

**TRAINING MANUAL
FOR FITNESS
PROGRAMMES IN
OLDER PEOPLE AND
PREVENTION OF
FALLS**

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Objectives of the manual

This manual is meant for CBR workers

- to identify people over the age of 60 years in the community,
- to identify those who are at risk of falling and supervise exercise programmes
- to prevent or decrease the problems that may arise because of aging including problems of memory.

This manual is not meant for academic purposes. This manual may be used after training has been completed by professionals.

Pre test

		Yes	No	Don't know
1	Older people will be harmed if they do exercises			
2	Diabetes, blood pressure will increase with exercise			
3	Older people have to accept some problems like pain and weakness due to old age			
4	Doing house work according to their liking is enough exercise for old people			
5	Falling without breaking any bones is all right			
6	Making alterations in the house can be done only when someone is in a wheelchair			
7	Walking is enough exercise for old people			
8	Doing exercises with a group of people is good for overall health			
9	Being fit improves the mental ability of old people			
10	Exercises are good for bone strength and muscle strength			

What is aging: old age is different in different parts of the world. In India too the age at which one is considered old changes from cities to villages and has changed over time. 20 years ago a person of 50 would have been considered as old. But now it is not so. What this means is that the word old age is not only the number of years of life but also related to social and cultural aspects. If one thinks back, activities that our grandmothers may have been considered too old to do are being done by our mothers at an older age. Therefore, when considering health, it is necessary to look at the number of years as well as the cultural meaning of “old”.

What is fitness: fitness is a state of health and wellbeing. A fit person is able to carry on routine normal activities without effort and is also able to perform unexpected tasks without ill effects. A fit person has stamina and generally has better ability to withstand illness.

Why fitness: being fit decreases the chances of a person getting certain diseases which are due to the way they live like diabetes, high blood pressure, certain types of cancers etc. Being fit decreases the chances a person injuring himself during activity. Being fit makes a person feel good about themselves, rest better, feel more energetic and live a happier life.

What are the benefits of being fit in old age: as mentioned earlier old age has as much a social and cultural meaning as actual years of life. Hence it is important to match age appropriate health expectations with cultural and social expectations. An older person who is fit will be a more productive citizen, more likely to live longer and healthier and have a happier outlook on life.

How to improve fitness: there are many aspects to fitness. All of these have to be addressed for overall fitness. These are

Flexibility: the most important areas that need good flexibility are ankle and neck. The ankle should have full movement in all directions. The ankle is the first joint that allows a person to maintain his balance if he loses his balance during walking. The ankle also helps maintain balance when a person is walking on uneven surfaces or on pebbles or loose sand. The minor adjustments required to walk without falling on uneven surfaces requires adequate movement in the ankles. Movement of the ankle can be checked in the following manner.

Neck: turning the neck to each side is very important for balance and safe walking. This is because there are sense organs in the neck that send information to the brain on the person's position in space. The amount of movement that occurs in the neck is important for this function.

Strength: the strength of the muscles is an important aspect of fitness. The muscles that are especially important are the muscle at the front of the thigh (quadriceps), muscles at the back of the leg (calf muscles), buttock muscles, and muscles of the back. If these muscles are weak the chances of falling are much greater.

Endurance: or stamina is the ability of the person to continue doing activity for a period of time. This involves the ability of the muscles to keep working as well as the heart and lungs to take up the extra load of activity. If a person has reduced stamina, he/she will find it difficult to do sudden spurts of activity. If he/she has to do sudden activity, he/she may fall, or injure himself/herself. Hence endurance training is an important part of fitness training in elderly.

Agility: or balance is the ability of a person to prevent himself/ herself from falling when his stability is upset for example when walking in a crowded place. For safe walking especially on outside terrain, a person must have good balance in the sideways, and backward directions. A person who has poor balance in the sideways and backward directions has more chances of falling and getting seriously injured. The amount of movement in the ankle is also important for balance as one of the mechanisms by which a person maintains balance is by ankle movement and stepping in the direction of movement when balance is upset. This is called stepping reaction.

Mental ability: adequate mental ability is essential for an older person to be able function in life. Some of the important aspects of mental function required are problem solving ability, sequencing of complicated tasks, foresight, memory and ability to perform more than one thing at a time. E.g. Ability to talk while walking. It is often thought that as a person gets older he/she will lose mental ability. This is only partly true. A person who is healthy can be alert and mentally able even in his eighties and nineties. Like physical fitness, which is lost if we do not exercise our body, mental fitness is lost if we do not exercise our mind.

Common problems associated with old age: as people age certain changes happen in their bodies. Some common problems are

Diabetes, high blood pressure, joint pains, increased fat and decreased muscle, loss of memory, dizziness, falling, softening of bones (osteoporosis) and incontinence.

How to decrease the bad effects of old age? To decrease the effects of old age that result in poor health; exercise, nutrition and mental exercises are required. Doing exercises increases the blood flow and allows more oxygen to be distributed through the body. Doing mental exercises will help the person to keep their memory and some of the other mental abilities at a good level.

What age is appropriate for starting fitness programs? Any age is suitable for exercising. The amount of exercise and the type of exercise must be suited for the individual patient. Most people can do some basic exercises that will decrease their chances of falling and increase mental functions.

Can people with diabetes and high blood pressure exercise? Yes. People with diabetes and high blood pressure can exercise. Diabetes is a disorder where there is

excess of sugar in the blood. When a person with diabetes exercises, some of the sugar is burnt up during exercise. Hence exercise helps to control diabetes.

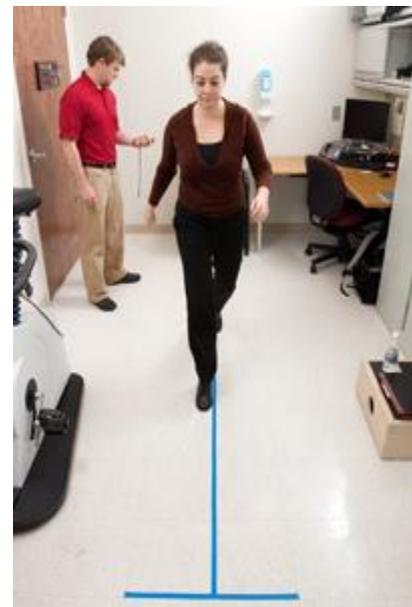
When a person exercises, the blood vessels dilate. Over a period of time, blood pressure decreases to some extent. Hence exercises done properly can help to control blood pressure.

How to decide who can join fitness programmes: before beginning any exercise programme, it is necessary to get a check-up from a doctor to make sure it is safe to exercise. Once the doctor has allowed a person to join a fitness programme, the following evaluation must be done to decide how much and what exercises the person can do.

Assessment

Balance: balance is the ability to change the body's position without falling. For a person to have good balance many things are required. He needs vision, hearing, neck movement, ankle movement, strength, feeling, and mental ability. One way to check an older person's balance is as follows:

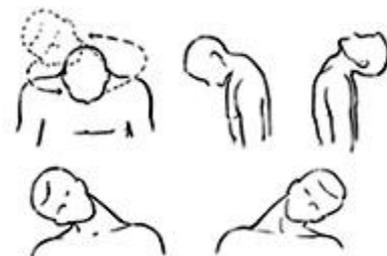
Make the person sit on a comfortable stool/ chair without arms (chair A). Mark a distance that is 10 metres from the chair. Keep another chair there to mark the distance (chair B). Tell the person to get up and walk to chair "B", turn around and walk back to chair A and sit down. If the person takes more than 30 seconds to do this activity, then he is at high risk of falling. The reason for falling may be one of the reasons given below or a combination.



Flexibility:

Neck: tell the person to move the head to look upwards at the ceiling. Measure the distance between the tip of the chin and the bone below the neck

Then tell the person to look downwards towards the feet and measure the same distance

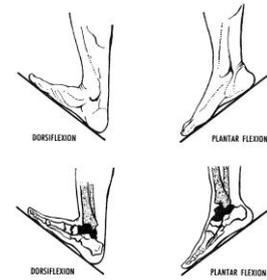


Tell the person to bend his neck so as to try to touch his ear to his shoulder. Measure the distance between the ear and the tip of the shoulder. Do this on both sides.

Tell the person to turn his head to either side as if to look over his shoulder. Measure the distance between the chin and the tip of the shoulder. Do this on both sides.

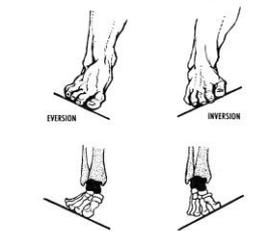
Ankle:

Upwards: with the person sitting with the legs straight, ask him to move his foot up towards the face. The heel should make an acute angle with the leg bones.



Downwards: with the person sitting with the legs straight, ask him to move his foot downwards so that the toes are pointing away from his face. The heels must move downwards and cause creases at the back.

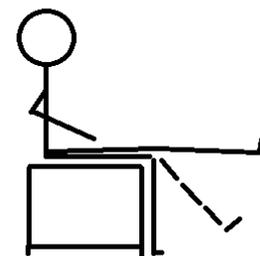
Sideways and inwards: in the same position as before turn your feet inwards so as to face each other. With the feet together, the great toes and the bone attached to it must touch one another.



Sideways and outwards: in the same position as above, turn your feet outwards so that the great toes and the bones attached to them make a “v”.

Strength:

Thigh: the muscles at the front of the thigh are important for several activities like standing from sitting, walking, climbing stairs and so on. These muscles are also very important in keeping the knee stiff so that the knee does not buckle and cause the person to fall. These muscles if not used properly, become weak very fast even within 1-2 days. Hence the strength of these muscles are very important. The way to check the strength of these muscles is as follows:



Give the following score

Can do the movement 10 times	5
Can do the movement 8 times	4
Can do the movement 6 times	3
Can do the movement 4 times	2
Can do the movement 2 times	1
Cannot do the movement at all	0

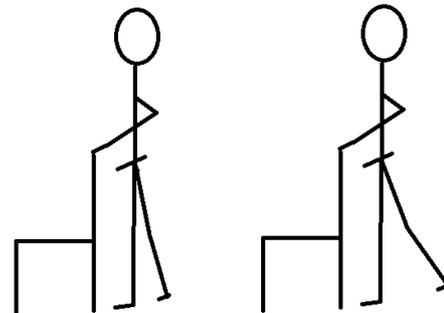
Calf: another extremely important muscle is the calf muscle- the muscle that is behind the lower part of the knee at the back. These muscles help to maintain balance and also help the person to walk by allowing him to push the ground and walk forward. The strength of these muscles is important to prevent falls from happening. The way to check the strength in these muscles is as follows:



- Stand on a firm surface
- Hold a solid surface
- Come up on your toes

The same scoring as above can be used for this movement also.

Buttocks: the muscles that form the buttock help a person to stand upright and are very important for walking and climbing. These muscles help the person from falling forwards. The way to check the strength in these muscles is as follows:



The same scoring can be used as above.

Back: along with the muscles of the buttock, the muscles of the back also help to maintain balance and prevent the person from falling. The way to check the strength in these muscles is as follows:

Have the person lie on his stomach. Tell him to keep his hands by his side. Then tell him to raise his head and shoulders up from the bed as high as possible. Measure the distance between his chin and the bed.



Strength needed for function: no activity that a person needs to do is done by one muscle alone. A number of muscles act together to perform an activity. So it is necessary to check combination of muscle strength or ability to do an activity. Some important activities are given below:

Sit to stand: have the person sit on a stool or chair without arm rests so that his feet are placed well on the floor. From this position, tell him to stand up without pushing up on his knees with his hands as many times as possible in one minute. This will give an idea of the total strength of leg and back muscles.



Step ups: have the person climb up steps of 20 cms height as many times as possible in one minute. The number of times he can climb will show his strength in the leg muscles.



Toe stand: have the person stand near a heavy piece of furniture and hold it for balance. Then tell him to come up on tip toes as many times as possible in one minute. The number of times he can do this will give an idea of the strength in his calf muscles.



Stamina: the amount of stamina that a person has helps him to perform work not ordinarily done. This means that a person who has less stamina is more likely to get tired and fall if he has to walk a long distance once in a while. For this maintaining stamina with exercises is important. The way to check the stamina of a person is as follows:

Mark a corridor and measure the distance between the two ends. Then from one end tell the person to start walking to the end and back as fast as possible for 6 minutes. Measure the total distance that the person walks in 6 minutes. This will give some

idea about his stamina. As the distance increases you can know that the person's stamina has increased.

The above given tests will help to identify people who may have chances of falling.

The following tests are general tests to check **flexibility and strength of the upper body**:

Flexibility: tell the person to reach as far as possible to touch his back from the opposite shoulder as if to scratch it. Then ask him to reach from under the same shoulder to do the same thing. How far he can reach in each direction, gives an idea of his arm flexibility.



Have the person sit on a chair and tell him to reach down as if to wash his feet. See if he can do this. This will give an idea of the flexibility of his back.

Strength: have the person lift a small bag or tin weighing no more than 1 kg over his shoulders as if to keep it on a shelf. Repeat this as many times as possible in one minute. This will give an idea of the strength of his arms.



The following activities will help to identify deterioration of mental functions which may act as a risk factor for falls.

Counting backwards: if the person is literate, ask him to count backwards from 100 in threes i.e. 100, 97, 94 etc. check the number of mistakes he makes.

If counting backwards is not possible, give the person a list of 15 common objects and ask him to recall. Check the number of items he can recall.

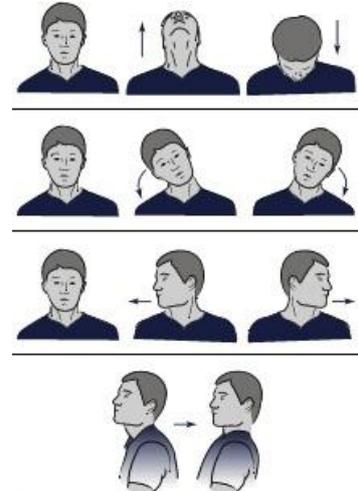
A good test for all older people is to tell them to draw clock showing 7:15 or 8:20 or some such time other than 12:00, 6:00; 6:30, 3:00 etc. the details you must look for are the numbering, evenness of numbering, small and big hands and the accuracy of

the time. A person with normal mental abilities will be able to draw a clock showing correct time in less than a minute.

Exercises to increase flexibility:

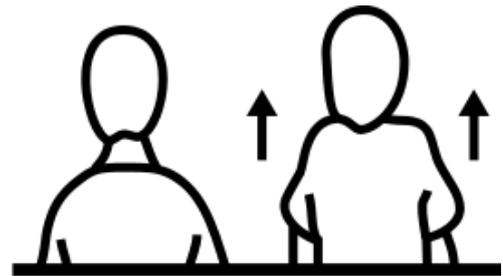
Neck

Move your head to look up at the ceiling and then down to look at your toes. Then bring your head to the normal position and turn to both sides so as to look over your shoulders. Next bring the head back to normal position and bend your neck so as to bring your ear to your shoulder.



Shoulders:

Bend your elbows and keep your fingers on your shoulders. Then bring the points of your shoulder up towards your ears and then back and then forward again thus making a circle along with your arms.



Trunk

Have a group of people sit in a circle on chairs without arms. Use a medicine ball or a pillow case filled with sand so as the weight is about 2 kgs. Have them pass the parcel alternating directions i.e. once to the left and then to the right.

Legs: sitting on a chair, bend and straighten your knees and then circle your feet in both clockwise and anti-clockwise directions.





Exercises to increase strength:

Shoulders: While standing grasp the stick behind the back and raise it as far back as possible.

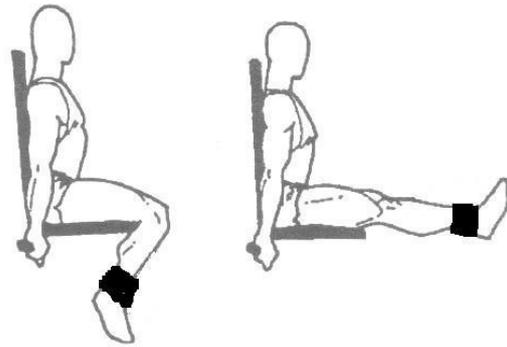
Another exercise would be - While sitting in a chair, or lying down on your back with legs bent, hold a stick in both hands so that your arms are in line with your shoulders. Tie a small bag filled with pebbles/ sand weighing not more than 1- 1.5 kgs. Using this weight lift both hands so as to lift the stick and weight above the head.



Hands: take a mug of water and a cotton cloth like a hand towel. Soak the towel in water and squeeze it out using one hand at a time. Then wring it out using both hands. As the hands become stronger, increase the thickness of the cloth.



Legs: While sitting in a chair, lift your legs up so as to straighten your knee. You can make this more effective by tying bags filled with sand or a similar substance and tying it around the ankles.



Other exercises include the functional tests described earlier. The same activities (sanding up from a chair, toe stands and step ups) can be done as exercises to increase overall strength. One can use backpacks with 2-3 kg weight in order to increase resistance of the functional activities. This type of exercise will help in strengthening of muscles, which will increase the ability to lift more weights and speed to perform the activities with coordination.

Exercises to improve balance: balance is essential for carrying out day to day activities. Balance is an interaction of multiple systems mainly vision, feeling, strength and flexibility. Therefore, it is necessary to involve all these systems during exercise which involve all of these systems are required. The following exercises are examples. The same guidelines can be used to create new exercises of increasing difficulty.

Usually, a single exercise must first be done with the eyes open and then with eyes closed. Doing exercise with eyes closed increases the difficulty of the exercise.

Stand in a place with adequate space. Hold on to a strong object with at least one hand. Then do the following exercises

- ***Walk sideways***



- Walk crossing your legs one over the other

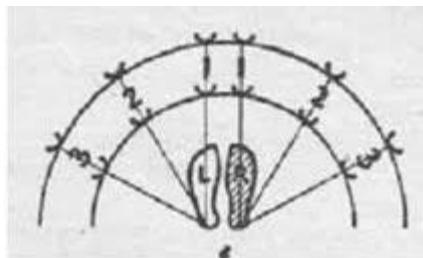


Cross right leg over left, then left over right and so on.

- Stand on one leg and then the other



Draw patterns on the floor, number them and tell the person to step into them as you call numbers.



- Musical chairs is another good activity.



- Simple dance steps can be used when the above activities are too easy for the person



Once the person can do these activities, do them to music. Then try to do mental exercises at the same time as balance exercises.

It is always more interesting to do these in a group.

Exercises to improve mental ability: simple exercises to improve memory and mental ability can involve trying to recall what the person did that day, the previous day, recall current events etc.

Depending on literacy, exercises can include capitals of countries etc.

Other exercises can include simple maths like counting in twos and threes, counting backwards, adding, subtracting etc.

Exercise programme for dementia: some symptoms of dementia include anger, violence, depression, lack of interest in routine life. So it is necessary to include counselling sessions. Also socialisation is very important to decrease the effects of dementia. So exercise programmes should be done in groups. Some activities that involve problem solving and sequencing must be included. Card games, building blocks, jig saw puzzles are useful activities. Due to the decreased motivation levels that are seen in dementia, these people also undergo physical deterioration. Therefore there is a greater need to include physical exercises to make sure there is no deterioration in physical abilities. As a precaution, persons with dementia should be closely supervised when doing exercises to prevent injury. Hence groups should be small and one person can supervise 3-4 people.

The exercise programme should consist of the following -

One session can be 45 minutes long. The first 15 minutes can be devoted to mental ability games and activities including physical activities. The next 30 minutes should consist of 5 minutes of flexibility, 20 minutes of walking/ cycling or other endurance (stamina) exercises and 5 minutes of balance exercises. On alternate days, instead of stamina exercises, they can do strength exercises.

People must exercise for at least 5 days a week.

Exercise programme for diabetes: the main reason to exercise if you have diabetes is in order to burn sugar. For this, at least 20 minutes of an activity like walking is required. People should walk at a speed that makes it hard for them to walk and talk at the same time. This also means that the person must feel that the walking is somewhat hard. All walking sessions must be preceded by 2 minutes of warm up consisting of flexibility exercises and 2 minutes of cool down which can consist of walking at a slower speed.

People with diabetes must walk for at least 4 times a week. The other 3 days can be used for strengthening exercises. Precautions include feeling dizzy or weak. Patients on insulin must be especially cautious.

Exercise programme for high blood pressure: a similar exercise programme to diabetes can be done in these people as well. Precautions include feeling dizzy, headache and flushing. In these cases exercise must be stopped and a doctor must be consulted.

Exercise programme to prevent falls: falling or fear of falling is a common condition among the older people. Most falls occur when the person gets up from a lying position. The reasons are many. There can be a sudden drop in blood pressure when a person gets up suddenly from the lying position. After lying down for some time, the joints and muscles get stiff and don't move easily. Also change in position may disorient the person. Keeping fit can decrease the chances of falling. An exercise programme for prevention of falls can be as follows:

3 times a week flexibility, balance, stamina.

2 times a week flexibility, balance. Strength.

In addition to the general exercise programme it is necessary to do a full assessment of the person to see what the risk factors are for falling. Risk factors for falling may be as follows

Within the person like decreased vision, poor balance, high blood pressure, poor feeling, decreased flexibility and strength

Outside the person in his surroundings like too bright or not enough light, too much shadow, uneven floor, slippery floor, things on the floor, pets, strange patterns on the floor tiles, walking aids that need to be repaired are some conditions that increase a person's chances of falling. These things must be looked at if the person seems to have a risk of fall. Light must be diffuse so as not to cast shadows. If floor is uneven it is a good idea to put grab bars.

Compensatory techniques for:

Low vision: older people with low vision can be given compensatory tools so that they can still be independent. The community can install audio signals at road crossings and public buildings. Other than that a simple hand held magnifier can help a person with difficulty seeing to read. Lights must be diffuse and clear. Yellow light is better than glaring white light. Grab bars or rails along the walls will be a useful thing for people with vision problems.

Fall precaution: if the reason for the fall risk is within the person, compensatory tools that can be used is to have a bedside bell so that the person calls for help each time they get up at night. If they have incontinence and get up often, a urinal or bedside commode will decrease the amount of walking to be done. Any walking aids that the person uses must be carefully checked and made sure that it is in good condition. All external reasons for falls must be removed. A remote battery operated bell can be carried around by the person at all times on a string round his/ her neck. If they need help or do actually fall, they could use the device to call for help.



Dementia: memory aids can be used for people who have decreased memory. If they take regular medicines, these can be sorted out in separate coloured boxes for each day. If the person is literate, write the day of the week on the boxes. Otherwise make sure only one box is outside. Mobile phones can be used for voice reminders if they tend to forget what they should do like eating and drinking water. If they tend to wander off, it is safer to write their name, address and number on a card and hang it around their neck on a non-removable chain.

Difficulty walking: if the person has difficulty walking, use of walking aids is recommended. In case of an older person with no problems with the hands, a walker with wheels is the best choice. This allows for continuous walking and eliminates the need to lift the walker each step thus increasing the chance of falls. It is better to fix bamboo or wooden or steel bars along the walls of the house especially in the toilet and bathroom.

Decreased flexibility: if the person has less flexibility in the knees and hips, use chairs that are higher, put a stool over the toilet to increase the height and put the bed on bricks to make it easier for the person to get on and off. If the person has difficulty lifting his legs up on to the bed, you can make a leg lifter for him. This consists of a stiff rod bent into a loop at one end with a loop handle on the other end. The person can hook the foot into the stiff loop and using the strength of the hand help to lift the legs on to the bed. Decreased flexibility that may make it difficult for the person to lift things off the floor can be managed with a long pair of tongs that can be easily made. Take two long flat sticks. Nail them together with a small block of wood between them to keep them apart. You can stick a piece of rubber or tyre to both ends of the tongs to keep articles from slipping. It is also better to have a loop on the holding end so that the person can put his hand through it preventing it from falling to the ground.

Making the handles of knives, toothbrushes and utensils thicker by wrapping them with cloth or putting wooden pieces on them will help if the person has less ability to bend fingers and hold things.

Decreased strength: decreased strength in the legs may require walking aids, splints etc. in the hands some modifications can be done by using longer handles, using both hands instead of one using the forearms instead of the hands etc. For this specific needs of the person has to be assessed and appropriate compensation done.

Decreased stamina: if a person has decreased stamina to do his work, a simple compensation is to break up the job into small tasks. Take rest in between and take more time.

In summary, simple exercises and simple modifications around the house can make the elders in your community safer and happier.

Everyone has to grow old
one day. Let's make it a
happy experience.

Age with grace!