

Selecting a Wheelchair for Agricultural Use

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THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

Agricultural Safety & Health Program



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Basic Webinar Instructions

- 5 quick survey questions + opportunity to share comments
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- **AgrAbility: USDA–sponsored program that assists farmers, ranchers, and other agricultural workers with disabilities.**
 - Partners land grant universities with disability services organizations. Currently 20 state projects
 - National AgrAbility Project: Led by Purdue’s Breaking New Ground Resource Center. Partners include:
 - Goodwill of the Finger Lakes
 - The Arthritis Foundation, Heartland Region
 - University of Illinois at Urbana–Champaign
 - Colorado State University
 - More information available at www.agrability.org

Selecting and Operating a Wheelchair to Meet Your Agricultural Needs



Available at:
agrability.osu.edu



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Today's Objectives for the Webinar:

1. Introduce the new bulletin and its contents
2. Identify multiple factors that exist on the farm, and how they affect wheelchair selection
3. Understand the expectations and limitations of the person in the chair, including the chores he or she will tackle
4. Recognize both the common and subtle features of a wheelchair and their impacts on utility

The presentation is designed for the chair user, not the service provider.

Evaluating your Environment

Identify factors that exist on the farm, and how they affect wheelchair selection

Evaluating your Environment

- Needs and Goals
- Roles and Routines
- Physical and Mental Status
- Progression of Disease Processes
- Psychosocial Appearance
- Compatibility with other Assistive Technology

What to Consider:

Where will I be using the wheelchair?

- inside or outside
- grass, dirt, or concrete

What climate will I be in?



What to Consider:

Will stairs or narrow doorways be an issue for me?
Will I use it constantly or occasionally?



More to Consider:

Do I need my wheelchair to be compatible with other assistive technology?

Do I have a caregiver or will I be independent?



Evaluating Yourself

Understand the expectations and limitations of the person, including the chores he or she will tackle

Current and Future Needs:

What are my needs today?

What will my needs be in the future?

How will my farming operation change in the future?

Will my needs change as a result of my farming operation changing?



What types of mobile devices are available?

Recognizing the common and subtle features of a wheelchair and their impacts on utility

- ◆ Attendant-Propelled

- ◆ Manual

 - Folding vs. Rigid

- ◆ Lightweight

- ◆ Ultra Lightweight

- ◆ Standard-Weight

- ◆ Power

- ◆ Manual with Power Unit

- ◆ Scooter

- ◆ Smart

- ◆ Standing



Attendant-Propelled Chairs

- ◆ Can be used as substitute while power chair is in repair
- ◆ Pushed by another individual
- ◆ Talk with caregiver to find a chair that will work for both of you
- ◆ Can be used full-time



Manual Chairs

- ◆ Must be able to brake and propel independently with upper limbs and/or lower limbs
- ◆ Freedom to tilt
 - helpful in a farm environment
- ◆ Flexible
- ◆ Easy to transport
- ◆ Various Types:
 - folding
 - rigid frame



Folding	Rigid
User/caregiver needs ample strength and range of motion for transportation and storage of chair	Improved energy efficiency & performance
Heavier weight and frame	Lighter frame weight
Elevating footrests available	Limited footrest options available
Snap-secure frames	Custom ordering from a rehabilitation technology supplier
Quick release wheels/ Adjustable front rigging	Better for a user who needs to be cautious of energy use

Lightweight Chairs

- ◆ Less than 40 lbs.
- ◆ Intended for full-time users
- ◆ User needs core body strength and stability to operate chair
- ◆ Difficult to operate on rough terrain



◆ Ultra Lightweight Chairs

- less than 25 lbs.
- intended for supplemental use



Standard-Weight Chairs

- ◆ Increased weight for improved balance and stability
- ◆ Come with less custom options
- ◆ Generally less expensive



**Do I have enough strength,
range of motion, and
endurance to propel the
chair?**

**Do I have enough strength
to propel the chair for
several hours at a time?
Does my caregiver have
enough strength to propel
the chair?**



Standard-Weight Chairs

Power Chairs

- ◆ Most have wheels separate from seating system
- ◆ Sturdy
- ◆ Good for full-time users
- ◆ Works well both indoors and outdoors



Power Chairs

- ◆ Additional maintenance and upkeep needed
- ◆ Batteries: wet cell lead acid and gel-cell lead acid*

For agricultural purposes:

- ***Gel-cell lead acid** may be a good option
 - battery cases exposed to weather elements are more likely to be damaged
 - user is less likely to be injured with a gel-cell lead acid battery if the battery case is damaged

- ◆ If the power chair breaks down, do you have a backup mobility option?

Power Chairs

- ◆ Points to Consider:
 - Requires cognitive and visual-perceptual ability to operate
 - Specialized transport requirements: lifts, ramps
 - Large turning radius
 - Vehicle needs to accommodate the weight and size of chair



Manual Chairs with Add-on Power Unit

- ◆ Allow power unit feature to be engaged or disengaged as needed
- ◆ “Test drive” of a power chair before committing to the purchase of a real power chair
- ◆ Power component adds weight to a manual chair



Scooters

- ◆ Not intended for full-time use
- ◆ Used as a supplement to a cane/walker for farther treks such as between barns
- ◆ Intended for community use



Scooters

- ◆ Large turning radius
- ◆ Difficult to operate:
 - indoors
 - In small outdoor spaces such as livestock pens or workshops



Smart Chairs

Computer or set of sensors attaches at the base of a mobile robot where the seat is attached.



Useful chair for those with:

Low vision

Cognitive impairment

Musculoskeletal dysfunction

Smart Chairs

Three Main Functions:

1. Collision avoidance
2. Navigation through environmental barriers
3. Navigation features from place to place



Standing Chairs

- ◆ Good option for those with a spinal cord injury or multiple sclerosis
- ◆ Pressure relief
- ◆ Improved environmental accessibility
- ◆ Face-to-face communication with others
- ◆ More expensive than other wheelchair options
- ◆ Some can be mobile in an upright position
- ◆ Large in size



Manual Power

Includes Manual Driven & Manual Lift

- ◆ Uses hydraulic system with a pump to raise the user to a standing position
- ◆ User has a support system that uses padded bars to keep them upright



Half Power

Includes Manual Driven & Manual Lift

- ◆ Manually driven chair that has a button that will automatically move user into a standing position
- ◆ User has a support system that uses padded bars to keep them upright



Full Power

Includes Manual Driven & Manual Lift

- ◆ Motorized chairs where the user has a button that will automatically move them into a standing position
- ◆ User has a support system that uses padded bars to keep them upright



Fitting your Chair

Points to consider for the best fit

Ensuring the best fit

- ◆ Seat width
- ◆ Seat depth
- ◆ Back height
- ◆ Seat height and leg rests
- ◆ Armrests



Seating and Positioning

Options for seating surfaces

Planar

- ◆ for those needing little or no postural support
- ◆ must be able to reposition themselves easily



Pre-Contoured

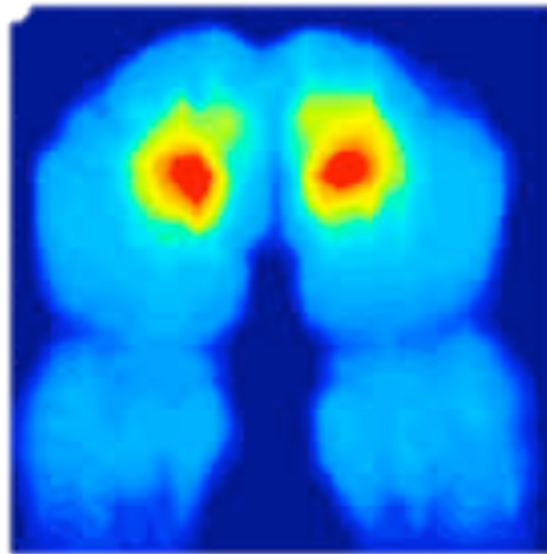
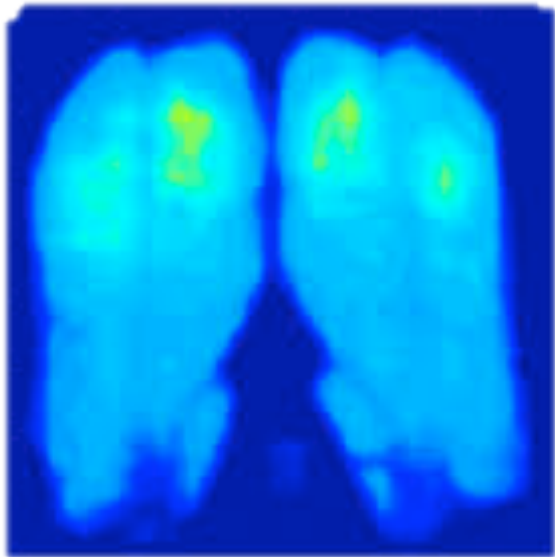
- ◆ gives added contact for stability
- ◆ provides greater pressure distribution



Custom Contoured

Best option for:

- a spine or pelvic deformity
- abnormal muscle tone
- decreased spinal support



Seating and Positioning

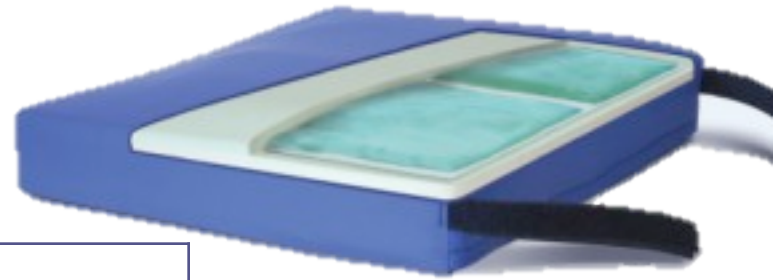
Adding cushions

Foam

Advantages	Disadvantages
Lightweight	Uneven pressure
Easily sized	Poor durability
Inexpensive	Hard to Clean



Gel-filled



Advantages	Disadvantages
Self-contouring	Heavy
Posture control	Temperature sensitive
Sitting balance	Requires frequent maintenance to prevent leaks

Air-filled



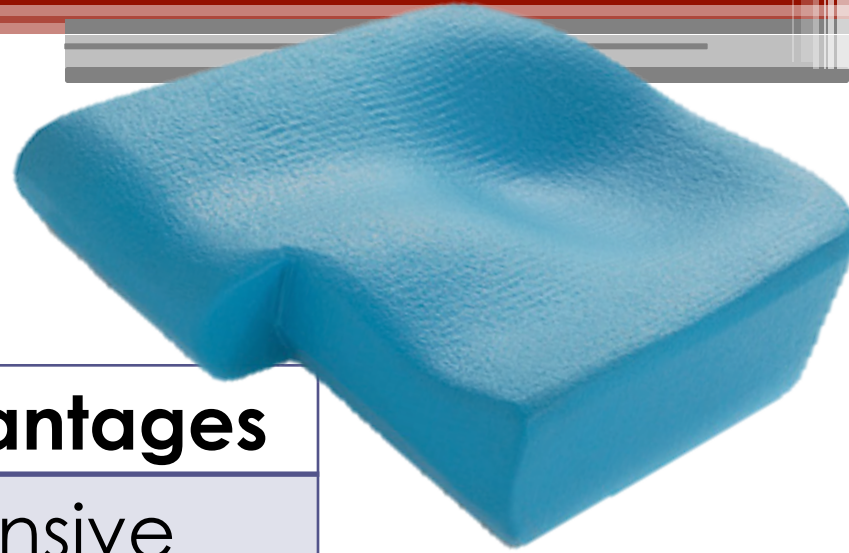
Advantages	Disadvantages
Lightweight	Reduced postural control
Even pressure	Air leaking is common
Reduced shear forces	Requires constant maintenance

Honeycomb

Advantages	Disadvantages
Lightweight	Uneven pressure
Easy to clean	Difficult to fit user
Low maintenance	Adds thickness to chair



Custom-contoured



Advantages	Disadvantages
High surface area coverage	Expensive
Reduced shearing forces	Poor longevity with biological changes
Improved postural control	Reduced ability to weight shift

Alternating Pressure Systems

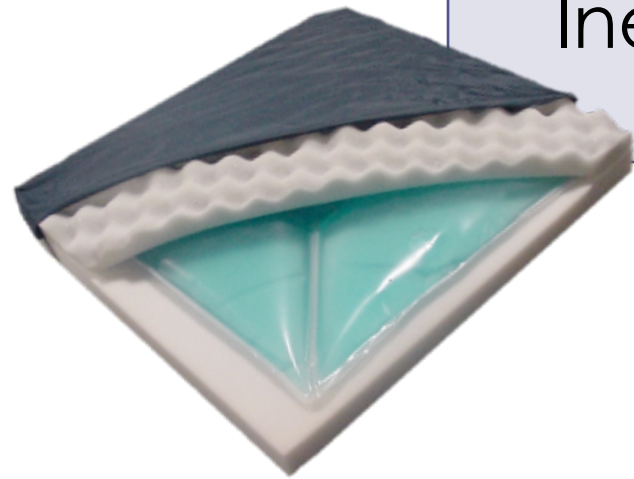
Advantages	Disadvantages
Scheduled pressure relief cycle	Expensive
Reduces user effort	Uneven pressure relief
Self-contouring	Poor sitting balance



Cushions

Water-filled

Advantages	Disadvantages
Self Contouring	Heavy
Posture Control	Prone to Leaks
Inexpensive	Temperature Sensitive



Tires

Important for terrain conditions

Pneumatic (Air-filled)

Advantages

- Lightweight
- Good Shock Absorption
- Can Extend life of Chair

Disadvantages

- Require Regular Maintenance



Semi-Pneumatic (Foam-filled)

Advantages

- Requires Little Maintenance
- Good Cushioning

Disadvantages

- Wears out quickly



Solid Rubber

Advantages

- Little Maintenance
- Good Cushioning
- Low rolling resistance

Disadvantages

- Adds Weight to Chair



Accessories

Important for overall function and independence

Guards

- ◆ Block clothing from getting stuck in tires
- ◆ Keep tools/ropes from getting stuck in tires
- ◆ Can be used on armrests



Anti-tip Devices

- ◆ Prevent chair from tipping in
 - Fields
 - Livestock Pens
- ◆ Can be difficult to maneuver in fields and pens



Lap Trays

Can use it as a personal work bench



Restraining Devices

- ◆ seat belts, vests, harnesses
- ◆ can help with neuromuscular impairment



Recline and Tilt Options

- ◆ offer rest changes and pressure relief
- ◆ most attendant-propelled wheelchairs offer
- ◆ semi-recline and full-recline options



Final points to consider

And where to go for more information

Final Points to Consider

- Multi-step process
- Requires user to think about themselves, their environment, and features of a wheelchair
- Consideration of seating and positioning



The National AgrAbility Project

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RESNA

The Rehabilitation Engineering & Assistive Technology Society of
North America
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This presentation was made based on the Ohio AgrAbility Program's Wheelchair Bulletin. The following references were used in both the PowerPoint presentation as well as the wheelchair bulletin.

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Thank You

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