Increasing the IMPACT of assistive technology

Physical impairments
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>PHYSICAL IMPAIRMENTS AND ASSISTIVE TECHNOLOGY SOLUTIONS</td>
<td>5</td>
</tr>
<tr>
<td>1.1</td>
<td>INTRODUCTION</td>
<td>5</td>
</tr>
<tr>
<td>1.2</td>
<td>PHYSICAL IMPAIRMENTS</td>
<td>5</td>
</tr>
<tr>
<td>1.3</td>
<td>SYMPTOMS OF PHYSICAL IMPAIRMENTS</td>
<td>10</td>
</tr>
<tr>
<td>1.4</td>
<td>IMPACTS</td>
<td>14</td>
</tr>
<tr>
<td>1.5</td>
<td>ASSISTIVE TECHNOLOGY (AT) FOR PHYSICAL IMPAIRMENTS</td>
<td>16</td>
</tr>
<tr>
<td>1.6</td>
<td>BEING AN ASSISTIVE TECHNOLOGY INTERMEDIARY (ATI)</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>SPOTTING UNMET NEEDS</td>
<td>31</td>
</tr>
<tr>
<td>2.1</td>
<td>AT HOME</td>
<td>31</td>
</tr>
<tr>
<td>2.2</td>
<td>DURING A MEDICAL CONSULTATION</td>
<td>36</td>
</tr>
<tr>
<td>2.3</td>
<td>IN HOSPITAL</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>REFERENCES</td>
<td>41</td>
</tr>
<tr>
<td>4</td>
<td>GLOSSARY</td>
<td>43</td>
</tr>
<tr>
<td>5</td>
<td>FACTSHEETS</td>
<td>45</td>
</tr>
</tbody>
</table>
INTRODUCTION

This module of the IMPACT courseware focuses on assistive technology (AT) that can support people with physical impairments.

The module begins with an overview of physical impairments, the kinds of AT that can help and how AT can be made available to people who need it.

This is followed by an outline of how health and social service professionals in various settings can identify unmet AT requirements for people with physical impairments.

**General information objectives**
By the end of the module, you will have had an opportunity to understand:
- the extent and consequences of some of the main physical impairments;
- the extensive range of assistive technology currently available in this area;
- how people with physical impairments acquire (or sometimes fail to acquire) the assistive technology they need; and
- the important role health and social service personnel can play in ensuring that needs are adequately met.

**Specific information objectives**
You will have been shown in detail the role health and social service personnel can play as assistive technologies intermediaries (ATIs) in three client settings where physical impairment problems can be spotted, and unidentified needs for relevant AT picked up:

- in the home environment (e.g. a visit from a community nurse or home help);
- in general medical consultation (e.g. visit to a family doctor);
- at the hospital (e.g. as an in-patient or at the point of discharge).

**ASSISTIVE TECHNOLOGY INTERMEDIARIES (ATIs)**

To refresh your memory from the Introductory Module:
An ATI is a health and social service professional who, whilst not being a specialist in assistive technology, nevertheless helps to ensure that his or her clients acquire the AT that they need. Being an ATI means watching out for unmet needs arising from disability or from age-related functional problems, and taking appropriate action when such needs are spotted.

Such action may include helping people to acquire AT themselves, referring them to an occupational therapist or other specialist in AT, or taking a more direct role. All health and social care professionals dealing with disabled or older people should include within their competencies the ability to act as an ATI.

Throughout this module you will follow the case of Elena.

Elena

Elena O'Keefe is a 65-year-old woman who lives alone. She has been struggling with arthritis since she was in her thirties. As her arthritis got worse, she had to take early retirement back in 1982. Since then her condition slightly improved following the replacement of several joints. Despite this, Elena is one of a minority of arthritis patients who needs or uses a wheelchair. Her brother convinced her it might be a good idea to use one, and when Elena saw a powered wheelchair once, she thought 'this could be fun'. Her decision to actually start using a wheelchair has been positively liberating. Now, she is much more independent. She can move around and actually do her shopping in the neighbourhood.
1 PHYSICAL IMPAIRMENTS AND ASSISTIVE TECHNOLOGY SOLUTIONS

1.1 Introduction

Thanks to advances in health and social care and the availability of numerous AT products and services, physical impairments do not restrict the daily life and welfare of the disabled people as much as they did some decades ago. Today, people with disabilities can live more independently with the help of AT devices such as a reacher, a rollator or more complex systems such as environment control units, electronic wheelchairs and joystick manoeuvred cars.

Beside these advanced technical devices, there is a myriad of relatively simple and low-cost equipment to support the daily activities of a person with minor physical impairments. But technology cannot help if the people for whom these devices are intended do not know about them, so it is important that everyone working in health and social care is aware of the AT available - and that they inform their clients about it.

As a carer, either with daily or occasional involvement, you have a vital role to play in assisting the physically impaired person to sustain and improve their quality of life and to maintain their independence. For many people the progress of physical impairment is slow. It is therefore important that you are alert to the signs that indicate that your client is experiencing physical difficulties that can be overcome by AT or by other health and social care services.

1.2 Physical impairments

This section introduces the area of physical impairments that specifically affect the daily lives of older people.

Activities of daily living
Physical impairments can affect all the activities of daily life, which are often divided into two categories: activities of daily living (ADL)
and the instrumental activities of daily living (IADL). ADL covers the basic personal activities of daily living, including personal care (such as eating, washing, using the toilet, grooming, dressing), communication and mobility. IADL encompasses such things as food preparation, housecleaning, shopping and money management.

**Changes in the ageing body**

Factors that impede mobility and physical functioning of older people can be physical, psychological, social or environmental. Numerous age-related changes, such as slowed neurological response and decreased muscle strength, can make everyday mobility a physical challenge for an older person.

The normal body undergoes various age-related changes that affect mobility and physical functioning. From age 50 on, the bone mass diminishes (at a greater rate for women than for men) and there is often a decrease in the number of muscle cells and a sequential loss in muscle strength. The degree of loss varies greatly among muscle groups. Changes due to ageing are significantly less where the muscle group has been used.

The decline of muscle function depends on other systems, such as the neurological and the musculoskeletal systems. Because of age-related changes in the neurological system, reaction time and speed of movement progressively decrease. This adversely affects muscle function, causing balance problems and the risk of falling.

Structural or anatomic changes in the ageing lung result in a decreased potential expansion, which alters the flow of air into and out of the lungs. The normal ageing heart has a diminished capacity to manage high levels of stress, causing general weakness.

Age-related changes in the human body can be summarised in the following way:

- Gradual loss of bone mass;
- Diminished muscle strength;
- Decrease in reaction time;
- Decrease in speed of movement;
- Changes in respiratory system;
- Changes in cardiovascular system.

A person may have one or more physical impairment. Barring serious accidents or illnesses such as a stroke, older people often acquire their impairment over many years - there is no clear trigger moment that creates or enforces the recognition of the impairment.

Physical restrictions are not only caused by a person’s physical impairments. Housing conditions, service provision and social relationships and attitudes can make a substantial difference.
Nicole

In the introductory and vision module, we introduced you to Nicole. An older person like Nicole, living in the city, may find herself disabled because of the changes in her environment. The local shop around the corner closes because of the arrival of a big supermarket out of town, and for people like Nicole, this can be a problem - she doesn't have a car and is unable to use public transport. The flat she has been living in for over forty years is on the second floor and there is no elevator. Nicole is beginning to have difficulties with climbing the stairs and carrying things. If the shops were near and there was an elevator, she could use a shopping bag with wheels to carry a manageable amount of goods.

Diseases that cause physical impairments

This section introduces some of the common diseases that can cause physical impairments especially to older people. These include:

- Rheumatoid arthritis and osteoarthritis;
- Stroke;
- Parkinson’s disease;
- High or low blood pressure.

In the communication module there are descriptions of neurological diseases and impairments such as multiple sclerosis (MS) and cerebral palsy (CP) and others which also cause physical impairments. There are many other diseases which cause physical impairments but actually the diagnose is not as important as the problems they cause so this is just to give you an idea of this area.

Rheumatoid arthritis and osteoarthritis

Rheumatoid arthritis (RA) is a common disease with world-wide distribution involving all races and ethnic groups. The prevalence of definitive and classical RA in Europe appears to be approximately 1 percent, and an overall female/male ratio of about 3:1. (Nordenskiöld, 1996)

The disease is progressive and widely varying in its severity. The main symptoms are morning stiffness, joint pain and tenderness, fatigue and general malaise, together with the signs of hot, swollen joints, muscle and tendon weakness.

Up to 40 percent of people over 70 throughout the world suffer from osteoarthritis of the knee. Osteoarthrosis, as it is also called, is a degenerative joint disease in which there is a progressive loss of articular cartilage accompanied by new bone formation and capsular
fibrosis. The disease often affects several joints symmetrically and the hand is the most commonly affected site.

In older people, osteoarthritis of the large weight-bearing joints, the hip and knee, is often the most disabling condition. The most commonly reported symptoms are pain, general stiffness, deformity and diminished range of movement. Almost 80 percent of patients with osteoarthritis have some degree of movement limitation and 25 percent cannot perform their main daily living activities.

**Research activity: arthritis**

You can find plenty of information on arthritis on the World Wide Web. Try:

- [http://www.arthritis.ca/](http://www.arthritis.ca/)
or
- [http://www.abledata.com/arth_in.htm](http://www.abledata.com/arth_in.htm)

**Stroke**

A stroke, also called a ‘brain attack’, happens when brain cells die because of inadequate blood flow, occurring when a blood vessel bringing oxygen and nutrients to the brain bursts or is clogged by a blood clot or some other particle. Because of this rupture or blockage, part of the brain doesn’t get the flow of blood it needs. Deprived of oxygen, nerve cells in the affected area of the brain can’t function, and die within minutes. When nerve cells can’t function, the part of the body controlled by these cells can’t function either.

Symptoms of a stroke are: motor dysfunction, sensory alteration, speech or language deficit and vision or hearing disturbance - or any combination of these symptoms. Symptoms can also be temporary - usually brief symptoms stem from a passing blood circulation disruption called transient ischemic attack (TIA). They are caused by disruption of blood supply because of a clot, which is dissolved by body enzymes.

The prevalence of stroke largely depends on the age level of the population. Improved treatment of stroke, and consequently increased survival rates, contributes to an increase in prevalence. Prevalence is roughly 500-800 cases per 100,000 population (Wester, 1992).

**Research activity - stroke**

In addition to our extra information in the factsheets, you can find plenty of information on stroke on the World Wide Web. Try the Methodist Health Care System at:
Alternatively, you can read about research on prevention, diagnosis, treatment and rehabilitation of stroke from the pages of the Swedish Council on Technology Assessment in Health Care:

- http://www.sbu.se/sbu-site/reports/abstracts/stroke.html

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### Parkinson’s disease

Parkinson’s disease is a common disorder of the brain, in which certain brain cells called neurons deteriorate. The exact reason for this process is not known. These neurons are important because they produce a substance called dopamine, which is a chemical ‘messenger’ in the brain that helps the nervous system control muscle activity. An abnormally low supply of dopamine causes Parkinson’s symptoms to appear.

Primary symptoms include: stiffness, tremor, slowness and poverty of movement, difficulty with balance, and difficulty in walking.

Secondary symptoms of Parkinson’s disease may include depression, senility, postural deformity, and difficulty in speaking.

There are other neurological disorders, which may have both primary and secondary parkinsonian symptoms. When this occurs, the condition may be referred to as Parkinson’s Syndrome or Atypical Parkinson’s. For example, parkinsonian symptoms can be caused by tumours in the brain, repeated head trauma or prolonged use of tranquilizing drugs.

Information varies on how many people with Parkinson’s disease there are in different European countries - an approximate estimate could be around 17 patients per 10,000 people. The risk of Parkinson’s disease increases after age 50-60 and it is rare in people under 30 years of age.

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#### Research activity - Parkinson

You can find plenty of information on Parkinson on the World Wide Web. Try:

- [http://neurochiefe.mgh.harvard.edu/parkinsonsweb/Main(IntroPD/Intro.html)](http://neurochiefe.mgh.harvard.edu/parkinsonsweb/Main(IntroPD/Intro.html))

The Parkinson Europe Networking Group was founded on April 21st 1998 and its Web address is:
High or low blood pressure

High blood pressure, or hypertension, is defined in an adult as a blood pressure greater than or equal to 140 mm Hg systolic pressure, or greater that or equal to 90 mm Hg diastolic pressure. Blood pressure is measured in millimetres of mercury (mm Hg). High blood pressure directly increases the risk of coronary heart disease (which leads to heart attack) and stroke (or brain attack), especially combined with other risk factors. Symptoms of high blood pressure are throbbing in the head, headache, giddiness and palpitations. Individuals with diabetes mellitus or kidney disease have a higher frequency of hypertension.

Low blood pressure, or hypotension, occurs in 20 to 30 percent of non-institutionalised elderly persons. There is a clear correlation between the incidence of hypotension and age. The greatest danger of the frail elderly with orthostatic hypotension is injury from a fall. Orthostatic hypotension means the low blood pressure that causes dizziness or even collapse due to sudden change in position e.g. from lying to standing. The heart is not able to pump hard enough, and thus blood supply to the brain diminishes temporarily, causing dizziness or collapse. Symptoms of low blood pressure are general weakness, depression, fainting and giddiness, especially on rising.

Review activity - blood pressure

You can find plenty of information on blood pressure on the World Wide Web. Try the American Heart Association at:

- [http://www.americanheart.org/Heart_and_Stroke_A_Zguide/hbp.html](http://www.americanheart.org/Heart_and_Stroke_A_Zguide/hbp.html)

1.3 Symptoms of physical impairments

In this section, you will learn about the main symptoms of physical impairments and their impact on daily living. These symptoms are:
• balance problems;
• stiffness of joints and muscles;
• weakness of muscles;
• pain;
• insensitivity;
• urinary incontinence.

**Balance problems**

Balance problems can be caused by many different things, e.g., low blood pressure, slow reactions, stiff joints, weak muscles or combinations of them. Forty percent of people aged 40 and over experience dizziness or balance problems at some point in their life. Balance disorders increase in frequency in the older age groups and by age 75 become one the most common reasons for seeking help from physicians.

When people with low blood pressure get up from bed or stand up from a chair they can feel dizzy, especially if the movement is too rapid. They can also have problems in putting on socks, shoes or trousers, because their blood pressure changes when they bend down. Balance problems worsen when eyes are closed, which makes it difficult for people with balance problems to wash their hair while taking a shower.

Many older people say they easily forget that their ability to move is not what it was, until they actually start to do things. If they walk on uneven or slippery ground they can easily lose their balance and fall.

**Emma**

Emma has balance problems due to blood pressure problems. She fell on the floor when she got up from a chair on her way to answer the phone. This frightened her and afterwards she did not dare to go out alone for fear of falling and hurting herself.

**Stiffness of joints or muscles**

Arthritis and Parkinson’s disease are some of the common causes of stiffness. Stiffness of joints or muscles can be due to an expanded amount of connective tissue. The elasticity of connective tissue and the ability of muscles to contract diminish with ageing.

Getting up from a squatting position becomes difficult, especially for women. Stiffness affects all activities of daily life, as reaching, grasping, lifting and moving around becomes difficult. Opening tins and carrying shopping bags, getting up from a chair, picking up small coins or handling small buttons all become difficult and time-consuming actions.
Sharon
Sharon has rheumatoid arthritis, which affects her shoulder and elbow joints. She has difficulties in lifting her hand and as a result cannot comb her hair.

Weakness in muscles
Arthritis, stroke and Parkinson’s disease can directly or indirectly cause weakening in muscle power. This leads to restrictions in daily activities: walking, getting up from the bed or a chair, handling, lifting and carrying things all become difficult. Opening a jar or a milk carton is usually the first activity that becomes difficult or impossible.

George
George has Parkinson's disease. He often talks about the time before he became aware of this, when he began to find it very difficult to get up from his sofa, which was a low one, bought in the seventies when low styles were fashionable. When he had visitors, he always made sure he chose to sit in his high armchair, which made it easier for him to get up. After becoming aware of his disease, he bought a new, high sofa, which improved the situation greatly for him.

Pain
Pain restricts life physically and emotionally. Rheumatoid arthritis, osteoarthritis, blood circulation problems and an overall poor physical condition can be causes of pain.

Pain in the joints of the hands prevents using tools or opening doors, carrying things, pursuing hobbies such as knitting or gardening, or following daily routines like dressing and making food. Pain due to blood circulation problems slows down movements and hinders heavy tasks like hanging out washing or carrying shopping bags.

A person can have difficulty in sleeping because of pain, and may also be prescribed night sedation. For older people this can have a disastrous effect, especially if they need to use the toilet during the night. Because of the sedation they can be clumsy and when they are in a hurry they can easily fall.

Most patients with rheumatoid arthritis experience chronic pain, which is defined as a pain that lasts more than 6-12 months and is described as burning. Morning pain and stiffness are the most typical
symptoms. Pain determined by inflammation is triggered or aggravated by motion in the affected joint.

The stiffness, soreness and muscular aches that often accompany the joint problems may be due largely to muscular spasms provoked by pain in the joints. Pain in itself might be disabling if it is present daily and incessantly. It creates fatigue and decreases the ability to concentrate, which is one of the central reasons why pain management is one of the main tasks of clinical care (Nordenskiöld, 1996).

People with rheumatoid arthritis experience frustration at being unable to do things, dependence upon others, and the disruption of daily routines because of the intrusion of the disease. Pain is a strong personal experience (Nordenskiöld, 1996).

**Insensitivity**

Insensitivity can be caused by blood circulation problems or can be a symptom of a stroke or a sequel of a disease. For example, a result of diabetes is that people may develop peripheral neuritis, which makes their extremities insensitive to touch.

Loss of sensation in the feet is common in vascular conditions in older people. This makes walking difficult and care is needed crossing thresholds or uneven ground, since the feedback from the feet is diminished and it is easy to fall. Loss of sensation in the hands makes it difficult to use fastenings that cannot be seen, e.g. back zips or collar buttons.

**Context activity - insensitivity: experimental test of how it feels when there is no feeling**

You can get some idea of insensitivity when you put on gloves and try to pick up small objects like coins, matches or peas.

Some of you may have woken up in the middle of the night with your hand totally numb because you have slept on it. You may have noticed how difficult it is to move the numb hand without help of the other hand – the hand feels like it belongs to somebody else. This is because there is no feedback coming from it into your consciousness.

**Research activity - Oliver Sacks, A Leg to Stand On.**

This book describes the writer’s own experience of losing sensation in his leg after an accident that happened in Norway during his holidays.
Urinary incontinence

Urinary incontinence may be temporary, caused by an acute urinary infection, or chronic, caused by functional problems of controlling the bladder or pelvic muscles. The problem may be due to hormonal status, childbirth, previous surgery, muscular dysfunction, physical injury, medication, etc.

One of the most common types of incontinence is stress incontinence, which occurs when small amount of urine leaks out while coughing, sneezing, bending, lifting a heavy object or participating in athletic activities. Another type is urge incontinence, or the inability to stop urine leakage long enough to reach the toilet when one feels the need to urinate.

Other types are mixed incontinence in which both stress and urge symptoms manifest in the same patient. Overflow incontinence occurs when the bladder cannot empty completely because of obstructions or loss of bladder muscle strength. Reflex incontinence is a loss of urine that occurs when the person is unaware of the need to void.

Review activity
Describe the main symptoms of physical impairments. How would you recognise these symptoms while working with your clients/patients?

1.4 Impacts

The ease with which most people plan a day shopping is quite foreign to people with limited mobility. The difficulties encountered by these people, who are trying to maintain their independence and pride in spite of impaired mobility, relate to transportation, environmental obstacles and public opinion.

Physical impairments, e.g. poor balance or weak muscles, impede mobility and thus have impact on all activities of daily living, which become difficult and more time-consuming to perform. The impaired persons have to change their daily routines, and may even have to give up doing some things, to be able to manage other things than the basic routines.

Pain in the hands and muscular weakness can affect a person’s eating habits. Lifting heavy pots and kettles becomes difficult or impossible, cutting and slicing meat or hard bread hurts and so s/he starts to eat soft bread, minced meat and ready-prepared food.

People with physical impairments need more and more help from other people and may feel embarrassed or uneasy to seek it. They
feel themselves to be a burden to other people, and may instead try to manage by themselves and avoid doing difficult things. Many give up favourite hobbies like knitting, gardening, sports etc.

In research done in the US in 1993 it was found that 23 percent of the over 64 age group had difficulty with daily activities (eating, bathing, dressing) and 10 percent of people in this group needed help with these activities. An even higher percentage of the over 65 age group (27 percent) reported difficulty with home management activities (Prohaska, 1993).

Urinary incontinence may cause insecurity in social contacts. The increased need to use the toilet may be so intimidating that people choose not to go out, or if they do, they need to check the location of and access to the toilet in advance.

**Outcomes**

Older people with impairments tend to avoid the daily activities which they find difficult to perform or which cause pain. This means that they change their daily routines, very often leading to the decline in their quality of life.

Fear of injury is a psychological condition that affects many older persons. They often make a realistic appraisal of the physical and environmental conditions and conclude that there is an increased risk of injury. How they deal with the increased risk is crucial: if the response is not to walk, not to cross the street, or not to travel (thereby significantly diminishing the risk of injury) they may lose their mobility and independence (Burke, 1992).

Related to the fear of injury is the fear of embarrassment - it is difficult to separate the emotional responses of elderly people coping with the loss of physical vigour and agility. If they don’t get help for their problems they may withdraw from daily activities and from going out and thus they may also slowly deteriorate mentally.

**General deterioration**

Physical impairments can cause so much insecurity and depression that people restrict their lives to a minimum. When they move less their muscles get weaker, their joints get stiffer and it becomes a vicious circle. Mental and physical conditions are connected and the ultimate result can be the general deterioration of people’s abilities and physical and mental functioning.
Emma

Without assistance, Emma, who fell as a result of balance problems, might become so frightened that she would not go out alone. Gradually she might restrict her movements within the house as well and her physical condition would deteriorate. She would gain weight and thus increase her problems. She might eventually be forced to move to an institution. Instead of this scenario, she could learn about why her balance problems occurred and she could get some medication and a walking aid to help her mobility. This would mean she could walk and go out and keep herself in good physical and mental condition.

Moving to a service house

If a person lives alone and his/her disability becomes severe, s/he might consider moving into a service house or into a flat where personal service is available around the clock. This applies particularly in rural areas and in the case of people living far away from the city centres.

Strain for the family

When one member of the family becomes disabled, the whole family has to rethink their daily routines. Even minor physical difficulties can cause strain for other members of the family. The situation is especially demanding when the mother or father of the family becomes disabled. If the condition is progressive (e.g. arthritis or multiple sclerosis) the adjusting is an ongoing process. Family members need to learn ways of helping the disabled person, or new ways to divide work in the family. They may also have to learn to use assistive devices such as hoists or wheelchairs.

Review activity

Describe the main impacts and outcomes of physical impairments. How could they be overcome?

1.5 Assistive technology (AT) for physical impairments

Context activity

List as many assistive technology products and services for physical impairments as possible. Try grouping them into categories. Discuss your lists and groups with your colleague students.

Check your information with the data in our factsheet on assistive devices in an elderly population studied at 70 and 76 years of age.
Everyone, at any age, can make use of an assistive device to make some tasks easier and safer to accomplish. A good example of this is grab bars in bathrooms - it is easier to get in and out of the tub if you have something to grab onto. Assistive devices become particularly useful when a person has problems with balance, finds it hard to stand for long periods, has difficulty lifting his or her legs or can’t bend or stretch etc.

There is a wide variety of technical aids that can help a person with physical impairments. Most of them are simple solutions that compensate for loss of power, reduced ability to reach or impaired hand control.

Studies done by Mann, Hurren, and Tomita (Mann, 1993a; Mann, 1993b) showed that, on average, older people owned and used a large number of assistive devices. In their study group people had about 14 devices and used 11 of them. According to them, older people with physical impairments, sensory impairments, or both, use the most assistive devices. Despite this, they still lack current information on services and on what assistive devices are available in the marketplace. In a study carried out by Mann, Hurren, Tomita, Bengali, Steinfeld (Mann, 1994), 110 older people with impairments were asked: “Can you think of a device you would like to have that you haven’t been able to find - a device that may not yet have been developed?” All the suggestions were for devices that had already been developed and were available for sale.

Before turning to technical aid, it is always good to think whether different methods could be used rather than aids. Are things functioning as they should? For example, if the door-lock is hard to open one should first check that the lock mechanism is oiled and cleaned properly and that it is not corroded, or that the hinges are straight etc. Only after this has been done should technical aids be considered. It is also important to check lighting - balance and mobility problems get worse if there is not enough light around.

**Personal assistive devices**

There are many practical aids available for dressing and undressing, but before recommending them, the clothing itself should be considered. Small buttons, tight clothes and back fastenings make dressing and undressing more difficult. However, people are often reluctant to get new clothes because of the expense and because old clothes are part of them and they are used to them.

For a person with stiff hip joints, for example, there are several aids available. Stocking aids can assist those who have difficulties in reaching down to their feet, dressing sticks help pull on or push off clothing, and long-handled shoehorns and reachers help to dress and undress.
If hand joints are stiff, buttoning devices, elastic shoelaces and reachers for pulling up pants or taking off a jacket can be useful.

For incontinence problems there are several types external devices for the collection of urine in men, as well as devices for women. There is also a large range of different absorbing pads and special underwear available.

Lightweight cutlery and utensils with large handles are available for people who have difficulties in grasping and holding due to arthritis, neuromuscular conditions or decreased hand strength and control. Large handles are much easier to use than small handles.

A peeler with a large handle is easier to use. It demands less gripping power to hold it while peeling and it causes less pain than holding a thin handle.

Walking aids are probably the most well known technical aids, along with binoculars and hearing aids. There are different types of canes and crutches, rollators and walking frames to assist a person with poor balance or diminished strength in the legs.

A rollator with a seat and a basket is a good help with shopping. Walking sticks come in different sizes and colours.
Adjust a walking stick to suit someone else. This can be done in two ways: first, hold the stick vertically beside the person standing erect with his/her weight evenly distributed on both feet, and shoulders and arms relaxed. Adjust the shaft so that the handle is level with the wrist (back side, as indicated by the arrow). The second way is to measure the length between the wrist and the bottom of the heel when the person is lying straight, hands by his/her sides. Add 2.5 centimetres to the measurement (or measure the shoes the person normally wears). The total length is the measurement of the stick.

With the stick measured correctly, the user should be able to walk with elbow slightly flexed. They should be able to lift their weight by fully extending the elbow, pushing down the stick when walking.

Try several different adjustable walking sticks from the local healthcare centre and adjust them to one another. Compare different models, their weight and particularly the shape of handles. Choose your favourite and explain your preference.

Shopping bags with wheels and a long handle are useful for a person who has problems with carrying things and keeping balance. The wheels should be checked to see that they are functioning properly. It’s also a good idea for the person to try putting goods in and taking them out of the wheeled bag before buying it. If the bag is too low, it may give rise to problems for someone with stiff joints.

Modern wheelchairs are light and they have several adjustment functions to suit the needs of the individual user.
There are several different models of wheelchairs for different purposes. Two main categories are manual and the electrical wheelchairs.

There has been immense development in manual wheelchairs during the last decade. Today wheelchairs can be made of very light materials such as aluminium and titanium and so can weigh only 8-10 kilos. But ‘old’, heavy chairs still exist and sadly very often they are given to older people. The reasoning behind is usually that, because elderly people move slowly anyway, they can use the heavier wheelchairs, which cannot be moved fast. In fact this is incorrect – older people have less power to move a wheelchair and should therefore have lighter models.

A wheelchair is a mobility aid, although it should also serve as a seat. Another reason for choosing a heavy, clumsy wheelchair for an older person is the fear of the person falling with it. But a lightweight wheelchair can be adjusted and provided with safety equipment (called anti-tipping devices) so that it will not tip backwards.

Manual wheelchairs have also been designed for people with special needs, e.g. for people with hemiplegia (one-sided paralysis) and amputations. People with hemiplegia have only one hand in use, so the wheelchairs are built with two handrims on one side, or are designed to be steered with the unaffected foot. Amputee chairs have been modified to compensate for a change in the centre of gravity - when a person with an amputated leg sits in a wheelchair, there is less weight in the front of the chair than in an ordinary wheelchair.

**Powered wheelchairs and scooters** are in many cases also suitable for older people who have limited strength in their arms. They are particularly suitable for outdoor use where the environment is wheelchair-accessible. The most traditional design for a powered wheelchair is that of a reinforced standard-looking wheelchair frame with a battery mounted under or behind the seat.

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*Two traditional powered wheelchairs. The one on the left is specially suitable for a person who sits in it longer times because it has formed and padded seat and backrest.*
Scooters, or three- or four-wheeled carts, are very good alternatives for older people who haven’t the strength to walk long distances. They are usually easier to manoeuvre and take up less space than ordinary powered wheelchairs.

Scooters take less space and can be easier to manoeuvre because they have a handlebar instead of a joystick. In most of the models the seat turns around its axle and which makes it easier to sit on it.

Research activity - wheelchairs

You can find more information about wheelchairs from the World Wide Web, e.g. the Rehabilitation Engineering Research Center:

- [http://wings.buffalo.edu/ot/cat/rerca-wheelchairs.htm](http://wings.buffalo.edu/ot/cat/rerca-wheelchairs.htm)

Adapted everyday items

Existing everyday objects can be adapted to suit the person and her/his needs. If a person has problems in getting up from a low bed, the bed can be fitted with raiser blocks that higher the bed and make it easier to get up from it.

Here are two types of bed raisers to suit different types of bed legs
If a person has difficulties in getting up from a toilet seat, the seat can be raised by casting an extra layer in the console of the seat. Alternatively a toilet seat raiser can be fitted directly on the toilet bowl or can stand on its own feet above the toilet bowl. Removable models are useful when there are several people in the family and only one who needs the raised seat.

A toilet seat raiser and armrests help a person with hip problems to use the toilet.

Many people have difficulties in getting into or out of a bath, due to poor balance, stiff joints or hip pain. It can also be dangerous when soapy water increases the risk of slipping. A variety of bath seats, boards and handrails is available to help people who want to keep on taking baths.

Bath or shower stools or chairs are placed in the tub or shower, enabling the user to sit while washing with the help of a hand-held shower. As their names indicate, these devices look like ordinary stools, chairs and benches, generally with four legs and a square or rectangular seat. But unlike ordinary stools, chairs and benches, these devices are designed to get wet, and should not slide, or tip over, in the tub or shower. In addition, they have holes built into the seat for water to drain through. Most of the stools are plastic and have no backrests. The chairs look like stools, except they always have backrests and usually feature one or two armrests. Some chairs are horseshoe-shaped with an opening in front for personal hygiene. A few chair models mount permanently to the wall. Chair seats and backrests come in a variety of materials: some are plastic, others feature a padded vinyl backrest and seat cushion. Some chair seats consist of two padded cushions that rest side by side. Shower water drains between the cushion into the tub.

A bathtub with bath board (and handle for ease of use) and a bath seat and a handheld shower make bathing easier.
Bath boards are rectangular pieces of flat plastic that extend across the width of the tub and rest on the edge of the tub wall. They have no legs and do not touch the floor of the tub. They can be used several ways: for sitting on and washing with a hand-held shower, or for sitting on prior to lifting the feet over the bathtub wall into the tub.

Bath lifts provide a high-tech alternative to getting into and out of the bathtub. They are for people who can’t step over the tub wall, have difficulty sliding along a transfer bench, or want to sit in the bath water for a bath (all other bathing seats require that you sit above the water and use a hand-held shower).

Most lifts operate manually using a hydraulic pump, which elevates the lift’s seat. You sit on the seat which, in some models, swivels toward you and push a release mechanism that lowers the seat into the water. These lifts can be permanently installed or removable. Bath lifts have specific space requirements - an assistive technology specialist will help with this.

Research activity - bath seats and lifts

You can find more information about bath seats and lifts from the World Wide Web, e.g. the Rehabilitation Engineering Research Center (good pages on canes and walkers in Helpful Products for older people):

- http://wings.buffalo.edu/ot/cat/rerca-seats.htm

Housing adaptation

Most common housing adaptations are removal of thresholds, replacement of bathtubs with showers, widening of doorways (especially in the toilet or bathroom) and choosing non-slippery floor coverings and materials.

Thresholds can be dangerous if the person has balance problems, poor sensation in their feet or difficulties in walking. If the person uses walking frames or rollators, thresholds are a hindrance and should be removed and replaced e.g. by rubber thresholds that give in when stepped on. Another way to prevent noise and draught through the chink after the threshold is removed is to use a threshold built inside the door. This comes out when the door is closed and withdraws inside the door when the door handle is depressed.

Doorways can be widened to make access easier for people who use walking aids or wheelchairs or who need to be transferred with a mobile lift. Their devices may be wide and a person in a wheelchair needs space to manoeuvre without fear of hurting their hands on the
doors. Doorways in narrow corridors also need to be widened because of lack of space to move straight through them.

Flooring can also be adapted: slippery materials can be changed to non-slip or can be covered with non-slip mats or special coatings (e.g. in bathrooms). It is generally preferable to change the material than add something onto an existing one. As time passes loose mats tend to turn up at the corners and become a hazard. Soft carpets or loose mats can be unsafe for a person who has difficulties in lifting her/his feet because of weak muscles or pain – non-slip materials reduce the risk of a bad fall.

Stair-lifts and lifting platforms or elevators are useful when a person has difficulties climbing stairs. For such adaptations people should be referred to assistive technology specialists. If the person can still climb stairs but for example has balance problems, handrails should be installed on both sides of the stairs and it should be ensured that they are of the correct height and suitable for holding.

Long corridors can be fitted with extended handrails to give support to a person with poor balance or other difficulties in walking. The lighting of the corridor should be of good quality and light switches should be accessible and easy to use.

Automatic lights are a good solution e.g. when the person regularly needs to get up to the toilet during the night. Lights and other electronic devices can also be operated with remote controls. People with severe disabilities can be helped by larger systems called environmental control units.

Sliding doors save space, and drawers instead of shelves are easier to use e.g. for wheelchair user.

Doors can be difficult to open or close. Heavy spring doors can be replaced by lighter models or with electronic locks and an opening mechanism. Doorknobs can be replaced by the more convenient...
lever-type. A person walking with crutches or rollator or moving with a wheelchair needs space to move e.g. in the bedrooms, and sliding/folding doors give more space than swinging doors.

In the kitchen the most common changes involve lowering cupboards, adjusting worktops to the correct height and equipping them with modern technology e.g. microwave ovens.

**Devices to support carers**

*There are several different types of person lifts. This model is attached to the ceiling where it takes up little space. Note also the electrically adjustable bed.*

There are many technical devices designed to support the carers of the people with disabilities. These devices (hoists, for example) ease lifting and transferring of a person with disability.

There are several alarm and communication systems to help surveillance and contact between the carer and the person with disability. Alarm phone systems, for example, are good for the physically impaired who live alone. If they fall or have an urgent need for help they can trigger an alarm which relays to their carer or to an alarm centre if the carer is not home and help is immediately at hand.

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**Research activity - lifts**

You can find more information about lifts from:

1.6 Being an assistive technology intermediary (ATI)

This section looks at the process of obtaining technical devices and your role in this process. In the introductory model it was pointed out the delivery systems vary between different countries in Europe, so the process described here is not complete - you should also study the your own country’s system.

Perhaps the most important role that you as an assistive technology intermediary will play is at the outset of the process. No country has a system to actively search for unmet AT needs and you are in a key position to identify them, particularly in the case of older people without a clear diagnosis who suffer age related physical problems.

The initiative to recognise that an individual needs an assistive device or adaptation to help with daily activities can be taken by anybody: by the individual, the carer or other people living close to the individual. The initiative may also be taken by a wide range of professionals who are in contact with him or her. Once the need is recognised the client or carer can contact the general practitioner or the local social service for a clearer validation of the need.

When the problems are complicated you should advise the person to be referred by a doctor to an occupational therapist (if the problems concern personal care and IADL) or to a physical therapist if the problems mainly concern mobility. In some countries, people can contact the community occupational therapist or physical therapist directly.

How to get the device

After assessment of the needs, there are two main ways to get assistive technology: the person in need can apply for it or buy it. In most countries, people with a precise diagnosis or disability are entitled to apply for assistive devices, either from their local health or social care authorities or from an insurance company.

If they don’t fulfil the requirements set by their local or national authorities, they will have to buy the devices themselves. This can be the case with older persons (often over 65 years) with no clear diagnosis, whose physical impairments have developed with ageing.
In some countries, the professionals can decide that the assistive technology needed can be purchased by the individual, because the authority decides s/he has sufficient means to pay for it. In some countries preventive aspects are valued and devices are given for this purpose. Some voluntary disability organisations or other organisations lend or rent devices for those who need them.

With technical devices, follow up is very important. Their real usefulness will be clear after the person have used the devices for some time. This is particularly relevant if the user did not have the chance to try out the device at home. The device in itself can be the right one but the adjustments may be wrong or something unforeseen may arise, such as a rollator being too wide to fit in the elevator. If you are working as a home visiting professional, your role in this matter will be very valuable. Older people in particular cannot be left without follow up on the devices.

Research activity - how to get AT

How do people get assistive technology for physical impairments in your country?

Points to keep in mind

• What organisations provide equipment: the state; centres providing equipment for disabled people (e.g. disabled living centres); organisations for blind and visually impaired people other charitable organisations?
• What assessment procedures are used to identify the equipment needed?
• Is there any state funding to provide this equipment and what are the requirements of this funding, e.g. is it means tested, are the items provided from a limited range of items?

Who’s who?

Assistive technology specialists in the field of physical impairments are occupational therapists, physical therapists and rehabilitation engineers.

Occupational therapists provide services to individuals whose abilities to cope with tasks of living are threatened or impaired by developmental deficits, the ageing process, poverty and cultural differences, physical injury, disease and/or illness, or psychological and social disability. The primary focus of occupational therapy is the development of adaptive skills and performance capacity. It influences or enhances performance and diminishes impediments to the individual’s ability to function successfully. Occupational therapists serve diverse populations in a variety of settings, such as hospitals and clinics, rehabilitation facilities, long-
term and extended care facilities, sheltered workshops, schools, private homes and community agencies. Occupational therapists receive and provide referrals to appropriate health, educational, or medical specialists.

Research activity - what is an occupational therapist?
You can find out more about this profession by consulting:
- [http://www.cot.co.uk/](http://www.cot.co.uk/)
- [http://www.who.int/ina-ngo/ngo/ngo170.htm](http://www.who.int/ina-ngo/ngo/ngo170.htm)

Physical therapists (physiotherapists) provide services in the prevention, assessment, and management of movement dysfunction. They strive to restore functional abilities to individuals permanently or temporarily disabled by illness, disease, trauma, or congenital abnormalities.

Physical therapists practice in hospitals and in private physical therapy offices, community health centres, industrial health centres, sports facilities, rehabilitation centres, nursing homes, home health agencies, schools or paediatric centres.

Research activity - what is a physical therapist?
You can find out more about this profession by consulting:
- [http://www.who.int/ina-ngo/ngo/ngo161.htm](http://www.who.int/ina-ngo/ngo/ngo161.htm)

Rehabilitation engineers are usually mechanical or electrical engineers who use advanced technology and innovations to help meet the needs of individuals with disabilities. Design and application of enabling technology are major skills of the rehabilitation engineer. Services provided concern mobility, seating and positioning, vehicle adaptations, environmental control, home and worksite modifications and computer access/interface.

Research activity - what is a rehabilitation engineer?
You can find out more about this profession by consulting:
- [http://www.cs.wright.edu/bhe/rehabengr/services.htm](http://www.cs.wright.edu/bhe/rehabengr/services.htm)

Assessment
Before selecting the appropriate device(s) for a person with a disability, assistive technology professionals usually do an assessment concerning their client’s needs and abilities.
An evaluation should include:
- Identification of the needs, goals, and desires of the consumer;
- Identification of the problem areas and prioritisation of the primary and secondary areas;
- Evaluation of the functional abilities of the consumer;
- Evaluation of the various devices for function, availability, safety, and affordability;
- Evaluation of the environments in which each device will be used.

AT specialists may do the assessment at the client’s home or in the hospital or training centre. The aim of the assessment is to find out the problem areas that need to be solved. Occupational therapists in particular will also assess the abilities of the person so that they can be used as much as possible. A very important part of the assessment is the interviews with the client and family members, which are aimed at finding out a person’s own thoughts and ideas about her/his situation and attitudes towards possible assistive devices.

Home visits are invaluable. The way people function in their own homes can differ considerably from how they are in a hospital ward. In familiar surroundings with familiar objects, daily routines may be much more easily carried out. In other cases the person can manage routines such as washing and using the toilet quite independently in a modern hospital ward and be totally unable to do so at home.

In the hospital impaired people can also have unrealistic wishes about their abilities to manage the daily life at home. It is easy to think that as soon as one comes home everything will be alright, and to blame any difficulties on the hospital surroundings and furniture - beds are different, corridors are long, slippery and wide, etc. The person’s real level of functioning can clearly be shown by home visits and experimenting with different tasks there.

Assessment can be done by:
- Interviewing the client, carers and other family members;
- Observing of the client’s abilities;
- Formal testing e.g. motor, co-ordination, sensory, muscle testing;
- On-site visits at home, school or work and community.

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**Context activity - a visiting occupational therapist**

Invite an occupational therapist into the classroom and have him/her present on the procedures used in such a comprehensive assessment. These professionals have a rich experience and can describe numerous cases in which AT has proven to be useful. You can locate an occupational therapist by enquiring at the nearest school of occupational therapy, the local social service or public health department.
Review activity - What to do about Sharon’s problems

In section 1.3, you encountered the case of Sharon. What could someone do to support Sharon? Choose the best option and explain why you choose that option and not the others.

- Do nothing, it is up to Sharon to ask for help.
- Support her in finding some assistive technology that can help her with her problem.
- Help her to accept her impairment and convince her to go to the family doctor or GP.
2 SPOTTING UNMET NEEDS

2.1 At home

Elena

The social service department provided Elena with a whole series of ‘gadgets’: tools which made her activities of daily living a lot easier. These included attachments to the electric plugs, kitchen tools with big handles, a reacher and adaptions to the bathroom such as a raised toilet and a shower stool. Elena has also been creative and ‘invented’ a couple of these gadgets herself.

As noted earlier in the introduction module, the current trend in the care of elderly people is away from the hospital into the community. People are discharged as soon as their medical care is given and they are able to manage at home. Reasons are economical and also preventive; hospital stays are expensive and the danger of institutionalising is always possible. This why slowly emerging physical dysfunction problems can go unnoticed during the hospital stay, particularly when a person has been taken into the hospital for other reasons such as migraine or digestion problems, rather than physical dysfunction problems.

In the hospital, staff is always available to give a hand and help out in daily routines. Hospital wards are also built so that usually it is easy move around, toilets are near, beds are adjustable and hospital clothes are easy to dress and undress. Nurses help with hygiene and bathing and food is served to the patient in bed. Problems in physical functioning can easily go unnoticed.

Once back at home, however, people realise that they have problems in managing their daily life activities. They may conclude that because they have already been in the hospital and while nobody there paid any attention to their problem, it means that there is no help available and that they are supposed to manage without.
Home visiting personnel can also mistakenly think that while the person has been in the hospital his or her problems must have been looked after. You should be alert to this when you make home visits, especially when visiting older people. You should ask yourself and the client if there is something that is gradually becoming difficult in their daily life and listen if the client mentions not to be able to do things as normal.

As a home visiting professional, you will be the key person to spot your client’s need for assistance. You should be very sensitive in this - sometimes clients try to hide their problems, especially when visited at home for some pre-arranged reason e.g. removing stitches, giving an injection or to help with the cleaning of the house. If the client thinks that she or he should manage, she or he may try to cope so that nobody notices the problems. The client might even be ashamed of them.

There are many benefits in working with elderly clients in the community as opposed to the hospital setting. Assessment of a person’s abilities is more realistic in familiar surroundings, where people are more relaxed because they are on their own home ground. The professional workers are guests in their house and must build a good relationship with their clients in order to gain their co-operation.

**Spotting unmet AT needs**

In the home there are usually lots of pointers to indicate how the elderly person is coping. The state of the house is one example: are there a lot of things left on tables or on the floor? Is furniture placed where you would not normally place it? Seeing clients in their homes helps to give clues about their life, their habits and things they value.

*Lots of things left on the tables* can be a sign of problems in reaching out or bending down. Stiff joints, pain or balance problems (or the combination of these) have forced the person to leave things on the tables so that they can get them easily without danger of falling or pain. Adaptations in the kitchen should be assessed to solve the problems.

*Here the person has left the things she needs daily on the table and sink. She cannot bend down or reach up to the upper cupboards due to balance problems and weakness.*
Cushions on chairs can be a sign of stiff hips or weakness in the feet muscles. Getting up from a low seat is difficult when joints are stiff and/or muscles are weak. It can also be due to pain in the hands, since sitting or rising does not hurt so much if one does not have to lean on the hands. The higher the seat the easier it is to get up or sit down, and raising blocks, higher chairs or raising cushion could be of help in this situation.

This chair is steady and has good armrest which help in getting up from the chair, but for it is too low for the user, so cushions and covers have been added.

Furniture in odd places. People with balance problems can place a chair in a long corridor or a big hall to help them walk without falling. Those with weak muscles in their legs can place furniture so that they can move around by leaning on it, or can sit on it when doing things they cannot do standing. Rollators, sticks and handrails could be the solutions.

Here the stool is placed in the corridor. It is used when the person puts on shoes or takes off outdoor clothes. Note the loose mat which could be replaced with a non-slip one.
Using aids that belong to somebody else. If a person is using e.g. a cane that belonged to his or her late spouse the matter should be discussed and the cane checked. It may need to be adjusted in length, or some other aid may be needed.

Books propping up bed legs are a clear sign of a bed being too low. Props under the legs of one end of the bed only can be a sign of back problems or breathing difficulties, which the person tries to overcome by changing the height of the bed. Bed raisers or an electrically adjustable bed could be an alternative solution.

Carving knife as knife. A person with weak muscles or hand pain may use a sharp carving knife instead of an ordinary knife when eating.
This is a good enough solution, but you should discuss what other kind of problems the person may have, e.g., problems with dressing.

Here the person uses a carving knife to cut food. The knife has also a thicker shaft than an ordinary knife. Note also the mug with large handle.

Review activity
Describe some of the signals that can indicate a physical impairment.

How to act as an ATI

If you have noticed that your client needs assistive devices you should discuss this with them and inform them about the availability of technical aids. If you are not sure which devices would be the best for your client you should advise them to see an occupational therapist, a physical therapist or other AT specialist at the local social or health centre. Alternatively, you could direct your client to a local assistive technology centre or shop to learn more about these devices.
AT centres or shops have different devices. It is worthwhile to visit them regularly because new devices come onto the market all the time.

As an ATI you can help with the maintenance of your client’s technical aids. For example you can make sure that there is enough air in the tyres of the wheelchair or a rollator. How well filled the tyres are makes a great difference in moving the wheelchair. Very often wheelchair users are unable to use the pump, and wheelchair tyres often have special needle valves in their tyres, which means that they need a specially-made pump too. If the user doesn’t have the pump, you could take the chair or the wheels (very often detachable) to the nearest petrol station to get them filled.

You can help by ensuring the devices are kept clean so that they function as they should and will last longer.

Fall prevention

Fall prevention is an important part of your work visiting old people at home. An injury caused by falling is a common reason why an old person is taken into hospital, and is very often a sign of deterioration of her or his health, and ability to perform daily tasks. The reason may be due to poor balance or poor muscle power in the legs (Ruikka, 1992).

The causes of old people’s falling accidents are mainly factors such as unfixed carpets, excessive amount of furniture, slippery floors, loose electric wiring, thresholds and stairs. The risk of accidents is
increased by poor lighting, beds and chairs being too low and lack of proper household ladders.

In the immediate surroundings of the home there may be risk factors like slippery external stairway, poor passageways for pedestrians and courtyards insufficiently sanded in winter. Additional risks are posed by the possible lack of banisters, handrails and door shelters.

Fear of violence and crime is very common among elderly people: research indicates that different security arrangements and devices for elderly people’s doors are much more common than equipment for fire safety or for preventing falls (Levon, 1994).

To prevent falling, it is often a simple matter of providing a person with a walking stick to help maintain balance.

Safety tips for persons with balance problems:
• Install safety grab bars on the bathtub and on the bathtub wall and shower wall;
• Remove loose mats;
• Arrange cupboards in kitchen and bedroom so that the things needed most often are easy to reach;
• Recommend that a person with balance problems sits when washing his/her hair, shaving etc.;
• See that electrical cords are out of walking paths or covered.

Review activity - Safety at home

Summarise the ‘safety at home’ suggestions given so far. Think about others.

For further information, you can check:
• [http://www.mayo.edu/vest-rehab/]

A very important part of your role is helping clients who already have fallen to overcome their fear of falling and thus avoid further injury. Walkers and canes can aid stability, and adaptations in the home are important. Physical activity and social interaction with family and community can often stop the vicious spiral into inactivity, reclusiveness, and progressive deterioration.

2.2 During a medical consultation

Martha

Martha is an 85-year-old woman who lives alone. She comes to see the doctor to get a prescription renewed. She has a small burn in her left hand and signs of an old bruise above it. She seems unaware of these and doesn’t refer to them, but when the doctor has renewed the prescription he asks
about the hand. Martha tells that she has become so clumsy nowadays, she had burned her hand in the stove and she thinks that the bruise came the same time. She then adds that there is no problem - they don’t hurt at all and she scarcely notices them. When the doctor examines her hand he notices that Martha has diminished sensation in the hand and a further examination reveals that Martha has had a mild stroke some time ago.

This section describes the situation where an older person has come for medical consultation on something not connected with physical impairment (i.e. headache or digestion problems). The importance of early intervention is emphasised - the earlier physical problems are noticed the better. Prevention is crucial for maintaining a person’s independence and physical abilities.

To act as an ATI, you as a medical consultant should to be aware of the kind of assistive devices that are available, have information about them and about where they can be obtained, e.g. technical aid centres.

**Spotting unmet needs for assistive technology**

Possible physical problems can be spotted when the patient is:
- walking into the room;
- sitting down or getting up from the chair
- getting onto the examination table;
- dressing or undressing;
- shaking hands with you.

Slow walking, limping, difficulties in keeping balance, in sitting down/getting up from a chair or examination table are all signs that require further investigation. In addition, if the person has difficulties in buttoning, putting on shoes or bending arms when dressing you should ask more about the situation. If the person avoids firm handshaking or complains of pain when doing it, it could be a sign of some ongoing physical changes in the hand. It is useful, after the main reason for the visit has been addressed, to ask if the person is aware of these problems or knows the reasons for them.

Older people in particular are often nervous about the situation. Even if they had planned to ask you about problems other than the one they came to see you for, they might forget it, or they might feel that they have complained already enough. They don’t want to bother the doctor too much!

**Context activity - GP and hidden impairments**

Think about the case of Martha who has diminished sensation in her hand. What should you do in this situation? Select the best answer and provide arguments for your selection.
After the doctor has done a thorough examination and found the
sensation loss and the reason for it (mild stroke), he/she orders
Martha medication to prevent new infarcts and she will be seen by a
home visiting nurse who will control her blood and medication.
Martha is also referred to an occupational therapist who makes a
home visit. Together with Martha they go through her daily
activities, discussing situations such as bathing and food preparation
where loss of sensation in her hand could cause problems. Martha
learns to always use her right hand to check the temperature of the
bath water and using gloves when working at the stove. She also
learns to control the colour and condition of her left hand with vision.

Anthony

Anthony is 66 years old former lorry driver who comes to see the doctor
because he suffers from occasional constipation. He walks into the room
slowly, obviously trying to hide the difficulty, and leans heavily on the
table when sitting down in the chair. He is ashamed of his constipation
problem and finds it difficult to talk about, even to the doctor. He wants to
get a prescription for some medicine from the doctor and get out as soon as
possible, and indeed it would be easy to just write the prescription and let
him go. Part of the constipation problem may lie in the fact that he has
problems walking.

Anthony’s wife died some years ago and he lives alone. He avoids walking,
seldom goes out and eats very monotonous food because he rarely goes to
the market, which is far away. He normally buys ready-made food at the
small corner shop. If the doctor can assure him that his problem is nothing
to be ashamed of and that it can be solved, he can then question him more
closely about the other problems. Anthony has osteoarthritis in his hips and
could be helped by devices such as long shoehorns, raising blocks to his
bed and chairs, and a shower seat. He is shown a rollator with a basket for
shopping. He tries it but as he is not sure whether he would use it yet, he’s
allowed to borrow it to try out at home. The doctor refers him for
occupational therapy and physiotherapy.

Research activity

There is a lot of information available about disability-related issues in the
web. You could try the following links to The Disabled Peoples’
International, which is a grass-root, cross-disability network with member
organisations in over 110 countries and to The European Disability Forum,
which is the representative voice of 37 million disabled citizens in the European Union start with:


2.3 In Hospital

The number of older people in the population is growing and there are therefore more older people in hospital. Nowadays hospital stays are getting shorter and patients are discharged as soon as possible. Management by results in health care leads to clear diagnoses and cure.

Staff in hospitals does not actively look for diffuse symptoms or problems that they aren’t paid for. The responsibility is increasingly shifted to people - everybody should be in charge of their own health. However, older people may be unable to be so proactive - they may not be used to modern ways of looking after their physical wellbeing, such as going to the gym. They rely on the authority of the health care personnel and believe in medication and medical treatment.

When you are working in hospital you should be alert when your older patients seem to have problems other than the actual reason they have been taken in the hospital for.

Many older people come to hospital for other reasons than direct physical problems and therefore do not see an AT specialist. They can be discharged without anybody paying attention to the fact that they might benefit from using assistive devices.

Through the alertness of discharge personnel (whose role as ATI is vital), older people could get the help they need but are unaware of.

Spotting AT needs

The obvious signs of physical functioning problems can be seen in insecurity in moving around the ward, difficulties in dressing or getting up from a chair or bed. A person who has stiff hip joints or pain in them, weak muscles or balance problems, is reluctant to move, especially in large wards. They try to get support from beds or chairs, or they walk near the walls.

A person who asks for help in cutting food, because she or he doesn’t have the strength or dexterity to do so, might also have other problems, such as dressing and undressing, taking care of daily hygiene etc.
Jane

Jane has been taken into hospital for a gallstone operation. The day she is discharged she asks the ward nurse to help her with buttoning her dress. Jane says that normally she does not wear this dress, but has put it on ‘for the occasion’. It is a beautiful dress which she is very fond of, but it has such small buttons she can wear it only if somebody helps her with the buttons. The nurse chats to Jane and finds out that she has given up many things that demand fine motor skills in her daily life. The nurse suspects osteoporosis in Jane’s hands and talks about it to the doctor. After an examination the doctor confirms nurse’s suspicion and refers Jane to an occupational therapist.

When you have noticed that your patient has problems with physical function in hospital you should discuss the home situation with the patient before discharging. Ask if the patient is aware of technical aids or if she or he has ever thought of getting some. Refer him/her to a physiotherapist or occupational therapist if the problems are obvious, e.g. the patient cannot walk without support or needs help with dressing.

Make sure that you have updated information about technical aids available in the ward. You should also have some simple technical aids in the ward, such as aids for eating, dressing and hygiene. These should be readily available so that patients can see them and try them.

A simple toilet seat raiser that is easy to put on the toilet and take away is a good device to have in a hospital ward where there are older patients.

A set of different feeding aids should also belong to the basic things in the hospital wards.

Review activity - Being an effective ATI

Indicate which critical skills and attitudes an assistive technology intermediary (ATI) needs to have.
This module aimed to give you a brief overview of physical impairments and the relevant assistive technology. You can extend easily this information by collecting publications either from an accessible higher education library or local associations for disabled persons.

Alternatively, you can browse the world wide web for further information. Although you can start by feeding your favourite search engine with words like ‘assistive technology’, ‘physical impairment’ or ‘walking aid’, we suggest you start at one of these sites and follow the links provided there:

- Abledata, a database of Assistive Technology
- Disabled Peoples’ International have a good link list to pages concerning disability all over the world:
- Disability Products Inc. has information about different assistive devices:
- Area Education Agency 13 has pages on Assistive Technology Devices:
  [http://www.netins.net/showcase/atforum](http://www.netins.net/showcase/atforum)
- University of Buffalo has a centre for Assistive Technology and a resource list of literature on the subject:
  [http://www.wings.buffalo.edu/ot/cat/rerca-papers.htm](http://www.wings.buffalo.edu/ot/cat/rerca-papers.htm)

Other sources of information cited in the text include:


• **Activities of Daily Living (ADL):** activities referring to personal care and safety such as feeding, hygiene, dressing, mobility and communication.

• **Amyotrophic lateral sclerosis (ALS):** a neurological disorder, characterised by progressive degeneration of motor cells in the spinal cord and brain, often referred to as ‘Lou Gehrig’s disease. ‘A’ means no or negative, ‘myo’ refers to muscle, and ‘trophic’ means nourishment = ‘No muscle nourishment’.

• **Arthritis:** refers to more than 100 different diseases that cause pain, swelling and limited movement in joints and connective tissues throughout the body.

• **Brain attack** see stroke.

• **Environmental control:** a system permitting remote control of electronic devices in the immediate surroundings.

• **Hoist** (mobile or stationary): equipment for transferring by lifting and freely, (or as the system permits) moving a disabled person from a sitting or lying position.

• **Hypotension:** abnormally low blood pressure.

• **Hypertension:** abnormally high blood pressure.

• **Multiple sclerosis (MS):** disease of the nervous system that causes different symptoms e.g. balance problems, stiffness of muscles, tremor and loss of sight. Symptoms vary considerably.

• **Osteoarthritis:** a degenerative joint in which the cartilage that covers the ends of bones in the joint deteriorates, causing pain and loss of movement as bone begins to rub against bone. The disease tends to affect the hips, knees and hands.

• **Osteoporosis:** refers to a decrease in the bone tissue due to which bones fracture easily.

• **Parkinson’s disease:** a disorder of the brain. Symptoms include stiffness, tremor, slowness and poverty of movement, difficulty with balance, and difficulty in walking.

• **Rheumatoid arthritis:** a disease that causes joints, especially the hands, feet and knees, to become swollen and painful because of inflammations.

• **Rollator:** a wheeled frame with built in handgrips and legs, which provides support whilst walking.

• **Scoliosis:** deformation of the vertebral column (spine).
• *Spasticity*: increased contraction in the muscles.
• *Stroke* (brain attack): occurs when blood supply to the brain is altered and brain tissue is starved of blood.
• *Walking frame*: non-wheeled or wheeled frames with built in handgrips and legs, which provide support whilst walking
5 FACTSHEETS

Stroke

A human brain has about 100 billion nerve cells and trillions of nerve connections. Although it is only 2 percent of the body weight, it uses 70 percent of the body’s oxygen and other nutrients. Because the brain can’t store these nutrients as muscles can, it requires a constant flow of blood to keep working properly. When a stroke occurs and blood supply is altered, brain tissue lacks blood and within four minutes of being deprived of essential nutrients, brain cells begin to die.

There are two main types of stroke:

Ischemic: About 80 percent of strokes are caused by atherosclerosis (build-up of cholesterol-containing fatty deposits called plaque). Growth of plaque roughens the inside of your artery and the irregular surface can cause turbulent blood flow around the build-up – like a boulder in a rushing stream – which can trigger the development of a clot. An ischemic stroke usually affects the cerebrum, the portion of the brain that controls movement, language and senses.

Haemorrhagic: This type of stroke occurs when a blood vessel in the brain leaks or ruptures. Blood from the haemorrhage spills into the surrounding brain tissue, causing damage. Brain cells beyond the leak or rupture are deprived of blood and the area is also damaged. One cause of a haemorrhagic stroke is an aneurysm. This ‘ballooning’ from a weak spot in a blood vessel wall develops with advancing age. Some aneurysms may also form as a result of a genetic predisposition.

Haemorrhagic strokes are less common than ischemic strokes – but more often deadly. About 50 percent of people who have haemorrhagic strokes die compared to about 20 percent from ischemic strokes. Strokes that occur in young adults are typically haemorrhagic.

(Healthoasis Mayo Clinic
www.mayohealth.org/mayo/9506/htm/stroke.htm)

Study: Sonn, U. and Grimby, G.: Assistive devices in an elderly population studied at 70 and 76 years of age.

The Longitudinal Intervention Study of the Elderly in Göteborg, Sweden carried out a report on the use of assistive devices in activities of daily living (ADL) in a subsample of elderly people living in their own homes,
Increasing the IMPACT of assistive technology
Physical impairments module, version summer 1999
Page 46 of 47

who were interviewed at the ages of 70 and 76 (371 people). One fifth at
the age of 70 and almost half of the population at 76 had assistive devices,
most frequently in connection with bathing and mobility. A higher
percentage of females and subjects living alone used assistive devices
compared to males and cohabitants. The longitudinal study showed that
315 developed a need for assistive devices between 70 and 76 years, while
50% had no devices at 70 or at 76 years of age. The usage rate was 90% and
a high degree of effectiveness was found, shown particularly by an
increase in safety and a decrease in effort in the various activities.

What are walking sticks or canes used for?

There are several reasons why people use a walking stick:
• because of muscular weakness in lower limbs;
• to relieve pain, e.g., because of arthritis;
• to widen the walking base in case of the poor balance, e.g., because of
  hypotonia, multiple sclerosis;
• to protect damaged joints or weak bones, e.g., because of accidents or
  osteoporosis;
• to compensate for deformity, e.g., because of scoliosis;
• for social reasons, e.g., people with multiple sclerosis might want to
  use a stick to show that they are not drunk when they walk unsteadily
  due to spasticity or balance problems

How to choose a wheelchair?

A wheelchair should always be individually chosen. Consideration should
be taken of the user’s needs for mobility, the environment where the
wheelchair will be used (indoors/ outdoors/or both) and the need for
transportation and storing. The needs of those who will assist with the use
of the wheelchair should not be forgotten either. It should be stressed that a
wheelchair which is good in all situations doesn’t exist and that it is better
to choose two different chairs for outdoor and indoor use if the person uses
the wheelchair daily. It may help somewhat to compare a wheelchair to
pairs of shoes, in order to see why more than one chair is needed.
Measurements that are vital for choosing a chair are the length of the
person’s thigh and the lower leg, width of the hips and length of the back.
The length of the hands and dexterity are also important and special
attention must be paid to the seating position. When choosing someone’s
first wheelchair it is wise to consult a specialist in the field.

Further information about wheelchairs is available – try:
the ‘guide to wheelchair’ section in http://www.abledata.com/conguide.htm
  Wheelchairs. Rehabilitation Press.

Environmental control units (ECU)

Environmental control units provide a method for people with severe
disabilities to operate appliances or devices. Appliances commonly
connected to ECUs are television sets and other audio-visual devices, lights, telephone and bed controls. With an ECU, individuals with severely limited motor control can turn on the television or adjust their bed. An ECU consists of three main components: the input device, the control unit, and the appliance. The input device controls the ECU by direct selection such as using a keypad or a control panel or by a set of switches, either single or dual control. The control unit receives the signals from the input unit and translates them into an output signal. The control unit gives directions to the appliance which can be nearly any electronic equipment, or an object like an ordinary window into which is attached an electronic motor for opening and closing. The control unit directs this motor.