “a quick cure” may appeal to any sufferer. However, some unproven treatments may be expensive and unhelpful. They may even prove harmful by delaying effective medical advice or care. The patient should always discuss alternative treatments with their health care provider.

## CONCLUSION

Back problems are some of the most common physical impairments in agriculture and can be difficult to manage. However, help is available to help you stay productive and minimize your pain. Each person's condition is different. Before making changes, seek the advice of appropriate professionals, including a health care provider.



*Back problems are common and can be challenging, but they are also manageable.*

## SOURCES OF ASSISTANCE

For more help on agriculture-related back issues, consider:

- **AgrAbility.** Visit [www.agrability.org](http://www.agrability.org) for resources on farming with physical limitations and to locate your nearest AgrAbility project.
- **Local rehabilitation facilities and other medical providers.** Call 2-1-1 for assistance in finding these.

- **County Extension offices.** Visit [www.csrees.usda.gov/Extension](http://www.csrees.usda.gov/Extension) to find your local office.
- **State Vocational Rehabilitation systems.** These can provide training, equipment, and other resources if your back problem limits your ability to work. See [www2.ed.gov/svr](http://www2.ed.gov/svr) for your state's office.
- **Veterans Administration.** If your back problem is related to military service, visit [www.vba.va.gov](http://www.vba.va.gov).

## FURTHER READING

- *Farming with a Back Impairment - Plowshares #26* is a greatly expanded version of this booklet. Visit [www.agrability.org/resources/back](http://www.agrability.org/resources/back).
- *Arthritis and Agriculture* is a 24-page booklet available from the Arthritis Foundation. See [www.arthritis-ag.org](http://www.arthritis-ag.org).
- *Low Back Disorders: Injury Prevention and Risk Reduction* is a publication produced by the Arkansas AgrAbility Project. Visit [www.arfamilies.org/health\\_nutrition/agrability](http://www.arfamilies.org/health_nutrition/agrability) or [www.agrability.org/resources/back](http://www.agrability.org/resources/back).
- *Simple Solutions: Ergonomics for Farm Workers* describes early intervention and simple technologies to prevent back and joint pain for farm workers. See [www.cdc.gov/niosh/docs/2001-111](http://www.cdc.gov/niosh/docs/2001-111), or for the Spanish language version visit [www.cdc.gov/spanish/niosh/docs/2001-111\\_sp/](http://www.cdc.gov/spanish/niosh/docs/2001-111_sp/).
- *Ergonomics of Back Pain in Farmers. Descriptive Reference Manual.* National Farm Medicine Center in Marshfield, WI. See <http://bse.wisc.edu/agrability/Pages/Documents/ergonomics.pdf>.



## GLOSSARY OF BACK PROBLEM TYPES

- **Arthritis** is a term used to describe a wide variety of joint disorders affected by inflammation. Arthritic changes in spinal joints may result in pain, reduced range of motion, and reduced lifting capacity.
- **Bone spurs** are abnormal growths of bone that may develop in various parts of the body, but in the spine tend to occur at the joint surfaces of the vertebrae.
- **Degenerative disc disorder/disease** affects the spinal discs which ordinarily act as cushions, spacers, and points of movement within the spinal column. A **bulging disc** is commonly called a “**slipped disc**,” (though it does not actually slip, it merely bulges). In severe cases of degeneration, the fibers that make up a spinal disc can rupture—termed a “**herniated disc**.” A herniated disc allows material from the center of the disc to be forced outside the disc, pressing against nerve roots in the spinal column, causing severe pain or reduced function in the lower limbs.
- **Displacement of Vertebrae (Spondylolisthesis)** is a condition in which one spinal bone slips out of position in relation to the bone below it.
- **Fractures** (cracks or breaks) can occur in vertebrae that are subjected to very high forces, such as might occur during a heavy fall, being kicked by an animal, being struck by fast-moving machinery, or during a vehicular collision.
- **Muscular fatigue** occurs when a muscle can no longer exert its normal level of force.
- **Osteoporosis** is a loss of bone mineral density that most often results from age-related hormonal changes.
- **Sciatica** is the name given to the symptoms of pain, numbness, tingling, or other unusual sensations caused by compressing the sciatic nerve, which originates in the lower back. Because the sciatic nerve branches from the low back into the hips, thighs and down to the feet, sciatica can cause problems in any or several of these body parts.

- **Spondylitis** is a general term for an arthritic inflammation of the spinal joints.
- **Spondylosis** is a form of arthritis in which there is narrowing of the space between the spinal joints. It can result in nerve root compression.
- **Sprains** are torn or overstretched ligaments, which connect bones together at a joint.
- **Strains** are torn or overstretched muscles or tendons. Tendons connect muscles to bones.

## REFERENCES

- <sup>1</sup> National Institute for Neurological Disorders and Stroke (2009). Low Back Pain Fact Sheet. Retrieved from [http://www.ninds.nih.gov/disorders/backpain/detail\\_backpain.htm](http://www.ninds.nih.gov/disorders/backpain/detail_backpain.htm).
- <sup>2</sup> Waters, T.R., Putz-Anderson, V. & Garg, A. (1994). *Applications Manual for the Revised NIOSH Lifting Equation*. Cincinnati, OH: National Institute for Occupational Safety and Health.
- <sup>3</sup> Griffin, M.J. (1990). *Handbook of Human Vibration*. London: Academic Press Ltd.
- <sup>4</sup> Haslegrave, C.M. (2004). Force Exertion. In Delleman, N.J., Haslegrave, C.M. & Chaffin, D.B. (eds.), *Working Postures and Movements: Tools for Evaluation and Engineering* (pp. 367-402). Boca Raton, FL: CRC Press LLC.
- <sup>5</sup> Brison, R. J. & Pickett, C. W. (1992). Non-fatal farm injuries on 117 eastern Ontario beef and dairy farms: a one-year study. *American Journal of Industrial Medicine*. 21(5): 623-36.
- <sup>6</sup> Liuke, M., Solovieva, S., Lamminen, A., Luoma, K., Leino-Arjas, P., Luukkonen, R. & Riihimaki, H. (2005). Disc degeneration of the lumbar spine in relation to overweight. *International Journal of Obesity*. 29 (08): 903-8.
- <sup>7</sup> Andersson BJ, Ortengren R, Nachemson AL, Elfström G, & Broman H. (1975). The sitting posture: an electromyographic and discometric study. *The Orthopedic Clinics of North America*. 6(01):105-20.6

## REFERENCES (CONT.)

- <sup>8</sup> Mayo Clinic. Slide show: Sleeping positions that reduce back pain. Retrieved from [www.mayoclinic.org/condition/back-pain/multimedia/sleeping-positions/sls-20076452](http://www.mayoclinic.org/condition/back-pain/multimedia/sleeping-positions/sls-20076452).
- <sup>9</sup> National Institute of Occupational Safety and Health. (1997). Back Belts: Do They Prevent Injury? National Institute of Occupational Safety and Health Publication No. 94-127. Retrieved from <http://www.cdc.gov/NIOSH/backbelt.html>.
- <sup>10</sup> Shiri, R., Solovieva, S., Husgafvel-Pursiainen, K., Taimela, S., Saarikoski, L.A., Huupponen, R., Viikari, J., Raitakari, O.T., & Viikari-Juntura, E. (2008). The Association between Obesity and the Prevalence of Low Back Pain in Young Adults: The Cardiovascular Risk in Young Finns Study. *American Journal of Epidemiology*. 7(9):1110-19.
- <sup>11</sup> National Center for Biotechnology Information, U.S. National Library of Medicine. Physical Activity and Exercise. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0005447/>.
- <sup>12</sup> Mayo Clinic. Back Pain. Retrieved from <http://www.mayoclinic.org/diseases-conditions/back-pain/basics/symptoms/con-20020797>.
- <sup>13</sup> Deyo, R.A., Mirza, S. K., & Martin, B.I. (2006). Back Pain Prevalence and Visit Rates: Estimates from US National Surveys, 2002. *Spine*. 31(23): 2724-27.
- <sup>14</sup> Melone, L. A New Way to Stretch. Retrieved from <http://www.arthritistoday.org/what-you-can-do/staying-active/fitness-benefits/stretching-benefits.php>.
- <sup>15</sup> Harvard Health Publications. (2014). Bed rest for back pain? A little bit will do you. Retrieved from <http://www.health.harvard.edu/healthbeat/bed-rest-for-back-pain-a-little-bit-will-do-you>.
- <sup>16</sup> Dugdale, D.C. (2013). Medications for back pain. Retrieved from <http://www.nlm.nih.gov/medlineplus/ency/article/007486.htm>.

- <sup>17</sup> Deyo, R.A., Mirza, S.K., Turner, J.A. & Martin, B.I. (2009). Overtreating Chronic Back Pain: Time to Back Off? *Journal of the American Board Family Medicine*. Issue 22: 62–68.
- <sup>18</sup> Meade T.W., Dyer S., Browne W., & Frank A.O. (1995). Randomised comparison of chiropractic and hospital outpatient management for low back pain: results from extended follow up. *BMJ*. 311(7001):349-51.

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**B**ack problems are some of the most common complaints by workers in all industries, and they often result in lost work time. While back problems are challenging, they can be managed. This booklet discusses many aspects of back problems in agricultural settings, including:



- Types of back problems
- Causes of back problems
- Preventing back problems
- Managing back problems
- Treatment for back problems



### **About AgrAbility**

*The vision of AgrAbility is to enable a high quality lifestyle for farmers, ranchers, and other agricultural workers with disabilities. While the term “disability” often brings to mind conditions such as spinal cord injuries and amputations, AgrAbility addresses not only these but also many other conditions, such as arthritis, back problems, and behavioral health issues.*

*AgrAbility is sponsored by the U.S. Department of Agriculture (USDA) and consists of a National Project and State/Regional Projects (currently serving 22 states).*

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