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The Fitting of Assistive Ambulation Devices of Residents from Assisted Living Facilities

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THE FITTING OF ASSISTIVE AMBULATION DEVICES OF RESIDENTS FROM
ASSISTED LIVING FACILITIES

A Capstone Experience/Thesis Project

Presented in Partial Fulfillment of the Requirements for

the Degree Bachelor's in Health Sciences with

Honors College Graduate Distinction at Western Kentucky University

By

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2014

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ABSTRACT

The purpose of this project was to determine if those who use walkers or canes in assisted living facilities have obtained a proper fit. Assisted ambulation devices are used to help one with movement. Walkers and canes that are not fitted appropriately could cause problems and even lead to potentially fatal falls. As the number of older adults continues to rise, more people need to be aware of the importance of a properly assisted ambulation device. To prevent these falls, it is vital to raise awareness of a proper fit for assisted ambulatory devices.

Residents from two assisted living facilities were asked if they used a cane or walker. Those who signed an informed consent document were then asked questions about their ambulation device. The participants then rose to a standing position while the investigator assessed proper fit. No changes were made to their equipment as this should only be done by trained medical professionals.

The primary conclusion in this study was found in the comparison between “fitted” and “needs improvement.” With 23 participants in the study, 52% of the people were in the “needs improvement” grouping. Other results were recorded including the type of device each participant owned, how long they had the device, the origin of the device, and if they thought the walker or cane fit.

Keywords: ambulation, walker, cane, fitting, falls, geriatrics, elderly

Dedicated to my wonderful family and many supporters

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CHAPTER 1

INTRODUCTION

In the United States of America the majority of the “baby boomers” are becoming a part of the elderly community. For the next several years about 8,000 of the baby boomers will reach the age of 65 each day (Boomers @ 65 Celebrating a Milestone Birthday, 2011). With an aging America, it is important to take all precautionary measures to keep everyone healthy and safe. In order to do this, it is important to look at some of the health problems that can be prevented. Measures that may be preventable include injuries due to falls. The main cause for both fatal and nonfatal injuries in emergency rooms across the United States is falls (National Center for Injury Prevention and Control, 2014).

Falls are common in the elderly. According to the World Health Organization, approximately 424,000 individuals around the world die each year from falls (Falls, 2012). Preventive measures are constantly analyzed in order to find solutions. Awareness to the problem could be key in preventing these potentially life threatening falls.

To encourage mobility and increase independence, many elderly persons use assistive ambulation devices. In order to prevent falls, assistive ambulation aids should also be in the correct condition by fixing broken or worn parts. In addition, assistive ambulation devices are beneficial if the correct device is obtained. Physical Therapists and

Physicians are trained to prescribe the best assistive ambulation device for specific conditions and injuries. Correct usage of walkers and canes are also important in maintaining a normal gait. The fit of the assistive devices is also a key component of obtaining a proper device for preventing falls.

A prescribed ambulation device from your Physical Therapist or Physician is the most ideal and safest way to get a properly fit assistive ambulation device. On the other hand, many people receive their ambulation devices from friends, family, or local distributors. Unfortunately, many are unaware of the importance of a fitted device.

The fitting of assistive ambulation devices has been researched by Physical Therapists and Physicians alike (Greenspan, 2009) (Ross, 2009). This study takes the fitting of assistive ambulation devices a step further by informing the elderly and their families, particularly those in assisted living facilities. The investigator gathered information from two different assisted living facilities in Bowling Green, Kentucky.

CHAPTER 2

AN AGING WORLD

The “baby boomers” were born between 1946 to 1964. In the United States more than 76 million people were born during this time. Today, the majority of these people are at least 65 years of age. By 2025 the youngest of the baby boomers will reach 65 years old (U.S. Census Bureau, 2011). Due to many factors, such as advancement in medications and treatments, the average person is living longer. According to the World Health Organization (WHO) the life expectancy has increased globally by about six years (Life Expectancy, 2014). The life expectancy is higher in areas with a higher average income. With the life expectancy increase, one would expect an increase in the population of the aging community (Life Expectancy, 2014).

The process of aging brings about many changes. As our bodies age, there are a wide range of changes mentally and physically. These physical changes include the size and density of bones as well as many other conditions that disrupt balance and movement. Balance is the primary reason for obtaining an assistive ambulation device.

Ginter et al. (1988) performed a study on a number of adults over the age of 70 who encountered a fall. The results illustrated that in a one-year observation period, 32 percent of the participants fell at least one time. Of those incidents, 24 percent encountered a serious injury (Ginter, 1988). This amount of injuries in a one-year time span should not be ignored. Results like this supply evidence that falls occur frequently in older adults, and at times, they are recurring.

In this study, the assistive ambulation devices that were analyzed came from people residing in assisted living facilities. These facilities are for those who need long-term care. People who may need assistance with activities of daily living (ADL's) typically reside here. The amount of assistance needed varies from person to person, but a fair amount of independence is typically maintained. Many residents in these facilities need assistance for mobility, so they have assistive ambulation devices.

A previous study indicates that in assisted living facilities, the majority of the residents navigate with some form of assistive ambulation device. This study revealed that 63 percent of the residents use devices such as canes, walkers, or wheelchairs (Ball, 2004). Assistive Living residents are often depicted as those who can execute most tasks on their own. This may be true, but many of the ADL's are being executed with an assistive ambulation device.

There are many different reasons and causes behind falling. Lack of balance, weakness, and degenerative conditions such as osteoporosis are a few causes of falls. One reason for falling that is completely preventable is the improper fit of canes and walkers. This advice comes in response to a study published in the *Journal of the American Geriatrics Society* (Greenspan, 2009), which found that about 47,312 people were treated in one year due to falls from improper use and fit of walkers and canes.

This information puts an emphasis on the care of older adults. Falls are a major concern to the elderly population, and precautionary measures can be taken to prevent serious injuries and even death. A proper fitting of the assistive ambulation device could prevent future falls and injuries.

CHAPTER 3

CONTRIBUTING FACTORS FOR FALLS IN THE ELDERLY

In this study, a fall is defined as an event that causes a person to be on the ground, floor, or lower level. Though not all falls result in injury, it is important to note that each fall increases the likelihood for another (Shubert, 2014). Addressing the subject of falls may cause uneasiness in the minds of many elderly persons. Very few people enjoy being sick, hurt, or injured. Unfortunately, as we age, recovery from illnesses and injuries can take longer when comparing the same condition at a younger age. In order to prevent a long recovery time, it is important to remove factors that may cause one to get hurt or injured.

Many of the factors that are attributed to falling are acquired as one ages. For each factor one has, the likelihood for falling increases. The reasons for falls include a variety of different causes and factors including (Shubert, 2014).

- Being 80 years old or older
- Leg muscle weakness
- Difficulty with balance or walking
- Vision problems (cataracts, macular degeneration, wearing bifocals)
- Medical conditions that limit your ability to get around, such as a stroke
- Conditions that cause confusion, such as dementia

- Depression
- Taking more than 4 medications at the same time
- Using a cane or other walking device
- Home hazards (throw rugs, pets underfoot)
- Low blood pressure
- A history of previous falls

Assistive ambulation devices are often recommended or obtained to reduce the risk of falling. One of the risk factors included in the list is using a cane or other walking device. This may seem like a negative connotation towards the use of aids. However, if the assistive device is not correctly used, it could in fact cause one to have pain, discomfort, and may even cause fatal accidents. Correct use of an assistive ambulation device is vital to reduce the risk of falling. This includes obtaining the proper device, the correct height or fit, and the knowledge of correct use. An additional risk factor is the maintenance of assistive devices. This includes making sure all locks, brakes, and tips are in proper condition.

At the ends of many walkers and canes is rubber tips designed to grip the floor. These tips are typically concave. Tips may be winterized to improve traction during the winter months (Joyce, 1991). Research has not found the most effective tips for walkers and canes to prevent slips and falls. However, precautionary measures can be taken to regularly check tips. If tips are worn and become uneven it hinders balance in the individual.

Ambulation devices, particularly walkers with brakes, have many pieces that need to be checked regularly. If a rolling walker is difficult to push, there may be something inhibiting the function of the wheels. Brakes on walkers are also able to become worn and dysfunctional. Enforcing the brakes on some walkers can be practically impossible for many older adults. This may be why many rolling walkers seem to “slip away” from users.

A previous study explored unintentional falls in the United States and said, “Falls associated with walking aids are probably an under recognized public health problem” (Greenspan, 2009). This seems true, especially in studies like this one where over 50% of the participants did not have a properly fitted or maintained assistive ambulation devices. The findings of Greenspan’s study included that an estimated 47,312 injuries are treated in the Emergency Department each year due to falls with walker and canes. Though the extent to which walkers and canes contributed to these injuries are unknown (Greenspan, 2009).

However, one study (Gross, 2004) found that there were 69,000 fall related injuries associated with crutches, canes or walkers. These falls were associated with assistive ambulation devices, however it is unknown as to the exact reasoning behind each of these falls. More research is needed to find the exact cause of falling with assistive ambulation devices. It may also be beneficial to research the design flaws in assistive ambulation devices.

Many have experienced a fall, and may cringe at the thought. Preventive measures can be taken to lower the risk of falling. One of these preventive measures is obtaining knowledge about assistive ambulation devices.

CHAPTER 4

THE PROPER FIT OF ASSISTIVE AMBULATION DEVICES

There are many different types of assistive ambulation devices. These assistive devices are carefully assessed and chosen by professionals to best fit the needs of the patient. Balance issues and weakness in the lower extremities are two common reasons a person may use an assistive ambulation device. This chapter will explain the different aspects of the assistive ambulation devices used in this study.

In order to have a proper fit, it is important to first obtain the proper walking aid. The devices used in this study include standard walkers, 2-wheeled standard walkers, 4-wheeled standard walkers, hemi-walkers, and canes. Each of these has a specific purpose and can inhibit walking if not chosen correctly. Physical Therapists and Physicians are highly trained to prescribe the correct device for patients.

One factor that inhibits proper gait with an aid is the improper height. Assistive devices that are too short force the patient to lean forward during the walking cycle. The effectiveness of the triceps is reserved if an aid is too high (Dean, 1993). This causes

unwanted tension in the triceps. Correct fit of assistive ambulation devices will improve gait patterns.

A previous study (Dean, 1993) recommended cane length to be ± 2 cm from the wrist crease. With 144 participants, the average cane was 3.9cm above the wrist crease. The range of measurements varied from -1cm to +15cm. The negative (-) sign indicates below the wrist while a positive sign (+) indicates above the wrist crease. This study demonstrated that assistive ambulation devices are found both too high and too low. However, the most common finding is assistive devices are too high. Centimeters may seem irrelevant; however it shows that there are many cases of a misfit assistive ambulation device.

Those who have any type of assistive ambulation device receive them from different places. Some may have a prescription from a physician, and then go pick it up at a local store. Others may receive a walker or cane from a friend. In many cases, people are unaware of the different devices available to them. Each aid has a specific purpose that coincides with a functional impairment. There are many different types of aids available today making it difficult to find the perfect match. Many healthcare workers, such as Physical Therapists and Physicians, will be able to find the best solution for the needs of a person.

Figure 1 is an adjustable standard cane. There are many variations of canes such as those with four tips at the bottom. Most standard canes are adjustable, but not all of them. It is very important to find one that can fit to you. Canes are for those with minor to moderate mobility problems. Canes can only withhold about 25% of your weight. A previous study (Dean, 1993) recorded explanations for their cane use. Popular responses included:

- Joint problems
- Balance difficulties
- Neurological problems
- A combination of joint and neurological problems



Figure 1 Standard Cane

The most commonly used ambulation device is the cane (ECRI, 2011). However, your investigator collected data in which the four-wheeled rolling walker was more commonly used. These walkers are used for those who are too weak to lift and move a standard walker. Though the wheels are beneficial in movement in the forward direction, they can

be difficult to stop. There are many situations in which the walker seems to be going much faster than the user. It is important for the users to have the ability to control the walkers. Many of these walkers have brakes on each handle, however many of these are difficult to press if braking was desired. Further research is needed about brakes on rolling walkers to determine if brakes are truly beneficial or not. Many of these walkers also include a seat. This is beneficial for the users who lack endurance and need to rest. In addition, the walkers are not able to assist when climbing stairs. Foldable standard walkers without wheels may be used on stairs.



Figure 2 four-wheeled rolling walker



Figure 3 Four wheeled rolling walker side view

A two-wheeled rolling walker is more stable than four-wheeled walkers. Typically rubber tips or even sliders are placed on the other two legs of the walker. The following picture, Figure 4, displays tennis balls, which are commonly used on walkers. The tennis balls, sliders, or tips need to be evaluated occasionally for wear and tears that could result in an uneven distribution between the wheels and the sliders. Minimal arm strength is required to use a two-wheeled rolling walker.



Figure 4 two-wheeled rolling walker

A standard walker does not have any wheels and typically requires a moderate amount of strength for use. Identical to a two-wheeled walker, a standard walker needs to have regular evaluation of tips, sliders, or tennis balls.



Figure 5 Standard Walker

A hemi-walker was also assessed in collecting data. Hemi-walkers, pictured in figure 6, are typically used for those who need a lot of support on one side of the body. Those who

have endured a stroke typically have a loss in function on the left side of the body. Hemi-walkers have a wide base of support so it allows more stability for those who need an assistive device for weight bearing purposes. (Your Hemi-Walker, 2013)



Figure 6 Hemi-Walker

When fitting any assistive ambulation device, Physical Therapists typically use the standards set by the American Physical Therapy Association (APTA). The following guidelines are posted on APTA.com in an article titled *Physical Therapists Can Properly Assess & Fit Walking Aids to Prevent Injuries (2009)*:

- The walker or cane should be about the height of your wrists when your arms are at your sides.
- When using a walker, your arms should be slightly bent when holding on, but you shouldn't have to bend forward at the waist to reach it.

After the correct device is determined, Physical Therapists assess correct fit of an assisted aid by lining the greater trochanter, or wrist crease, with the topmost part of the walker, cane or other assistive device. Figure 7 displays the wrist crease and alignment with the upmost part of the assistive ambulation device. This measurement is determined while the patient or participant is standing in the upright position.



Figure 7 Wrist Crease

Below in Figure 8, one can see the slight bend in the elbow. The elbow bend should be at angle of 15° to 30° (ECRI, 2011). Figure 8 shows hands placed on the walker without any bend at the waist.



Figure 8 Bent Elbow

Typically when the proper fit is achieved, the patient will be informed of proper use. Correct use is determined based on several factors such as the injury itself. Physical Therapists and Physicians are knowledgeable when it comes to deciding which assistive ambulation device is most suitable for a specific medical condition or injury. Though it may seem like common sense on how to use a walker, there are many tips that are necessary in preventing additional falls and injuries due to improper use.

CHAPTER 5

BENEFITS TO ASSISTIVE AMBULATION DEVICES

Having any form of assistive ambulation device can be a positive experience, because one is able to be more independent. Assistive ambulation devices are able to compensate for many problems including balance and injury. Assistive devices may also alleviate pain by reducing the weight bearing on lower limbs. Other users may be improving goals such as weakness and ambulatory motion.

If one is struggling with balance issues, it is important for Physicians to appropriately suggest an assistive aid that can provide stability and support. To increase stability and support it is important to find the force line from the body's center of mass and line it with the base support (Joyce, 1991). There are a variety of assistive devices, such as a walker, that can expand base support. Other problems like weakness in the hip could be compensated by using a cane in the opposite side where the pain or weakness is. For instance, a weak hip abductor on the left side could be adjusted by placing a cane in the person's right hand. Of course, the person would need to be demonstrated correct use of the cane as well as obtaining a proper fit.

A previous study on various assisted living facilities and found that 63% of the residents used assistive devices. They included a testimony of one of the participants saying, “I like it more for protection. If I’m wobbly, I feel more secure if I have something to push along” (Ball, 2004). This testimony demonstrates some of the motives to obtaining an assistive ambulation device.

A study by Greenspan (2009) describes assistive ambulation devices saying, “Walking aids such as canes and walkers are frequently prescribed for high-risk older adults with limited mobility to help prevent falls” (Greenspan, 2009). High-risk older adults are susceptible to falls, and assistive ambulation devices can assist with that if they are used correctly.

CHAPTER 6

METHODOLOGY

There were many factors to consider when measuring the proper fit for a cane or walker. It is important first to consider the person's safety upon standing and sitting. The use of walkers and canes are typically due to weakness of the body or inability to balance properly. Those who have encountered a fall may be hesitant when asked to stand from a seated position. Several precautions were taken throughout the research project, safety being the top concern at all times.

This study, which was approved by the Institutional Review Board (IRB) of the investigator's institute, was conducted in two different assistive living facilities (IRB approval 534039-2). These facilities are located in Bowling Green, Kentucky. All residents of Chandler Park Assisted Living and Bowling Green Retirement Assisted Living who use an assistive device for independent ambulation were invited to participate. Those who had desire to participate were explained the process as well as the importance of having a fitted walker or cane. The entire process was voluntary, and the participants were aware they could choose not to participate or withdraw at any point.

After signed consent was given, the process began. There were not any standardized instruments used in this process. As they remained seated, questions were asked about their device. These questions were relevant because they eliminated outlying factors such as wearing different shoes than they normally do, which could cause their height to be higher or lower. Other factors such as where they received or purchased the device may explain reasoning to why the device was not fitted. The questions asked of the participant were as follows:

Who gave you the walker/cane?

How long have you had it?

Are these your normal walking shoes?

Do you think your device fits?

Next, assistive ambulation devices were examined for faulty brakes, tips or other broken pieces that could cause considerable harm or injury. To comfort the participant, a wall or side rail was offered for balance while the proper fitting was assessed. The fitting process followed standard procedures used by physical therapists (APTA, 2009).

The investigator stressed the importance of standing as straight as possible. This is valuable to maximize the height of the participant. There were participants that were unable to stand up straight, but it was considered valid because it was their maximum height each day. The participant was asked to place one hand by their side and face forward. Demonstrations were provided to those who did not fully comprehend the

instructions. The cane or walker was then placed at their side and measured from their wrist to the topmost part of the assisted ambulatory device.

After each participant's assistive aid was assessed, they were handed a piece of paper that revealed their specific results. This is beneficial for those who may not remember the results of their device. If their walker was not fitted to them, the paper advised that they see a Physical Therapist or Physician to be properly fitted. If there were not any suggestions for their assistive ambulation device, their paper revealed they have a correct fit and condition.

CHAPTER 7

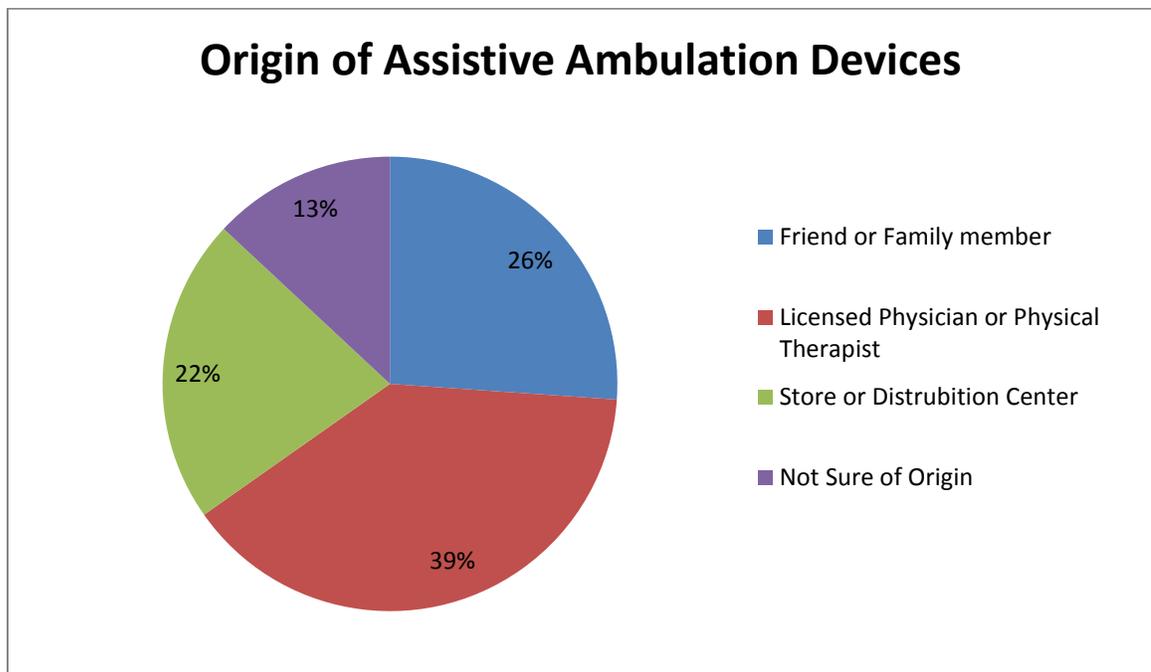
RESULTS

The data collection process was quick and enabled residents to learn about the importance of having a properly maintained device. Individually, participants were informed if they had a fitted walker or cane. If the investigator found an improper fit or any type of problem with an assistive device, the owner of that device was strongly encouraged to see their physical therapist or physician.

Data collection revealed that 6 participants said they received their assistive device from a Physician. Of these 6 participants, none were properly fitted. This may suggest that many Physicians prescribe the assistive device to be picked up at a distribution company for walkers, canes and other devices. Additional research would be needed to determine if the majority of Physicians prescribe assistive ambulation devices without ever fitting them. The origin of the assistive devices substantially impacts the importance placed on the assistive device. Table 1.1 displays the results when the participants were asked, “Who gave you the assistive ambulation device?” These results revealed from whom they received their walker or cane. Of the twenty-three participants, 61% (16) received the device from a place other than a licensed Physician or Physical Therapist. Some participants answered the question by giving a more descriptive response.

One participant revealed to the investigator how exactly the walker was received. According to the participant, upon arrival to the assisted living facility, another resident fell while using their walker and the user's injuries were fatal. Though the participant in the study revealed that they received a free walker, the alarming story should have been questionable to the use of a rolling walker. This person's walker was adjusted too high for safe use.

Figure 9



The participants were also asked if they thought their assistive device fit. Information in Table 1.2 reveals the type of device and the number of participants with the correct height. It is noteworthy that each participant who did not have a proper fit (13) answered “yes” to the question: “Do you think your assistive ambulation device fits?” These crucial results could raise several questions. Those who have never had a properly fitted device

may have no idea what an assistive aid should look and feel like. As mentioned previously, assistive devices that are considerably too high or too low can create problems such as back pain due to irregular ambulation movement.

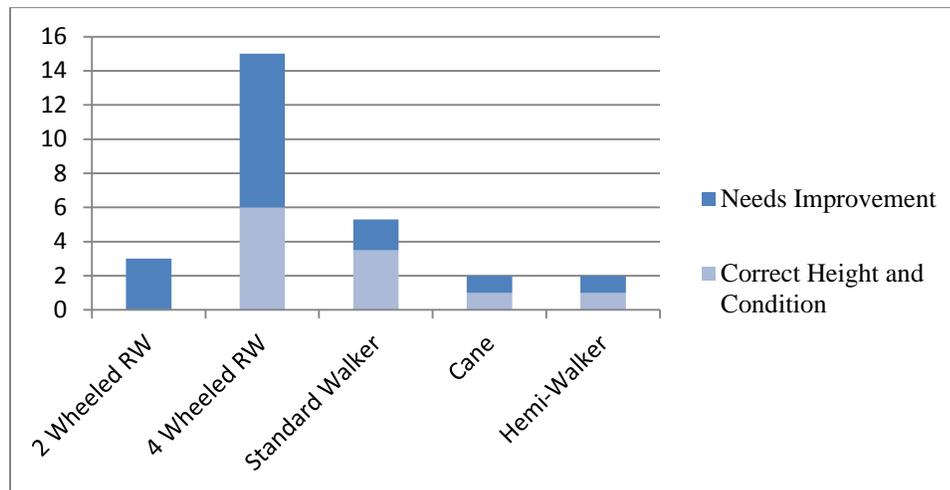
Table 1

Number of Participants Who Thought Their Device Fit vs. Correct Height

Type of Device (Below)	Number of Participants	Number of Participants Who Thought Their Device Fit	Number of Participants with Correct Height
Four-Wheeled Walker	15	12	6
Two-Wheeled Walker	3	3	1
Walker with Sliders	2	2	1
Cane	2	2	2
Hemi Walker	1	1	0
Total	23	20	10

Figure 10

Type of Device and Correct Height and Condition



A comparison between the proper fit and condition is separated into different types of assistive devices in Table 1.3.

The age of the device may also reveal results that could lead to future studies. Those who have an assistive aid for an extended period of time may have lost the proper fit. For instance, a person who was once correctly fitted may have decreased in height. Table 1.4 reveals the age of the device and the results of the participant's assistive ambulation devices.

Table 2
Age of Device vs. Correct Height and Condition

Age of Device (in years)	Correct Height and Condition	Needs Improvement
0-1	3	4
<1-3	2	4
<3-5	3	5
<5+	2	0
Total	10	13

The majority of the participants were wearing their typical walking shoes. This eliminates any added height to the participants upon measuring the correct fit.

The results revealed that 13 participants did not have assistive devices up to standards. Of the twenty-three participants 52% (13) did not have an assistive ambulation device that met the correct height for the participant based on the wrist crease (APTA, 2009).

CHAPTER 8

DISCUSSION

This study came about due to the observation that many assistive ambulation devices are not fitted appropriately. These observations were not solely collected at assisted living facilities. Hospitals, outpatient clinical settings, and even non-clinical locations such as grocery stores have people with walkers and canes that are not suitable for use. Many may believe that the use of assistive devices is common sense thereby eliminating the need for a physician or physical therapist. This approach could lead to injuries that may be acute, chronic and even fatal. Seeing a physician or physical therapist prior to obtaining an assistive aid will attribute to an ambulation device that is more beneficial for the user.

The height of an assistive ambulation device is important to promote a normal gait. In finding the proper height, Physical Therapists typically use the wrist crease when arms are straight to one's sides for adjusting an ambulation aid.

Assessing the condition of assistive devices takes an adept person, but it is not information one cannot obtain. Many assistive devices have rubber tips, tennis balls, or

sliders at the bottoms of their aids. These should be checked for unevenness to eliminate a risk factor for falling.

There are several different studies regarding the fitting of canes and walkers (Dean & Ross, 1993) (ECRI, 2011) (Joyce & Kirby, 1991). However, there are very few studies concentrating on long-term care facilities. Assisted Living Facilities particularly have many benefits for residents, especially the emphasis on independence. In order to be independent, it is important to be mobile. There are many benefits to assistive devices, but only if they are used correctly.

In the process of analyzing the data, several questions arose that could lead to further research. It is necessary to find the exact cause of falls that may be associated with the fitting and/or condition of assistive ambulation devices. Conclusions may pinpoint if it is a design flaw or simply the lack of knowledge of how to use and fit the assistive aids. One design flaw that was observed during the collection of data was the brakes on four-wheeled rolling walkers. Many of the brakes were difficult to grasp or press to administer the brake. Additionally, research is needed to discover the most effective tips for assistive ambulation devices. This would be beneficial to prevent slips and falls.

The importance of having a properly fitted and maintained assistive device is vital information that should be known by more than just the user. All long-term care staff and

those involved with distributing the walkers and canes should be involved with the process. To prevent future problems in assisted living facilities, a regulation should be established to improve the number of people with a correct fit. This regulation could be as simple as training employees so they will be able to recognize when an assistive aid is not in the correct condition. Maintenance of devices should also be encouraged by long-term care facilities. In conclusion, raising awareness about the importance of fitted assistive ambulation devices would not only benefit the residents, but their caretakers and loved ones as well.

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