

Ergonomic Considerations in the Private Apartments of Assisted Living Facilities

Ed Manning

Prepared under the guidance of Jim Clauson
Instructor in Human Factors Engineering
QAS 515.41, Summer, 2006
California State University, Dominguez Hills

Statement of the Problem

Though healthy lifestyles prolong our aging, the human body becomes more frail and prone to disease and infirmities. This study presents a small portion of the solutions available on the commercial market to assist the senior citizen with day-to-day aids for an improved quality of life.

Background

With the life expectancy of the senior population (65+) becoming longer with improved medical care and a generally healthier lifestyle, it becomes imperative that more types of aids for the senior citizen be developed, tested, and made available through national channels including the US and state governments.

The older population, generally defined as those who are 65 years or older, numbered 36.3 million in 2004. This number represented about 12.4% of the U.S. population, equating to about one in every eight Americans. By 2030, it is predicted there will be about 71.5 million older persons or about 20% of the population. (7)

While a relatively small number (1.56 million) of the 65+ population lived in nursing homes in 2000, the percentage of the 1.56 million was higher with age:

- 1.1% for persons 65-74 years
- 4.7% for persons 75-84 years
- 18.2% for persons 85+

Additionally, 5% of the elderly lived in various other types of senior housing, many of which had supportive services available to their residents. (7)

In 1997, more than half of the older population reported having at least one disability, both physical and nonphysical, of some type. Some of these disabilities were relatively minor; however, others caused people to require assistance to meet important personal needs. These numbers increased sharply with age. (7)

Disability takes a much heavier toll on the very old. Almost three-fourths of those aged 80+ reported at least one disability, and over half of those reporting had more than one severe disability. A third of those disabled reported needing assistance. (7)

In another study which focused on the ability to perform specific activities of daily living (ADLs), about 28% of senior housing residents over age 65 in 1999 had difficulty in performing one or more ADLs. In addition, 76% of the population had difficulty with three or more ADLs. These ADLs include:

- bathing
- dressing
- eating
- getting around the house
- preparing meals
- shopping
- managing money
- using the telephone
- doing housework
- taking medication

Limitations on activities because of chronic conditions increased with age. The rate of limitations on activities among persons 85 and older were much higher than those for persons 65-74. (7)

Public opinion surveys of older adults indicate that the vast majority desire to remain in their own home as long as possible. For some, the decision to leave is based on lifestyle changes such as moving to a location with a different climate or to an active retirement community. For others, the decision to move is based on new limitations in mobility created by a physical or health-related condition. In many cases, independent living can be sustained in one's current residence through design modifications and the addition of home safety appliances and appurtenances. (7)

The need for Elderly Care

There are approximately 17,000 nursing homes in the United States caring for over 1.6 million older adults. Until the mid 1980's, nursing homes were one of the few housing options adults with disabilities had to help them manage activities of daily living. As a consequence of new housing options such as assisted living and community and in-home long term care services, the demographic profile of nursing home residents has significantly changed to a population which is older, more disabled and in greater need of medical attention. (7)

Long -term care (LTC) refers to the medical, social, personal care, and supportive services needed by people who have lost capacity for self-care because of a chronic illness or condition. It is distinct from acute health care in its duration and resistance to recovery of function through continuation of therapeutic measures. LTC includes health care and supportive services for tasks of every day living including housekeeping, chore services and transportation. A beneficiary of LTC may live in a nursing home or in a less restrictive environment including assisted living facilities and single family residences. Family caregivers can be supported with professional care such as adult day services and caregiver respite programs offering temporary relief of responsibility for care giving. (7)

The majority of people with long-term care needs are women. Among community residents with long-term care needs, 60 percent of those age 18 to 64, and 69 percent of those age 65 and older, are women. Among nursing home residents of all ages, 72 percent are women. (8)

There is considerable variation in the extent of long-term care need among community residents. Some people need assistance for a few hours each week while others need fulltime support. Many people have substantial need; 21 percent of community adults with long-term care needs, or 1.8 million people, require assistance in three or more ADLs. (8)

More than three-quarters of community-dwelling adults with long-term care needs rely exclusively on unpaid assistance from family members, friends, or volunteers. The

Ergonomic Considerations in the Private Apartments of Assisted Living Facilities

other 22 percent receive varying amounts of paid assistance, usually in combination with unpaid assistance, including services provided by home health or home care agencies, self-employed individuals, and adult day care providers. Only 8 percent of adults receiving long-term care at home depend solely on paid care. Even among community residents with substantial long-term care needs, those who need assistance with three or more ADLs, two-thirds rely exclusively on unpaid help.(8)

In the United States, one of every three persons aged 65 years and older falls each year. Among older adults, falls are the leading cause of injuries, hospital admissions for trauma, and deaths due to injury. In 1999, about 10,097 seniors died of fall-related injuries. Fractures are the most serious health consequence of falls. Approximately 250,000 hip fractures, the most serious fracture, occur each year among people over age 65. Many of these falls and resulting injuries can be prevented. Strategies to prevent falls among older adults include exercises to improve strength, balance, and flexibility; reviews of medications that may affect balance; and home modifications that reduce fall hazards such as installing grab bars, improving lighting, and removing items that may cause tripping. This kind of non-fatal injury was the top injury reported in a 2004 survey of all races and both sexes. (9)

Other kinds of non-fatal injuries occur with increasing frequency and severity among those who are 65+. Some of these include: (9)

| Injury | Percent of injuries for those 65+ compared to all age groups |
|--|--|
| Striking something or being struck | 5% |
| Overexertion | 6% |
| Riding as an occupant of a motor-vehicle | 6% |
| Being cut or pierced | 5% |
| Insect bites or stings | 7% |
| Unintentional poisoning | 8% |
| Injury on public transport | 7% |

Alternatives for Elderly Support

There are numerous alternatives for senior care:

- **In-Home Services** encompass a wide range of supporting services offered to individuals who are homebound due to illness, functional limitations in activities of daily living, or disability. Their availability often is credited for allowing people to remain in the community.
-

Ergonomic Considerations in the Private Apartments of Assisted Living Facilities

Home Health Care is recognized as an increasingly important alternative to hospitalization or care in a nursing home for patients who do not need 24-hour day professional supervision. Many people find it possible to remain at home for the entire duration of their illness or at least to shorten their hospital stay. In many cases readmission to the hospital can be prevented or delayed. A variety of health services are provided in a home health care program in the patient's home, under the direction of a physician.

- **Homemaker Service** is extended to individuals who are unable to perform day-to-day household duties and have no one available to assist them. Services include light housekeeping, laundry, limited personal care, grocery shopping, meal preparation, and shopping assistance.
- **Adult Day Care Programs** offer a lower cost alternative to institutionalization for newly or chronically disabled adults who cannot stay alone during the day, but who do not need 24-hour inpatient care. Designed to promote maximum independence, participants usually attend on a scheduled basis. Services may include nursing, counseling, social services, restorative services, medical and health care monitoring, exercise sessions, field trips, recreational activities, physical, occupational and speech therapy, medication administration, well-balanced meals, and transportation to and from the facility. Adult day care can provide the respite family members require to sustain healthy relationships while caring for their elderly loved one at home.
- **Respite Care.** The provision of short-term relief (respite) to families caring for their frail elders offers tremendous potential for maintaining dependent persons in the least restrictive environment. Respite services encompass traditional home-based care, as well as adult day health, skilled nursing, home health aide and short term institutional care. Respite can vary in time from part of a day to several weeks. (7)

In the above alternatives, the issue still remains that there is a need to introduce ergonomic solutions to aid in the continued functionality of the elderly citizen. For the senior citizen with multiple frailties' or disabilities, expensive upgrades to the home may need to happen in order to accommodate the elder. This may intensify the need for that person to move into a nursing facility, a senior community, or an assisted living environment. The decision may be one of social needs or monetary limitations.

A suggested solution for Elderly Care

Assisted Living refers to a special combination of housing, personalized supportive services and health care designed to meet the needs, both scheduled and unscheduled, of those who need help with activities of daily living. Services provided in Assisted

Ergonomic Considerations in the Private Apartments of Assisted Living Facilities

Living residences usually include:

- Three meals a day served in a common dining area
- Housekeeping services
- Transportation
- Assistance with eating, bathing, dressing, toileting and walking
- Access to health and medical services
- 24-hour security and staff availability
- Emergency call systems for each resident's unit
- Health promotion and exercise programs
- Medication management
- Personal laundry services
- Social and recreational activities

This solution is an excellent choice for people who choose not to live on their own, but do not necessarily require 24-hour care. Assisted living facilities offer a homelike atmosphere with trained professionals who are available to help residents with their daily routines. An activity coordinator arranges both on and off premise activities for residents. Other descriptions for this type of facility include Residential Care, Personal Care, and Adult Congregate. (1)

The federal government does not establish standards for assisted living as it does for nursing homes who participate in the federal Medicare program. Most states license and regulate assisted living residences, and an increasing number of states place adults in assisted living residences as an alternative to traditional placement in a nursing home. This trend leads speculation that the federal government will become increasingly involved in setting minimum standards of care in residences electing to participate in the federal-state Medicaid program. National associations representing selective areas the industry have increased self-regulation efforts, motivated in part to delay federal oversight and regulation. The number of older adults living in assisted living is estimated to be between 600,000 to 1 million with as many as 50,000 receiving Medicaid support, compared with 1.6 million older adults in nursing home beds including 1 million with Medicaid assistance. (7)

Ergonomic products and solutions that may need to be considered

Physical, cognitive and other forms of disabilities afflict individuals of all ages, and in their severest forms make it difficult for persons to perform even the most ordinary functions of daily living. While there are developmental differences across the age span, assistive aids originally designed for one age group frequently have applications for others. (7)

The private apartments will need to be fitted with unique devices and solutions to facilitate the elder citizen in ADLs. The following is a discussion of just a few solutions that are available.

Doors

Turning Handle



This device reportedly provides extra leverage to facilitate turning knobs, keys and faucets. It is targeted to persons with limited hand motion. The hexagon-shaped plastic prongs retract individually, fitting over the knob being turned to create an improved grip. (4) http://www.activeforever.com/product_Turning-Handle_706_T17,0007.htm

Great Grips Doorknob and Faucet Grips



The simple act of opening a door is taken for granted by most, but for senior, arthritis suffers and many disabled individuals, turning a round doorknob can be a difficult and painful experience. Many times, small children will also struggle to turn a slick, round doorknob. This solution is available in a clear color and a red and blue for faucets. (4) http://www.activeforever.com/product_Great-Grips-Doorknob--Grips_726_T17,0007,0067.htm

Leveron Door Knob Levers

This solution is targeted at people with arthritis or weak hands. It converts a variety of door knob shapes to lever door knobs. The person will now push the handle down to open doors. (4) http://www.activeforever.com/product_Leveron-Door-Knob-Levers-Glow_708_T17,0007,0067.htm

Enablers Key Enlarger

This solution increases leverage for turning keys, and it is targeted to those with arthritis pain. It is reported that this solution helps to unlock doors with little to no pain by its added leverage and ease of installation while minimizing stress on the hands. It snaps over any standard key. It is claimed that it was designed in consultation with occupational therapists to ensure ergonomic comfort and support and ease of use. (4) http://www.activeforever.com/product_Enablers-Key-Enlarger_1028_T17,0007,0067.htm

Blue Solid Handle Key Turner

This product includes a large handle provides leverage for turning keys, and it is targeted to those with arthritis pain or a weak grip. It is a solution for unlocking doors and turning knobs with reduced pain. The handle of this solution provides extra leverage for easy turning. (4)

http://www.activeforever.com/product_Blue-Solid-Handle-Key-Turner_709_T17,0007,0067.htm

Lighting

Lights in the bathrooms of hotels, senior living centers, and nursing homes are frequently left on for extended periods. The reasons for this can be attributed to forgetfulness or as a deliberate act so the lighting serves as night-lights. The night-light function is especially critical in senior housing where tripping and falling can cause serious problems. (6)

As an environmental and monetary consideration, leaving lights on for a long time wastes energy, especially when inefficient incandescent light sources are used. Occupancy-sensor controls can be employed, but there has been reluctant to employ occupancy sensors in various areas because of concerns about lights turning off when rooms are occupied. This occurrence is referred to as “false-off”, and happens when the room is occupied, but the person does not move for an extended period of time. (6)

In a particular case, California’s Title 24 energy code requires that bathroom lighting use efficient sources or use motion controls with “off ” capability, which turns lights off after the room unoccupied and the delayed off time expires. (6)

Living RoomGelCo GSeat Ergonomic Gel Seat Cushion

The GSeat uses visco-elastic gel and a functional design to disperse pressure and improve the level of comfort while seated. Some of the features that are reported are:

- Center relieved groove eliminates soft tissue pressure and suspends the tailbone (coccyx) which eliminates direct pressure on the spine
- Forward slope enables proper lumbar curvature while seated
- For sufferers of low back pain, arthritic or degenerative hips, stiffness, leg numbness, poor leg circulation, sciatica, and varicose veins. (2) (3)

<http://www.seniorshops.com/gseat.html>

Flexing Foot Rest

With the increasing health risk of blood clots in the legs due to prolonged sitting during long flights, this exercise therapy device is reported to provide outstanding blood circulation and muscle stimulation while sitting. The lightweight and compact foot rest is small enough to fit in a carry-on bag, and it is claimed that it provides soothing comfort for the feet and legs during flights or while sitting for extended periods of time.

Ergonomic Considerations in the Private Apartments of Assisted Living Facilities

The flexing foot supports is said to absorb body weight that would normally be placed on the floor, and it provides a dynamic movement in feet and legs. This motion stimulates the feet and legs, relaxes the muscles, and it helps to maintain good blood circulation. Additionally, this solution reportedly can help reduce stiff joints and back pain, enabling the body to rest and relax during long periods of sitting.

This device is a defense against deep-vein thrombosis (DVT). When sitting for long periods of time at a desk or on a long flight, this foot exerciser helps stimulate leg muscles and improve blood circulation. (4)

http://www.activeforever.com/product_Flexing-Footrest_1245_T18,0036.htm

Drive Hip-High Chair

A person who has had recent hip surgery may need to sit at an elevated height. This solution is a hip chair with a padded seat, back and armrest. It is designed to help keep the hip immobile, and enables the user to get up without bending your hip. It also features a foot rest with three adjustable heights to provide maximum comfort and an ideal ergonomic fit.

This hip-high solution features:

- square armrests make sitting down or pushing up to get out from the chair safe and easy
- a vinyl seat and backrest that is soft, comfortable and water resistant
- a footrest that has three levels for adjustment to provide maximum comfort and an ideal ergonomic fit (4)

<http://www.activeforever.com/Products.asp?Action=View&ID=1616>

BathroomSliding Swivel Seat Transfer Bench

With a swivel seat, the sliding transfer bench enables users to turn 90 degrees before getting in and out of the bath tub. It is designed to make patient transfers easy and safe. It has a double safety lock for inside and outside positions, and the legs adjust to a variety of heights. (4)

http://www.activeforever.com/product_Sliding-Swivel-Seat-Transfer-Bench_980_T17,0001.htm

Safety Bath Walk-In Bathtub

This solution is designed to allow ease of access for those unable to bathe in a regular tub, including those with physical challenges, limited mobility or the elderly. It has a no slip surface on the floor and seat and comes with a built-in hand held shower. All controls on this tub are within easy reach. The seat and back are molded for maximum comfort and the sides of the bath provide comfortable arm support. (4)

http://www.activeforever.com/product_Safety-Bath-Walk-In-Bathtub_1042_T17,0001.htm

Drive Bath Mat

This solution is an extra long slip-resistant bathtub mat that provides a safe means to stand in the shower or bathtub, and it provides safety while getting in and out of the shower or bathtub. It claims to have a strong gripping power, a slip-resistant surface, and a contoured design to completely cover the bottom of the tub or shower. It is designed for almost any bathtub. It is considered to be a safe solution for fall prevention in the shower, especially for those facilities that do not have grab bars.

It is further reported that the multiple suction cups adhere to the bathtub floor and provide an extremely strong grip to prevent it from sliding. (4)

<http://www.activeforever.com/Products.asp?Action=View&ID=1137>

Soapy Soles Elite 3 in 1 Foot Washer



This is a solution for people who need assistance with cleaning their feet safely and thoroughly. The product claims to be particularly effective with conditions such as diabetes, arthritis, foot fungus, or any other condition requiring special foot care. The product massages and cleanses your feet with the scrubbing fingers, foot massager and foot stimulator. The blue foot pad attaches to the tub or shower floor with suction cups. It requires no bending or stretching for use. (4)

http://www.activeforever.com/product_Soapy-Soles-Elite-3-in-1-Foot-Washer_1233_T17,0001,0045.htm

The Grip-All



This solution transforms a small handle into a large one instantly. It is designed for individuals who have reduced use of fingers. Applications include use for gripping utensils, tools and items such as toothbrushes into the gripping coil. The plastic tube is made in two pieces and connected by a toothed rim on each half which controls the gripping action as one half is turned and the other held. Two independently adjustable hand clasps enclose the hand so that grasping the tube is not necessary. (5)

<http://store.grovergear.com/gripall.html>

BedroomSmart-Rail Bed Rail

This solution is a bed assist rail designed for users requiring a little help for moving, standing and transferring in and out of bed. This product can unlock and pivot outwards to provide better standing support with less reaching and twisting. (4)

http://www.activeforever.com/product_Smart-Rail-System-Bed-Rail_599_T17,0002.htm

Hermell Elevating Leg Rest Pillow

The leg rest pillow claims to improve circulation. It is wedge pillow that relieves the discomfort from swollen legs and ankles, varicose veins, or phlebitis. (4)

http://www.activeforever.com/product_Hermell-Elevating-Leg-Rest-Pillow_1503_T17,0002.htm

Drive Med Aire Alternating Pressure Mattress System

If an individual has lost a great deal of mobility and is now bed ridden, the risk of bed sores is increased. This solution reportedly provides powerful air support that will help reduce the growth of pressure ulcers. It claims to be a mattress replacement for hospital bed or home use, and it is designed to aid in the prevention and treatment of Stage I to Stage IV pressure ulcers (bed sores). The product reduces interface pressure by alternately inflating and deflating 20 individual 8-inch air cell bladders every 10 minutes.

Patients with immobility or perceptual problems who remain bedridden for extended periods can develop open sores at points where the weight of the body compresses the skin, often under bony prominences like the hips or shoulders. These sores are called pressure ulcers. The product helps in pressure ulcer treatment and management by shifting pressure to different parts of the body in a repeating cycle, which prevents any body area from being under pressure all the time. (4)

http://www.activeforever.com/product_Drive-Med-Aire-Alternating-Pressure-Mattress-System_1677_T17,0002.htm

Hermell Face Down Ergonomic Pillow

This solution is reportedly designed for users who sleep on their stomach or have trouble sleeping due to breathing problems or have back or neck problems.

Ergonomic Considerations in the Private Apartments of Assisted Living Facilities

This product provides elevation while sleeping face down. The slope design allows for better comfort for anyone that must lay face down for relaxation or medical conditions. The U-shaped opening cradles the face while keeping the spine in the correct position, and it allows for breathing freely and clearly. (4)

http://www.activeforever.com/product_Hermell-Face-Down-Ergonomic-Pillow_1788_T17,0002.htm

Blanket Lift Bar

The product is designed to keep the weight of covers off the feet without sacrificing warmth. One side slips under the mattress and the other side supports the blanket. (5)

<http://store.grovergear.com/blanketliftbar.html>

ClosetsCarex EZ Grabber Reacher

The product literature helps users grasp items from hard to reach places. A 90 degree rotating arm on the twist shaft turns the grasping jaws on the reacher and saving the user from turning and twisting. (4)

http://www.activeforever.com/product_Carex-EZ-Grabber-Reacher_1520_T18,0136,0025.htm

Remote Controls

HyTek Big Button Universal TV Remote



This product features extra large buttons to facilitate reading ease. The lighted buttons light up at the touch of any button. The product was designed as a practical alternative to standard remotes. The remote can be used hand held or placed on a table or arm of a chair. (4)

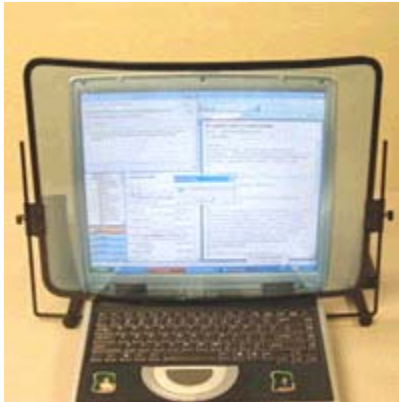
<http://www.activeforever.com/Products.asp?Action=View&ID=1436>

Vision Aids

QuickLook Portable Video Magnifier



This product is designed to help the user read fine print on medicine labels, food packages, contracts etc. It enables the visually impaired individual to magnify anything that he or she is trying to read. This solution is a lightweight, full color, electronic print magnifier with an integrated 4" LCD flat screen display. Its compact size makes it easy to fit in the inside pocket of a jacket or a ladies' purse. It has proven useful for consumers who use even a 12x magnifying glass, particularly because of the ability to display a wide 4" diagonal reading screen, has image enhancement, and various brightness level adjustments. (4) http://www.activeforever.com/product_QuickLook-Portable-Video-Magnifier_1247_T18,0010,0162.htm

TV and Computer Screen Enlarger

This is another solution for those with low vision. The TV and computer screen can double the size of a TV or computer screen. It provides color, brightness and clarity with no washout or "fishbowl" distortion. (4)

http://www.activeforever.com/product_TV-and-Computer-Screen-Enlargers_826_T18,0010.htm

Timex ACCU Curve Talking Thermometer

This solution claims that it makes temperature-taking easy, accurate, and comfortable. The product accurately finds the hotspot under your tongue. The thermometer's curved shape allows it to fit comfortably in your mouth while in use. The curved tip on this product fits precisely under the tongue and displays temperature accurately in 30 seconds. (4)

<http://www.activeforever.com/Products.asp?Action=View&ID=1139>

Voice Announce 9900 Talking Caller ID

This product says the caller's number out loud through its built in speaker. This model pronounces the number of the caller, or, as a feature, the user can also record up to 50 frequent callers names into the unit so the name will be spoken when they call. (4)

<http://www.activeforever.com/Products.asp?Action=View&ID=901>

Ameriphone P-300 Amplified Photo Phone

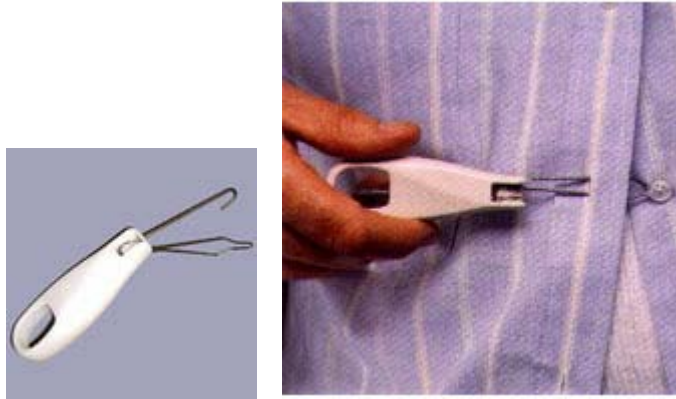
This product is an aid for the user who has hearing problems or has difficulties seeing when dialing the phone. The product claims to provide excellent amplification and claims to be very easy to read with pictures for pre-dial phone numbers. This solution is designed for users have low vision as well as low hearing. The user can touch the picture of the person to be called and the product dials the number.

The product also features an adjustable tone selector that clarifies hard to distinguish sounds like "chair" and "share". The adjustable volume provides up to 10 times standard sound level (20+dB) for people with mild to moderate hearing loss. (4)

<http://www.activeforever.com/Products.asp?Action=View&ID=849>

Dressing Aids

Button Hook and Zipper Puller



The Button Hook and Zipper Puller is a product specifically designed to assist in the daily activities of the elderly and those with arthritic or weakened grip due to conditions such as stroke, Parkinson's, ALS, or Neuropathy. The product claims to be ergonomic, comfortable, and easy to use. For the user with weak or arthritic fingers, there is difficulty with buttoning buttons/. Stress is reduced and frustration minimized by pulling the button or zipper into position. (4)

http://www.activeforever.com/product_Enablers-Zipper---Button-Puller_765_T18,0136,0025.htm

Easy Pull Sock Aid



The product claims to make it easier to pull on socks for people who've had recent surgery, arthritis or other conditions. This sock aid consists of a trough for mounting the sock and long straps with large loop handles for pulling on the sock. The product features a trough that is made of flexible plastic and is covered in soft terry and nylon, which allows the foot to slide easily through the trough.

Ergonomic Considerations in the Private Apartments of Assisted Living Facilities

The product further claims to allow the user to slide socks or stockings on the trough easily, using just one hand. Large loop handles at the end of the 32" straps facilitate the pulling of the sock for weak grasps, such as those found in individuals with arthritis and other hand conditions. Reportedly, this product is ideal for persons who have had hip surgery or suffer from back pain. (4)

http://www.activeforever.com/product_Easy-Pull-Sock-Aid_747_T17,0009.htm

So Near and Yet So Far Kit

When a user is injured, recovering from surgery, or experiencing restricted movement, this product help the patient to comfortably pick up items from the floor, shelves, closet, and more. (4)

http://www.activeforever.com/product_So-Near-&-Yet-So-Far-Kit_950_T17,0009.htm

Predicted results from application of these types of devices

Physical, cognitive and other forms of disabilities afflict individuals of all ages, and in their severest forms make it difficult for persons to perform even the most ordinary functions of daily living. While there are developmental differences across the age span, assistive aids originally designed for one age group frequently have applications for others. (7)

When some of the above suggested remedies for different living situations are implemented, the elder citizen will be able to have a better quality of life. There is ample evidence to suggest as we live longer, we will have one or more disabilities that will make it difficult to go about our daily lives. While these disabilities can't be avoided, they can be minimized through the use of devices that help the disabled person to maneuver more effectively.

Conclusion

The initial problem indicated that healthy lifestyles prolong our aging even as the human body becomes frail with increased exposure to disease and infirmities. This study presented a small portion of the solutions available on the commercial market for the elderly community.

The data presented has outlined the need for and broad availability of devices that aid the senior citizen in day-to-day activities. Given the increasing older population with longer life expectancies, the need is going to intensify.

Disclaimer

The author does not warrant or promote the use of any of these devices and has no financial interest in the sale of any of these devices. These are suggested through scholarly research only.

References

- (1) SeniorOutlook.com: A Guide to Senior Housing
<http://www.senioroutlook.com/proptypes.asp> Most recent access 7-19-06
- (2) Comfort Channel: A Division of ZEarth.com
<http://www.comfortchannel.com/prod.itml/icOid/6468> Most recent access 6-30-06
- (3) Senior Shops <http://www.seniorshops.com/gseat.html> Most recent access 7-12-06
- (4) Active Forever.com <http://www.activeforever.com/> Most recent access 6-30-06
- (5) Grovergear.com <http://store.grovergear.com/index.html>
Most recent access 7-07-06
- (6) Public Interest Energy Research Program
http://www.esource.com/public/pdf/cec/CEC-TB-24_BathroomLights.pdf
Most recent access 6-27-06
- (7) Department of Health and Human Services Administration on Aging
http://www.aoa.gov/prof/notes/notes_assisted_living.asp Most recent access 6-25-06
- (8) Georgetown University Long-Term Care Financing Project
<http://ltc.georgetown.edu/pdfs/whois.pdf> Most recent access 6-28-06
- (9) Center for Disease Control and Prevention Health Information for Older Adults
<http://www.cdc.gov/aging/info.htm> Most recent access 6-27-06