Returning to Farming after Upper-extremity Loss: What the Farmers Say

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Abstract

Despite the prevalence of disabling injuries in agriculture, little research has explored the occupational rehabilitation process of injured farmers. A qualitative study was undertaken to identify variables farmers with a severe disability, upper-extremity amputations, perceived as important in the return to physical labor on their farms. Sixteen farmers in five states participated in interviews that enabled the researcher to identify variables affecting the rehabilitation process. Physical barriers, social barriers, and resources that influenced rehabilitation were examined. Farmers with upper-extremity amputations in this study mastered their disabilities and continued profitable farm operations. Health professionals and others who have contact with farmers with disabilities need to be cognizant of the strong desire and continued ability to farm after severe injury. More attention should be given to farm-specific occupational rehabilitation programs, such as AgrAbility, and in the engineering of prostheses and other assistive technology.

Keywords. Injury, Rehabilitation, Amputation, Agriculture, Disability, Technology.

Injuries are rampant in agriculture. Estimates from population-based studies report that amputations account for 11% of all major farm-related injuries, with fingers and hands as the predominant injured body parts (Elkington, 1990; Zhou and Roseman, 1994). A review of workers' compensation claims filed by farmers in Washington State from 1982-1986 revealed 78 claims for all amputations (Demers and Rosenstock, 1991). Amputations were two and a half times more likely to occur in farming than in all other industries (O.R. = 2.5; 95% C.I. = 2.0 – 3.1). Unlike workers in many other occupations, farmers have no structured occupational rehabilitation programs that can assist them in returning to their vocation. Pratt et al. (1992) reported that rural rehabilitation resources are limited and farmers often return to work without training to accommodate farm tasks. How farmers with upper-extremity limb loss remain in agricultural production has not been examined. The objective of this study was to explore farmers' perspectives of their recovery process after a severe, permanently disabling injury.

The concepts of control, self-perception, and influence of others are factors in decision making (Conners et al., 1990; Smith, 1984). Decision making is influenced by cognitive, personality, and emotional characteristics. In a study of seriously ill

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patients, factors affecting decision making were identified as patients' desire for information, knowledge of condition, treatment and alternatives, perceived control over treatment plan, and perception of influence of others (Coulton, 1990). The non-use of formal rehabilitation programs by injured farmers may be the result of independence valued by farmers or a loss of control over the health care process.

Achievement to a farmer is a tangible product gained at personal expense (Garkovich et al., 1995). Injured farmers can return to the fields more quickly if time is not spent in formal rehabilitation. For injured farmers and the farm community, this swift return to farm labor may be viewed as analogous to "getting the crop out first", a valued achievement in the farm culture.

Reed (1993) conducted a preliminary study of farmers' perspectives of rehabilitation after upper-extremity loss (n = 9). Farmers reported that their own determination, the presence of a mentor (one who had a similar loss), and the support of family and community were the primary components of their recovery process. They did not perceive the usual methods of rehabilitation, including physical and occupational therapies, as helpful. Indeed, such programs were frequently cited as barriers to reentry to work. Participants cited distance and prolonged courses of therapy as counterproductive to their work function. Time constraints and distance have been reported to be factors for rural non-use of rehabilitation programs (Bushy, 1991; Taulbee, 1981). The self direction of rehabilitation by injured farmers is more thoroughly explored in this article.

Rehabilitation is the process by which the injured party achieves maximum personal autonomy through the optimal restoration of biological, psychological, and social function (Committee on Trauma Research, 1985). Given the magnitude of permanently disabling injuries that occur within the farm population it is imperative that attention be given to how these injured workers return to agriculture.

Method

A descriptive qualitative design, using personal interviews, was used to gain insight into the processes used by farmers to return to agricultural production after the loss of an upper-extremity. Participants were identified by referral from county extension services, AgrAbility projects, and the farm community. Each interview lasted about two hours and was guided by general questions regarding the injury, hospitalization, and barriers and resources the participant identified as important in returning to farming. Interviews were conducted in person (n = 15) or by telephone (n = 4). All interviews were audio recorded and transcribed verbatim after assigning fictitious names to protect anonymity and confidentiality. In ten of the interviews the participant provided a walk-about of the farm to further explain the accommodations made after the injury. Field notes and photographs of farm activities supplemented the verbal data. Analysis was conducted following the constant comparative method of Glaser and Strauss (1967) using the Non-numerical Unstructured Data Indexing Searching and Theorizing software (QRS.Nud*IST), a computer program for qualitative analysis (Qualitative Solutions and Research Pty Ltd, 1996). Using this method the data were continually examined during the study to guide subsequent interviews and gain a deeper understanding of the recovery process. Data collection ceased when no new information was discovered in the last three interviews.

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20–39
40–59
60–79
≥ 80
Time since amputation
≤ 3 years
4–10 years
11–20 years
21–30 years
31–40 years
> 40 years
Level of amputation
Hand
Below elbow
Above elbow
Entire arm
Dominance of lost appendage
Dominant
Non-dominant
Cause of injury
Farm machinery
Other
Farm commodity
Grain
Beef cattle
Cattle and grain
Tobacco and grain
Hay and animals
Other

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Sample

Nineteen interviews were conducted. Sixteen active farmers, two nonfarmers, and a farmer who left farming after injury were interviewed. For this article only analysis of the 16 active farmers is used. To be included in the study participants had to be at least 18 years of age, have an upper extremity limb loss at wrist level or above, farmed before limb loss, and be farming at time of interview. In addition, the participant had to be at least 12 months post limb loss. This criteria was included so an entire cycle of agricultural production would have been completed; thus, the farmer would have a more complete understanding of the impact of the limb loss across all phases of the farm operation. Participants were purposively recruited to achieve variation by level of amputation, time since injury, age, prosthesis use, agricultural commodity, and geographic location. The two nonfarmers and the farmer who left farming were included to assess the boundaries of findings. Table 1 summarizes the demographic characteristics of the sample.

The mean age of participants was 54.3 years, while the mean age at time of injury was 37.1. Most amputations occurred as results of farm injuries (n = 12) but war, motor vehicle, and hunting injuries accounted for four amputations. All except one

Table 1. Demographic profile of participants (N = 16)

Characteristic	Frequency		Percent	
Age (age at amputation)				
<20	0	(6)	0.0	(37.5)
20–39	2	(3)	12.5	(18.7)
40–59	7	(4)	43.7	(25.0)
60–79	6	(2)	38.0	(12.5)
≥ 80	1	(1)	6.3	(6.3)
Time since amputation				
≤ 3 years	6	37.5		
4–10 years	3	18.7		
11–20 years	1	6.3		
21–30 years	2	12.5		
31–40 years	1	6.2		
> 40 years	3	18.8		
Level of amputation				
Hand	2	12.5		
Below elbow	7	43.8		
Above elbow	2	12.5		
Entire arm	5	31.2		
Dominance of lost appendage				
Dominant	11	68.7		
Non-dominant	5	31.3		
Cause of injury				
Farm machinery	12	75.0		
Other	4	25.0		
Farm commodity				
Grain	6	37.5		
Beef cattle	2	12.5		
Cattle and grain	2	12.5		
Tobacco and grain	1	6.3		
Hay and animals	4	25.0		
Other	1	6.3		

participant owned a prosthesis, but only eight used these devices at all. Of these, just five participants consistently used their prostheses. Those who used prostheses were all below elbow amputees. Median educational level was 12 years. All but one participant owned the majority of their farm acreage.

Researchers chose participants from across five states (Kentucky, Indiana, Tennessee, Ohio, and Illinois), to assess cultural and commodity diversity. Thirteen interviews were conducted in person and three were accomplished by telephone.

Analysis

Grounded theory is useful in areas where little research has been done, as it allows the constant comparison of data (Glaser and Strauss, 1967; Strauss and Corbin, 1990). In the constant comparative method the data are searched as they are collected in order to identify variables that impact the phenomena under study and explore them more fully as the study progresses. The aim of this study was to identify variables that farmers with upper-extremity amputations felt were important in their return to farming. Transcribed data were coded independently by two readers, using a definition code book developed from Reed's (1993) pilot study and the literature. Codes were refined during the study as understanding of the rehabilitation process increased. Inter-rater reliability was calculated using the Kappa coefficient. Coding definitions were revised if agreement dropped below 70%. Coding consistency was calculated using the entire transcripts for the first three interviews then by randomly selecting 20% of the pages of each subsequent transcript. Final agreement between readers remained above 90% after code revisions. Confidence in truth of the findings was supported by sharing definitions and concepts with participants and agricultural safety professionals and by comparing goodness of fit of the data to existing literature (Glaser and Strauss, 1967).

Two code levels were employed. Open coding, in which the reader coded data by definition and verbatim terminology, was used during first level coding. This substantive level allowed expansion and revision of code definitions as variables were identified. Second level coding, theoretical coding, was used in the later part of the analysis to define concepts, identify linkages of concepts, and formalize the social process of return to farming.

Findings

The process of returning to farm work can be dichotomized into barriers that impeded return and resources that farmers reported facilitated their reentry to farming. Figure 1 summarizes these variables. Participants reported physical and social barriers that had to be overcome. These barriers were countered by the resources farmers were able to assemble.

Physical Barriers

The loss of an extremity results in major physical responses. The center of gravity shifts. Circulatory and musculature loads are reallocated. Fatigue is elevated because of the extra energy required to complete physical labor. Participants reported new balance techniques had to be learned. Climbing equipment and buildings, walking on rough terrain, and carrying heavy weights are necessary tasks in farming. Participants reported an increased prevalence of falls after the amputation, which continued even years after the return to familiar farm work. Certain tasks, such as

Barriers

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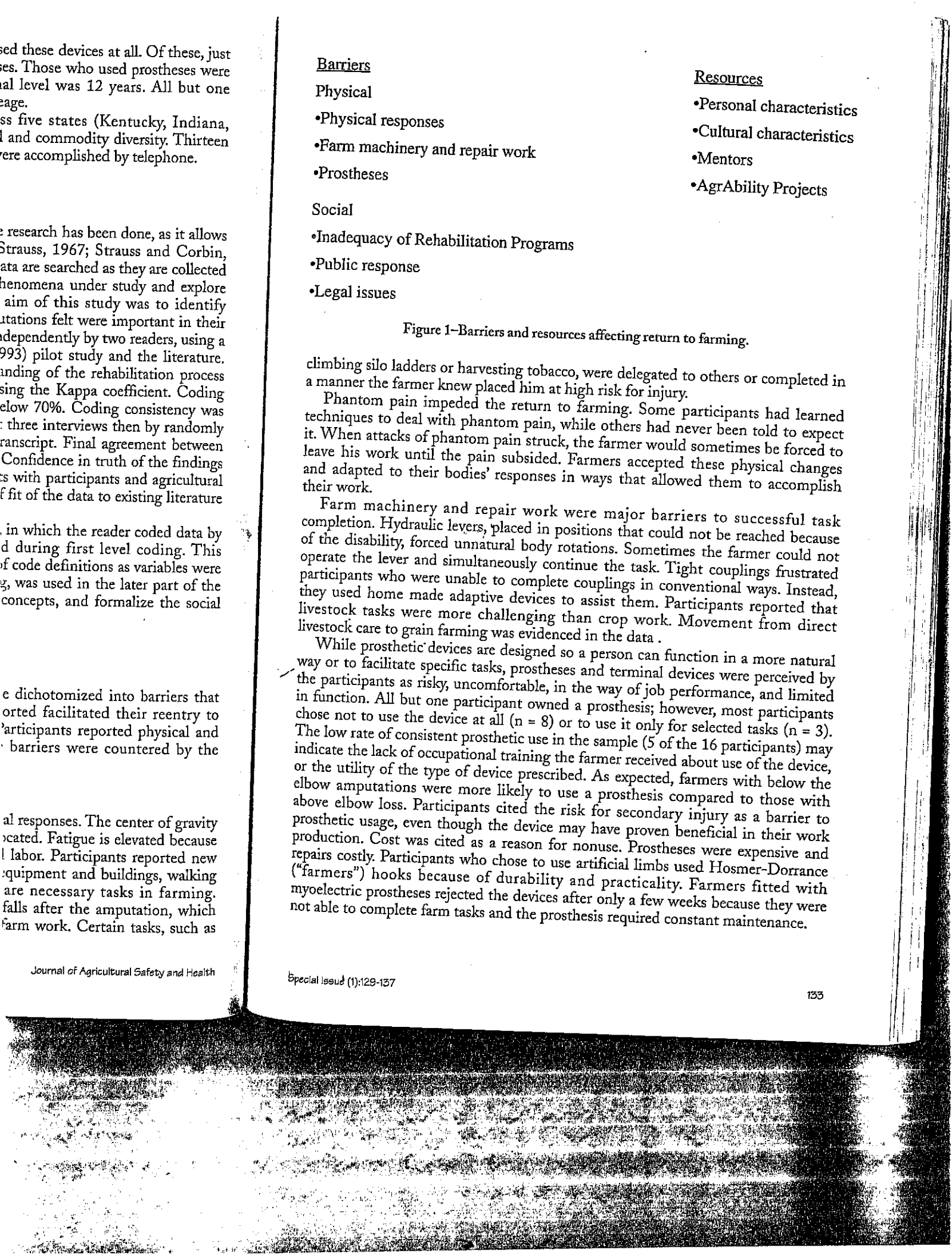

Figure 1–Barriers and resources affecting return to farming.

climbing silo ladders or harvesting tobacco, were delegated to others or completed in a manner the farmer knew placed him at high risk for injury.

Phantom pain impeded the return to farming. Some participants had learned techniques to deal with phantom pain, while others had never been told to expect it. When attacks of phantom pain struck, the farmer would sometimes be forced to leave his work until the pain subsided. Farmers accepted these physical changes and adapted to their bodies' responses in ways that allowed them to accomplish their work.

Farm machinery and repair work were major barriers to successful task completion. Hydraulic levers, placed in positions that could not be reached because of the disability, forced unnatural body rotations. Sometimes the farmer could not operate the lever and simultaneously continue the task. Tight couplings frustrated participants who were unable to complete couplings in conventional ways. Instead, they used home made adaptive devices to assist them. Participants reported that livestock tasks were more challenging than crop work. Movement from direct livestock care to grain farming was evidenced in the data .

While prosthetic devices are designed so a person can function in a more natural way or to facilitate specific tasks, prostheses and terminal devices were perceived by the participants as risky, uncomfortable, in the way of job performance, and limited in function. All but one participant owned a prosthesis; however, most participants chose not to use the device at all (n = 8) or to use it only for selected tasks (n = 3). The low rate of consistent prosthetic use in the sample (5 of the 16 participants) may indicate the lack of occupational training the farmer received about use of the device, or the utility of the type of device prescribed. As expected, farmers with below the elbow amputations were more likely to use a prosthesis compared to those with above elbow loss. Participants cited the risk for secondary injury as a barrier to prosthetic usage, even though the device may have proven beneficial in their work production. Cost was cited as a reason for nonuse. Prostheses were expensive and repairs costly. Participants who chose to use artificial limbs used Hosmer-Dorrance ("farmers") hooks because of durability and practicality. Farmers fitted with myoelectric prostheses rejected the devices after only a few weeks because they were not able to complete farm tasks and the prosthesis required constant maintenance.

Social Barriers

Participants noted that the greatest initial obstacle to their work was not the physical adjustments needed but the perception by many health care and rehabilitation professionals that farming may be too physically demanding for amputees. None of the participants who participated in physical or occupational therapies were instructed in farm task performance. In response to this void the farmers experimented with various ways to accomplish work tasks, sometimes culminating in injury. Six of the participants related injuries ascribed to their readjustment process when they returned to farm work.

Physical barriers were more easily mastered than social barriers. While the farm community was generally supportive of the farmers' return to the fields, vocational counselors, bankers, and persons who did not know the farmer prior to injury sought to dissuade him from returning to physical farm labor. Six of the participants tried alternate vocations but were emotionally unable to acclimate themselves to new jobs. "It's in my blood", was a phrase heard repeatedly through out the interviews. "All I ever wanted to do was farm", resounded in the data. With or without social support the injured farmer was determined to return to his chosen vocation.

The Americans with Disabilities Act (1991) is a major boon for most injured workers, but has limited impact on farmers with disabilities. "Reasonable accommodation" on the farm is left to the farmer, who is generally self-employed. Participants in this study who were injured on the farm were not covered by workers' compensation plans, placing them at a distinct financial disadvantage. Legal regulations impeded return to pre-injury farm function for farmers who provided interstate transportation of agricultural products. Three participants were unable to continue this activity because they did not wear a prosthesis. The failure of policies and existing regulations to recognize the uniqueness of farming increased hardships participants encountered in their return to work.

Resources

Personal characteristics factored heavily in the successful return to farming. Personal determination to master farm tasks enabled the farmer to maintain his farm activities. Plans to return to farming were often made while the farmer was still hospitalized. In six cases the farmer returned to the fields to either supervise field work or actually perform physical farm labor the day of discharge from the hospital. Hard work, including the self-imposed rigors of farm tasks, was viewed by the participants as therapy. They countered the physical obstacles by comparing their injuries to others they had observed. They always considered themselves to be physically able to return to work when comparisons were made. True to the Agrarian spirit, participants voiced personal faith that God would give them the ability to return to their vocation. A sense of humor combated depression and daily difficulties. Participants stated these characteristics are part of the essence of farming, where self-reliance, harmony with nature, and humor is required to face the natural and economic uncertainties that surround farming.

The cultural characteristics of farm life encompass a strong desire to farm, a bond to the land, a sense of cultural heritage, and the supportive qualities of family and community. The informal networks of farm communities provided participants with unanticipated resources. Farmers with amputations found access to each other through contacts at tobacco warehouses, commodity cooperatives, churches, and farm auctions. Exchanges of knives, gloves, and other assistive devices occurred at local farm supply stores and through persons who delivered feed or provided

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agricultural services to the farm. This type of support was not found in data from nonfarmers included in the sample.

A mentor is someone who has similar experiences and can provide guidance. While it is desirable to have a mentor, such persons are not readily available (Marinelli and Orto, 1995; Veitch, 1995). Ten of the participants in this study were able to locate mentors and each mentor was highly valued. Mentors were able to provide task specific instruction and to trouble shoot when obstacles were encountered. Moreover, mentors were viewed as comparison standards for farmers. When the newly injured farmer was able to complete a task that the mentor could do, it was perceived as a mastery of the disability.

While conventional occupational therapy programs were not helpful to injured farmers, some participants had accessed their state's AgrAbility Project and found the staff to be helpful. AgrAbility is a United States Department of Agriculture extension service project that provides technical assistance to farmers with disabilities; however, this program is not yet widely known and has limited service areas. Cited as most helpful was the program's on-farm assistance and suggestions for low cost fabrication of assistive technology. Prior to contact with AgrAbility, the participants had either modified equipment and machinery based on their own ingenuity or had not made any modifications, leading to excessive time to complete a task or doing the task in a high risk situation. Immediacy of response was the most desired characteristic of any potential resource. When a farmer requested assistance it was usually for a specific challenge and a quick response was essential to proceed with the task. AgrAbility is geared to respond to the uniqueness of farm operations and uses agricultural specialists incorporated in a program long accepted by the farm community. Participants who used AgrAbility resources often responded by assisting others with similar disabilities, providing an increasing network of resources to the farm community.

Resources were encapsulated within the personal and cultural context of the participants which were critical to the farmers' return to work. Health professionals and others must acknowledge these unique characteristics when developing and administering rehabilitation programs for injured farmers.

Discussion

Participants in this study were articulate about their struggles to return to farming after their injuries. Although barriers outnumbered resources participants maximized resources to overcome the barriers and return to farming. Participants planned and proceeded with their rehabilitation without waiting for assistance from health care professionals or vocational retraining; however, they admitted the return is a continual challenge as new obstacles arise in the course of daily work. The barriers and resources identified in this research can be used when planning assistance for injured farmers as they resume their farm tasks.

Prosthetists and others who advise farmers about assistive devices should consider the type of activities required in the farm operation. Participants in this study often modified their prosthetic devices themselves in order to accommodate their work. Sometimes these modifications placed them at greater risk for injury because of workmanship or materials. Prosthetists need to work closely with farmers to make suggested modifications to reduce failure of the device, thereby reducing injury risk. When commercially manufactured terminal devices exist for specific tasks these devices should be offered to the amputee and training on their use provided as part of the rehabilitation process.

Information about existing resources should be made available before hospital discharge. Simple resources, such as catalogs featuring assistive technology, would prevent much of the experimentation that occurs because farmers are not aware of existing technology. In addition, the immediate access to information about assistive technology would alleviate the mental stress and frustrating burden of searching for information.

Social support can be fostered by the location of mentors through the AgrAbility project and other support groups for persons with disabilities. Mentors played important roles in the reentry to work for farmers who were able to find others with similar disabilities. More attention should be given to facilitating mentorship. Families need to be included in the occupational aspect of rehabilitation. Roles of family members often shift after the farmer incurs a disability. Farmers in this study valued the support given by spouses and children. Spouses were frequently the primary information seekers, but had no instruction on how to find assistance.

Communities offered intangible support but perhaps placed undue expectations on the injured farmer to return quickly to the fields. Conversely, if the farmer was not well known in the community prior to the injury, it was sometimes difficult to secure loans or rent land. Communities continue to need education about the abilities and legal rights of persons with disabilities. Insurance companies need to be apprised of the need for more frequent replacement and repair of prosthetic devices for farmers than for persons in sedentary occupations, due to the nature of the farmer's occupation. Financial coverage for more than one type of terminal device would encourage the use of devices for specialized use.

Successful rehabilitation implies the ability to be a productive member of society. Farmers, by trade, are production driven. The physical and social barriers that must be mastered by farmers with upper-extremity limb loss are difficult to overcome. Except for a small expert group of agricultural specialists delivering occupational rehabilitation guidance through the AgrAbility projects, there is little vocational guidance that fosters injured farmers' reentry to agriculture. While not every farm task can be addressed in occupational rehabilitation programs certain tasks are fundamental to the majority of agricultural operations. Tractor driving, hitching equipment, and repair work are activities found on nearly every farm. These types of activities should be included in the rehabilitation care plan.

"Reasonable accommodation", as required by the Americans with Disabilities Act (1991) does not extend to most family farms. Farmers with disabilities of all types are left to their own ingenuity to do their jobs safely and productively. Farmers and places where farmers conduct business need to be diligent in insuring compliance with ADA regulations.

This research was a first attempt to understand a phenomena bound not only by physical and social dimensions but set in a cultural context with a rich history of self-preservation. Farmers in this study were physically and financially successful in their return to farming after the loss of an upper-extremity; however, their perspective of returning to farming may be unlike farmers with similar injuries who did not remain in farming. Because of the specific nature of the disability studied in this research, findings may not be generalizable to persons with other types of disabilities. Certainly, additional research is needed to more fully understand the issues farmers with disabilities face in their rehabilitation process.

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Conclusion

The purpose of this study was to identify the occupational rehabilitation process of farmers with a severe disabling injury: upper-extremity amputation. By exploring this phenomena health care workers can formulate plans of care that will facilitate the occupational component of the rehabilitation process. Others involved in agriculture can use these findings as a template to accommodate the needs of farmers with disabilities. The resources that assist injured farmers, such as AgrAbility, can be expanded to assure access and availability. With a growing body of knowledge about the process of reentry to farming for farmers with upper-extremity amputations occupational rehabilitation can be based on dimensions valued by farmers with these disabilities.

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