



The background image shows an older man with white hair and glasses, wearing a light purple sweater, looking towards a large digital screen. A woman with dark hair, wearing a pink top and dark jeans, is pointing at the screen with her right hand. The screen displays a software interface with various icons, text, and a small image of a bowl of food. The room has a light-colored ceiling with a green exit sign, a white door with a circular window, and a green wall. A potted plant is visible in the foreground.

User manual

SILVERFIT

March, 2010. Version 2.0.2

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Manual edition 2010-01.

Safety considerations

SilverFit should be used by therapists



The SilverFit is a tool for therapists to provide exercises in geriatric rehabilitation. It is intended for patients who are often frail and vulnerable. A skilled therapist should judge whether a particular patient is able to do the exercise required and monitor the safety of the patient during the exercise.

The system cannot monitor or guarantee the safety of your patients. Although some patients can train by themselves, judging whether this is possible or not is the sole responsibility of the therapist.

Particularly vulnerable patients may require continuous assistance (see the relevant section for some suggestions on how to do this).

In no event will SilverFit be liable for any direct, indirect, incidental, special, consequential or other damages, including personal injury, arising out of the negligent use of the SilverFit by any person.

Introduction to SilverFit

A very short summary...



The SilverFit is a virtual therapy system.

It provides exercises for physical rehabilitation, e.g. after a stroke, a knee or hip operation, or an accident. We try to include all relevant gross motor skills over time.

Patients can use the system as part of their physiotherapy program.

This manual describes the operation of the system in detail. A summary of the scientific background and other relevant information can be obtained from our website or by email at info@silverfit.nl

Turning the system on or off

To turn on



1. Plug in power



2. Turn on computer



3. Turn on TV

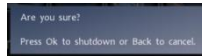


4. This menu appears

To turn off



1. Left click off button



2. Confirm with left mouse click



3. Turn off TV



4. Unplug power

Navigation using the mouse

Basic operation



Control mouse with your wrist

You do not need to move your arm to control the mouse. A small wrist movement will do. You can calibrate the mouse by making a quick bottom-left to top-right movement.



Press left button to choose

For example, to choose a menu item, press a button, or proceed to the next screen.



Press right button to cancel

This brings you back to the previous screen. You can also use the right button to exit a game.

Tricks and tips



If the mouse does not work...



If the mouse is operational, you will see lights on the front. If you see no lights, turn on the mouse with the switch on the back. If this does not work, the battery has to be charged. Put the mouse in the mouse holder to charge.



Press the “play” button on the mouse during a game to open a small camera screen. This screen shows the current camera view and can help you to troubleshoot.

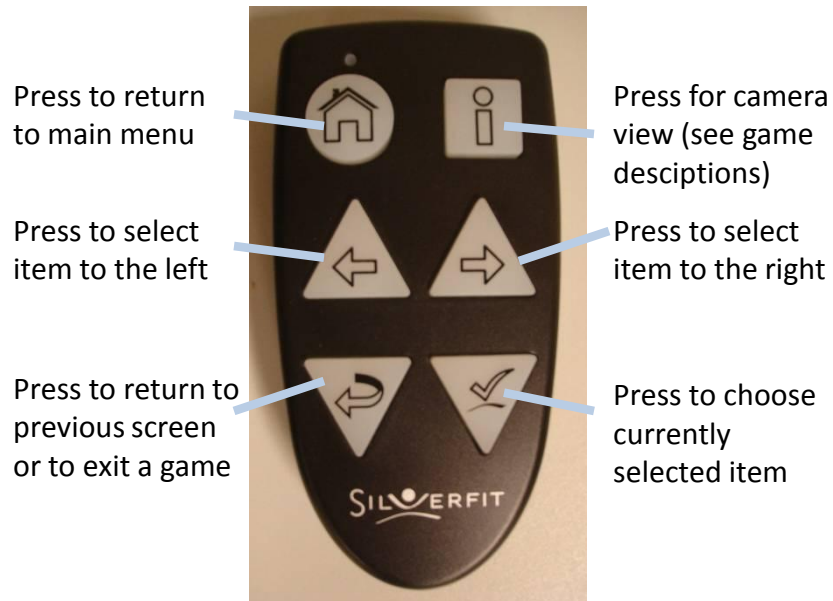


Press the “vol” button on the mouse to turn the sound on/off. Hold the button and move the mouse to the left to lower the volume. Press button and move the mouse to the right to increase the volume.

Navigation using the remote

Using the remote

The remote has been designed for use by the patient. Therefore, it's not possible to access the patient data files and detail menu screens using the remote. It's also impossible to turn the system off using the remote. For this, you need the mouse.



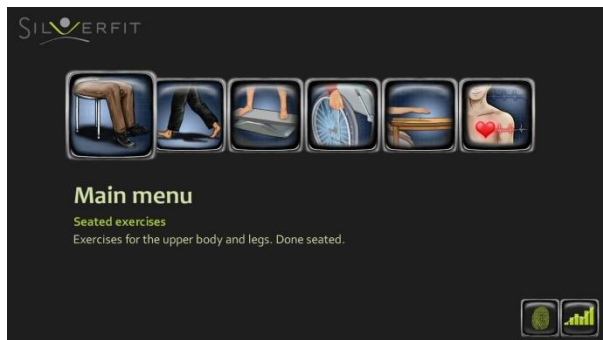
If the remote does not work...

If the remote is operational, you will see a light turn on when pressing a button. If there is no light, change the batteries of the remote.

The remote needs to be pointed at the system to work.

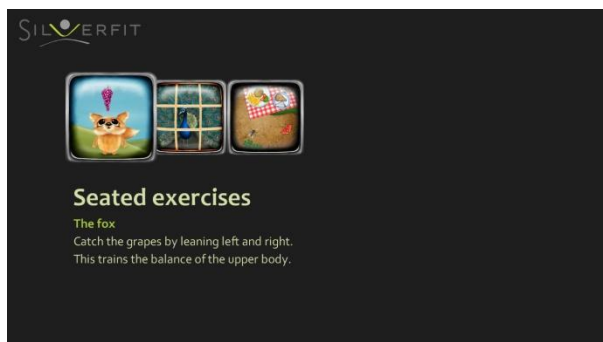
Menu structure

Press three buttons to start



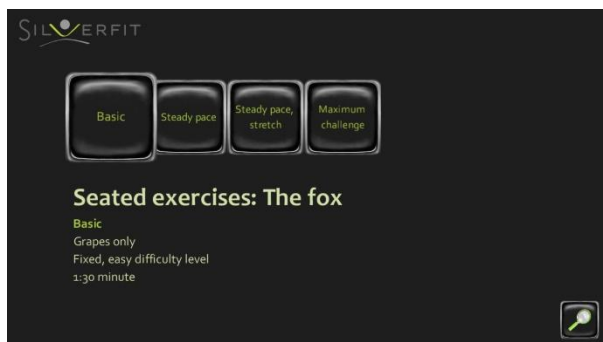
Choose movement

The main menu shows 6 types of movements. Choose one of the categories.



Choose exercise

The next menu shows 1-5 game options. Choose a game.



Choose difficulty

The next menu shows 4 difficulty settings, with the easiest setting on the left. Choose a difficulty to start the game.

Additional options



Patient login

Log in a particular patient



Administration

Open the patient management section



Turn off

Turn off the SilverFit system



Use detailed settings

Adjust the game options using the detailed settings menu

Using the detail menu

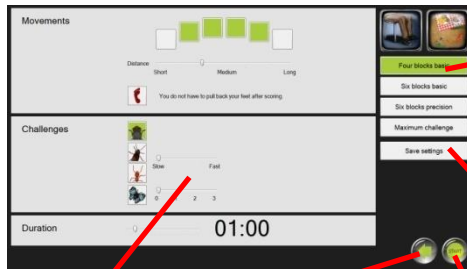
Detail menu screen



Access to the detail menu

Each game menu has a “looking glass” button. Clicking on this button opens a menu with detailed settings for that game.

This menu allows you to adjust the exercise settings to your patient’s needs. After adjusting the settings, start the game with the button on the bottom right.



Click on one of these buttons to choose a preset game setting

Click to save your current setting (see right hand panel)

Click to start exercise with the current setting

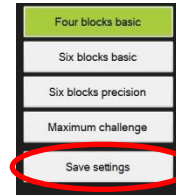
Adjust game settings here

Return to previous menu

Refer to the individual game descriptions for more information on the detailed settings.

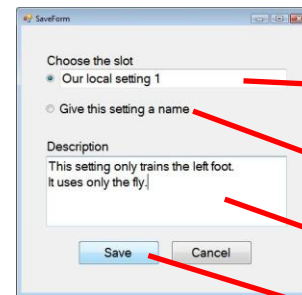
Saving a custom exercise setting

You can save a setting to make it accessible to colleagues.



Press the “save settings” button

When you are satisfied with a particular setting, press the “save settings” button



Type in name and description

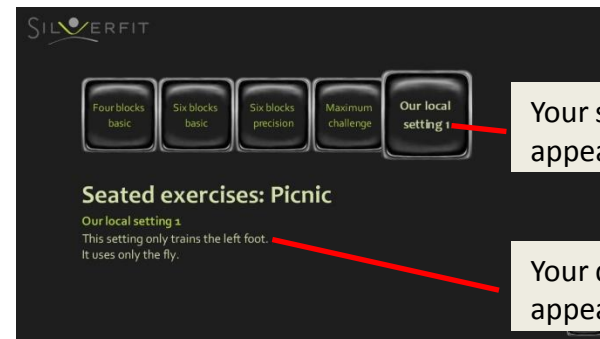
Type the name here

You can save a 2nd setting here

Type a description here

Click on “Save” when done

The setting is added to the menu



Your setting appears here

Your description appears here

Overview of the exercises

Sitting



Bending left/right



Bending left/right
Sit-stand
Arm movements



Tapping with leg



Any arm movement



Any arm movement

Walking



Walking left/right



Walking on the spot
through a small city



Walking in a small area

Balance



Bending left/right
while standing



Dynamic balance

Wheelchair



Fine navigational
control in
wheelchair

Arm



Move arm on table
Raise arm from table
Grab/reach



Move arm in lateral
direction, on table
or unsupported

Cardio



Fast lateral walking



Fast reaction speed
and dynamic balance



Squats

Choice guide to the exercises

2 Can be done with 2 patients

		Post-stroke	Total hip	Total knee	Fall prevention	Amputation	Multiple sclerosis	Parkinson	Activation/fitness	Alzheimer fitness	Cardiac disease	COPD	Recent wheelchair	Skilled wheelchair
	Sit-stand													
	Lean with upper body													
	Tap/kick with feet													
	Simple arm movement													
	Lateral walking													
	Walk in place													
	Walk in small area													
	Wheelchair control													
	Dynamic balance													
	Leaning left/right													
	Move arm on table													
	Lift arm from table													
	Reach/grab													
	Stepping exercise													
	Squatting exercise													

How to help a patient

How to help a patient



As long as the therapist stands behind the patient, the camera will react mostly to the patient and not to the therapist.



It is possible to use tools like the parallel bars to make things easier for the patient.



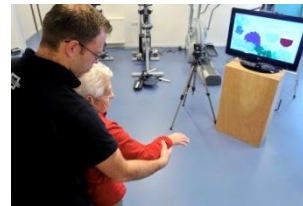
It is easy to explain a game by sitting next to a patient. However, when the game starts, the therapist should move back. If he does not, there is a chance the camera detects the therapist instead of the patient.



If you have to hold or touch the patient, the camera will have difficulty separating patient and therapist. Make sure to stand behind the patient to minimize the disturbance.



If the therapist stands closely behind a sitting person, the camera can sometimes interpret the therapist as the upper body and the patient as the lower body. Move somewhat to the side, back, or sit down to minimize the disturbance.



It is also possible to use help a patient more intensively. If the therapist fully mimics the patient's movements, the camera will react to the combined movement.

Sitting exercises, The Fox: exercise overview

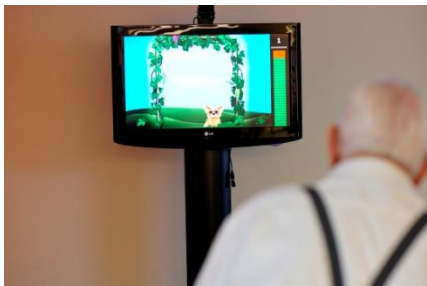
When to use, contra-indications

- Goal:** This game trains upper body control: leaning left and right.
- Used for:** Post-CVA, MS, balance impairments, maintaining upper body flexibility for long-term wheelchair users.
- Contra-indications:** The patients should be able to lean left/right without falling over.

Exercise description

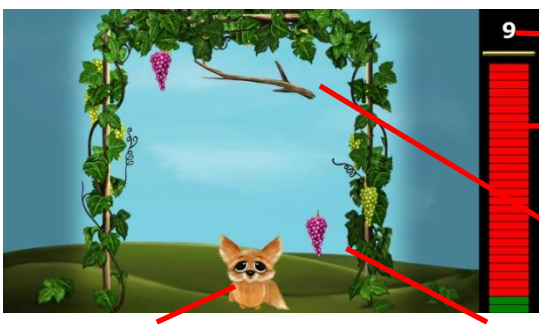


The patient sits on a chair or wheelchair about 2-3m from the screen. Press “OK” (left mouse button) when patient is ready to start.



When grapes appear, the patient leans left or right to move the fox towards the grapes and catch them. Branches should be avoided by leaning away. Chickens can be caught by raising both arms in the air.

Rules



Current score

Remaining time

Avoid the branches

Move the fox by leaning left and right

Catch as many grapes as you can



Raise both arms to make the fox jump and catch the chicken. This gives a small time bonus.

Scoring



Overall score, 1 per grape caught

Grapes caught

Grapes missed

Chickens caught

Branches hit

Sitting exercises, the Fox: standard settings

Standard difficulty settings



This is a very simple basic setting. Only one grape will appear at a time, and there are no branches or chickens.



With this setting, the number of grapes and the speed at which they fall increases over time, based on the patient's performance.



This setting adds the chicken and branches. Use it with patients who are able to manage more complex visual inputs and movements.



This setting is similar to the previous one, but starts at a higher level so that there are more grapes falling at higher speed from the beginning.

Alternative applications



Patient can be seated on a balance cushion or wobble board to make the exercise more challenging.

Sitting exercises, the Fox : detailed settings

Detail menu

Movement

 Move short distance

 Move maximum distance

Set how far the patient has to bend to move the fox

Difficulty

Easy, 1 grape

Hard, many grapes

Adapt to player

Click here to let the game automatically adjust the difficulty based on the patient's performance. Turn off for fixed level

Set the starting level: number of grapes and speed

Game elements

 You have turned off the chicken.

 You have turned off the branch.

Choose the type of challenges you want to appear

Duration

01:30

Currently set duration

Move the trackbar to set the game's duration

Click to start exercise with current settings

START

Sitting exercises, the Fox: troubleshooting

Troubleshooting



Unable to reach sides: the game measures the actual movement of the patient during the game to determine how far he/she should move. Let the patient lean left and right a few times to reset the calibration.
If the patient sits closer to the screen, he has to move less far. Move the patient closer if the required movement is too large.
The degree of movement can also be adjusted in the detail menu.



Fox off center: the system will assume the patient is in the center of the screen when you press "OK". If the patient moves afterwards, e.g., moves his chair or walks to his chair, the center will be off. Restart the game with the patient sitting. Make sure the therapist is behind and below the patient.



Playing area is very large and the fox is almost not moving: you have selected the walking version of the fox game. Go back to the menu and select the sitting version.



Fox does not jump: the game reacts to hands that are stretched forwards and upwards. Stretching your hand by the side of your body does not trigger a jump.



Fox jumps too much: the game can react to an upwards movement of the hands, even if they are not fully raised. Let the patient rest his hands on his lap when he does not want the fox to jump.

Sitting exercises, Puzzle: exercise overview

When to use, contra-indications

- Goal:** This game trains sit-stand and leaning left and right
- Used for:** Post-CVA, MS, orthopedic surgery, amputation; retrain sit-stand ability
- Contra-indications:** Sit-stand exercise should not be used if patient has insufficient strength to stand up safely without being aided

Exercise description



The patient sits on a chair or wheelchair about 2-3m from the screen.

The patient leans left/right with the upper body, and performs a sit-stand-sit exercises.



To start:

Select a picture from the range of easy-very hard pictures. Press “OK” (left mouse button) when patient is ready to start.

Rules

Stand up for this piece

Target picture

Lean left for this piece

The next piece should go here

Lean right for this piece

The screen shows a 3x3 (or larger) grid with one piece in grey. There are 3 pieces around the grid. The patient has to choose which piece fits in the grey area. To do so, he leans towards the correct piece to get the pieces on the left or right, or he stands up to get the piece on top. On the easy settings, only the correct piece is shown. On difficult settings, the patient has to choose.

Scoring

Time taken to complete puzzle

of pieces

Picture chosen

of mistakes

Sitting exercises, Puzzle: standard settings

Standard difficulty settings



This is a very simple basic setting. Only one puzzle piece will appear, and the patient does not have to stand up. This is the easiest setting from a cognitive point of view.



Two puzzle pieces will appear, but the patient still does not have to stand up. More difficult from a cognitive point of view, but similar on a physical level.



In this setting, three pieces will appear. The patient will have to stand up 3-5 times.



This setting shows a more challenging 4x4 puzzle and is only applicable for people with strong visual acuity and puzzle experience.

Alternative applications



Patient can be seated on a balance cushion or wobble board to make the exercise more challenging.



If the patient cannot stand up, use the detail menu to select an alternative movement, like raising the hands, or bending forward.

Sitting exercises, Puzzle: detailed settings

Detail menu

Movement

Bend to the left

None

Arm only

Slightly

Stretch

Bend to the right

None

Arm only

Slightly

Stretch

Get up from chair

None

Arm only

Slightly

Fully

Forward

Puzzle size

Choose the number of total puzzle pieces (3x3, 4x4, 5x5) by clicking on the right puzzle

3x3

4x4

5x5

Choice of pieces

1 answer

Choice

Click to start exercise with current settings

START

Select "arm only" to change the leaning movement and instead move the arm in the equivalent direction

Choose slightly vs stretch/fully to set the distance the patient has to lean or stand up

This option changes the sit-stand exercise so that the patient has to bend forward

Choose "1 answer" to have only the one puzzle piece appear; the patient will not have to choose, so the cognitive element of the exercise is much easier. "Choice" displays 2-3 pieces, making the exercise harder.

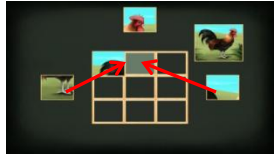
Choose "none" to get rid of puzzle pieces on the left/right/top

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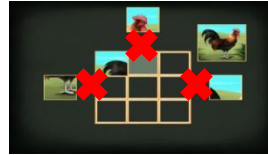
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Sitting exercises, Puzzle: troubleshooting

Troubleshooting



Pieces move by themselves: this can happen if the patient is not well detected and the system is following another person or object. Make sure the patient is sitting on a chair with as few objects around as possible. Check if the patient is visible in the camera view (“i” on the remote or “▶” on the mouse). If not, place the chair at the right distance (2-3m) and ask the patient to move his body or arms until he shows up.



Pieces do not move: check if the patient is visible in the camera view (see above). Also, make sure the therapist is not seen on camera. If the patient is in wheelchair with built-in table, remove these accessories.

If only the patient is visible and the pieces still do not move, check if the settings in the detail menu correspond to the movement made.

In the standard settings, the game reacts only to body movements, not to arm movements. If arm movements are selected, the game will not react to body movements.

Sitting exercises, Picnic: exercise overview

When to use, contra-indications

- Goal:** This game trains strength and agility of the lower extremity for a seated patient
- Used for:** Total joint, MS
- Contra-indications:** Recent total hip patients should play only with 4 squares to prevent torque forces on the hip

Exercise description



The patient sits on a chair, wheelchair or a flat surface 3m or more from the screen.



The patient taps with his feet to chase away bugs that appear on the screen.

After the bug has been chased away, the patient pulls back his feet before tapping again.

Rules

Stand up for this piece

Score

Remaining time

Hit flies on the right with your right foot

After hitting a bug, your foot turns red. Pull it back under the chair before hitting the next bug.

- Avoid hitting butterflies or you will lose points
- Cockroaches and ants walk on after a short while, so you have to catch them quickly

Scoring

Total score: 1 per bug minus 2 per butterfly

12 3 8 2

Flies hit Ants hit Cockroaches hit Butterflies hit inadvertently

Sitting exercises, Picnic: standard settings

Standard difficulty settings

Four blocks basic

This setting only shows four squares, so the patient does not need to torque the hip. Feet do not have to be pulled back after a tap. Only flies appear.

Six blocks basic

Six squares, so torque of the hip is required. Do not use if the patient cannot turn the hip yet. Feet have to be pulled back. Only flies appear.

Six blocks precision

This setting is similar to the one above, but now butterflies are added. These have to be avoided. This requires the patient to control his movements more precisely.

Maximum challenge

In this setting, the distance the patient has to tap is increased. Also, ants and cockroaches are added. These walk away after a while, setting a time challenge for the patient.

Alternative applications



Patient can be seated on a balance cushion or wobble board to make the exercise more challenging.



By setting the distance in the detail menu very high, you can require a patient to kick upwards instead of tap

Sitting exercises, Picnic: detailed settings

Detail menu

Movements

Distance

ShortMediumLong

You do not have to pull back your feet after scoring.

Click to determine which squares are in play (green). E.g. turn off all squares on the left if patient should only train right leg

Set how far the patient has to tap. The "Long" setting requires most people to kick. Taller people can reach farther

Challenges

SlowFast

0123

Choose which bugs should appear. Flies sit still and wait to be tapped. Cockroaches and ants walk away, so they create a time challenge. Butterflies have to be avoided. They require more coordinated movement.

Set the speed of ants and cockroaches

Set the maximum number of butterflies

Duration

01:00

Set the duration of the exercise

Currently set duration

Click to start exercise with current settings

START

SILVERFIT

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Sitting exercises, Picnic: troubleshooting

Troubleshooting



Feet are visible but do not react: the game is very sensitive to the orientation of the patient compared to the camera. Make sure the patient is seated straight in front of the camera, with his knees pointing at the system. Turning or sitting in an odd posture will diminish the reactivity of the feet.



“Too close” message: The camera has to see the feet of the patient, which is impossible if the patient is too close. The optimal distance for this game is about 1-1.5 m further than for most other sitting games.



“Not detected” message: If the patient sits far from the camera, it may take some time before the camera detects him. Ask the patient to make some random arm or body movements so he will be detected. Alternatively, stand very closely behind the patient and make some movements yourself. If this does not work, move the patient somewhat closer until he is detected.

Sitting exercises, Volleyball: exercise overview

When to use, contra-indications

- Goal:** This game trains moving the arm or the upper body. It is intentionally non-specific as to the exact movement made.
- Used for:** Activation exercise for early rehabilitation or keeping fit.
- Contra-indications:** The exercise may strain the arm if done for too long. The exercise requires good timing skills.

Exercise description



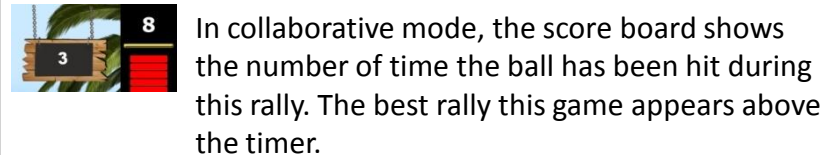
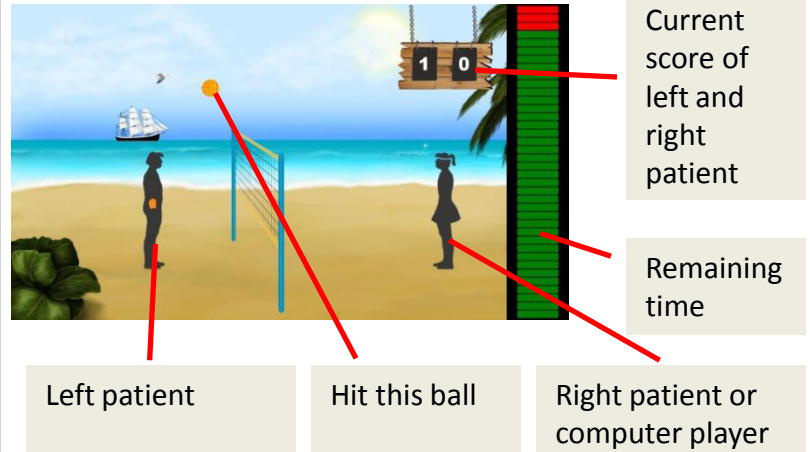
The exercise can be done by one or two patients. The patients may either sit or stand next to each other.



Two players will appear on screen. By moving either their hands, their head, or part of their upper body forward or upward the patient can hit a ball to the other side of a net.

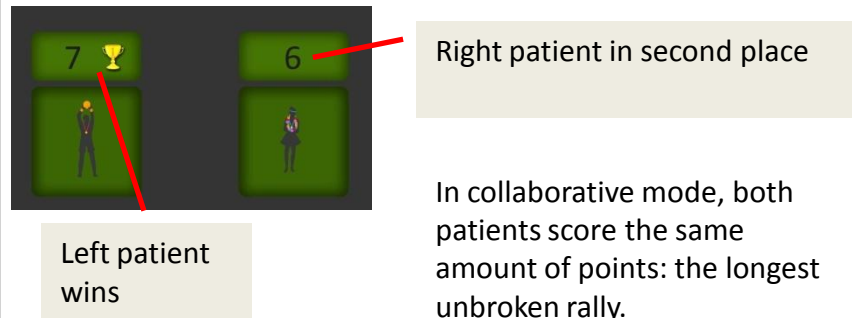
In this way, it is possible to play either a competitive game: try to get the ball on the ground on the other side; or a collaborative game: try to keep the ball in the air as long as possible.

Rules



In collaborative mode, the score board shows the number of time the ball has been hit during this rally. The best rally this game appears above the timer.

Scoring



In collaborative mode, both patients score the same amount of points: the longest unbroken rally.

Sitting exercises, Volleyball: standard settings

Standard difficulty settings



Play with the computer to create the longest rally. The computer will almost always hit the ball.



Play against the computer; the computer player is not at a very high level.



Play with another patient to get the longest possible rally.



Play with two patients against each other.

Alternative applications

The game can be played in one- or two patient mode.

As the system will recognize any upward/forward movements, you can let the patient use their arms, or stand up, or jump, or step forward, or nod their head, etc., in order to hit the ball.

Sitting exercises, Volleyball: detailed settings

Detail menu

Movement

Sensitive to
any movement

Large movement
required

Set the amount of movement required to hit the ball. If this is set to small, any movement will trigger an action. The patient can play by just nodding their head; but it is easy to trigger unintended actions. If set to large, strong movement is required and the reaction is more robust.

Game mode

Competitive

Cooperative

Set to determine the rules, either collaborative or competitive

Duration

03:00

Set the total time. The game will always finish the last rally when the time is up.

Number of players



~~One player game~~

Click to set the number of patients.

Opponent difficulty

Easy

Hard

For a one patient game, set the strength of the computer opponent.

Press to start exercise
with current settings.



Sitting exercises, Volleyball: troubleshooting

Troubleshooting



Player hits too early: any upward or forward movement will trigger an action from the figure on screen. Make sure to start the action only when the ball is very close. If the ball is still triggered too early, try sitting closer to the camera and/or setting the movement slider in the detail menu to “large movements”.

Sitting exercises, Funfair: exercise overview

When to use, contra-indications

Goal: This game trains moving the arm or the upper body. It is intentionally non-specific as to the exact movement made.

Used for: Activation exercise for early rehabilitation or keeping fit.

Contra-indications: The exercise may strain the arm if done for too long. The exercise requires good timing skills.

Exercise description



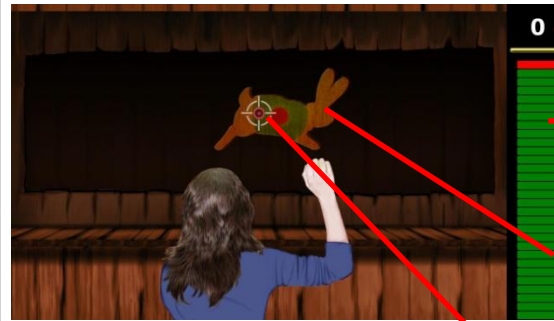
The patient sits in a chair in front of the screen. Wooden animals are moving across the screen.

Any movement upwards or forwards by the patient will trigger the person on the screen to throw a ball. If the ball hits the animal, you score points.



As the system will recognize any upward/forward movements, you can let the patient use their arms, or stand up, or jump, or step forward, or nod their head, etc., in order to hit the ball.

Rules



Current score

Remaining time

Animal to hit

Patient character (male or female)

You will throw the ball here

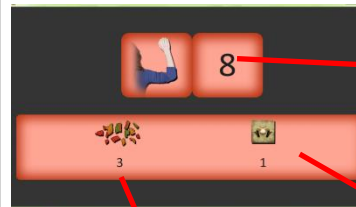


Hitting an animal on the right spot three times will earn you a trophy.



Hit the glowing part of animals to earn a trophy. Hit the bull's eye on all other animals.

Scoring



Overall score, 1 point per hit, 5 points per trophy

Animals hit

Trophies earned

Sitting exercises, Funfair: standard settings

Standard difficulty settings



The animals will move very slowly and come only from the left.



The animals will start slowly and start to move faster if the patient does well. They will come from both sides.



The animals move very fast making them hard to hit.



This setting is very sensitive to any movement. It can be used for patients who cannot make large movements but it will sometimes trigger unintended throws.

Alternative applications

As the system will recognize any upward/forward movements, you can let the patient use their arms, or stand up, or jump, or step forward, or nod their head, etc., in order to hit the ball.

Sitting exercises, Funfair: detailed settings

Detail menu

Movement

Sensitive to any movement

Large movement required

Set the amount of movement required to hit the ball. If this is set to small, any movement will trigger an action. The patient can play by just nodding their head; but it is easy to trigger unintended actions. If set to large, strong movement is required and the reaction is more robust.

Difficulty

Determine the speed of the animals

Easy

Hard

Adapt to player

Click to make the animals move faster if the patient does well.

Animals start

Left

Left+Right

Right

Determine from which direction the animals come.

Duration

03:00

Set the duration of the exercise.

Press to start exercise with current settings.

START

SILVERFIT

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Sitting exercises, Funfair: troubleshooting

Troubleshooting



Unintended throws: any upward or forward movement will trigger an action from the figure on screen. Make sure to start the action only when the animal is very close. If the ball is still triggered too early, try sitting closer to the camera and/or setting the movement slider in the detail menu to “large movements”.

Walking exercises, The Fox: exercise overview

When to use, contra-indications

- Goal:** This game trains lateral (sideways) walking.
- Used for:** Walk training post-orthopedic, post-CVA, fall prevention.
- Contra-indications:** The patients should be able to stand (possibly supported by parallel bars).

Exercise description



The patient stands 2-3m from the screen.

When grapes appear, the patient steps left or right to move the fox towards the grapes and catch them.



Branches should be avoided by stepping away. Chickens can be caught by raising one or both arms in the air.

Rules

Current score

Remaining time

Catch as many grapes as you can

Move the fox by leaning left and right

Avoid the branches



Raise both arms to make the fox jump and catch the chicken. This gives a small time bonus.

Scoring

Overall score, 1 per grape caught

Grapes caught

Grapes missed

Chickens caught

Branches hit

Walking exercises, the Fox: standard settings

Standard difficulty settings



This is a very simple basic setting. Only one grape will appear at a time, and there are no branches or chickens. This makes it easy from a cognitive point of view.



With this setting, the number of grapes and the speed at which they fall increases over time, based on the patient's performance.



This setting adds the chicken and branches. Use it with patients who are able to manage more complex visual inputs and movements.



This setting is similar to the previous one, but starts at a higher level so that there are more grapes falling at higher speed from the beginning.

Alternative applications



Patient can hold on to parallel bars for support.

Walking exercises, the Fox : detailed settings

Detail menu

Movement

 Move short distance

 Move maximum distance

Set how far the patient has to walk to move the fox

Difficulty

Easy, 1 grape

Hard, many grapes

Adapt to player

Set the starting level: number of grapes and speed

Click here to let the game automatically adjust the difficulty based on the patient's performance. Turn off for fixed level

Game elements

 You have turned off the chicken.

 You have turned off the branch.

Choose the type of challenges you want to appear

Duration

Move the trackbar to set the game's duration

01:30

Currently set duration

Click to start exercise with current settings



Walking exercises, the Fox: troubleshooting

Troubleshooting



Fox makes small sudden moves to left and right: most probably, this happens when the patient comes close to an object, the wall, or the therapist. Make sure the patient has enough space to do the exercise.



Fox jumps too much: the game can react to an upwards movement of the hands, even if they are not fully raised. Sometimes, a therapist standing close by can also cause the fox to jump.



The playing area is small and the fox jumps around: You have inadvertently selected the sitting version of the fox game. Select the walking version instead from the main menu or choose the “1.5m” or “3m” settings in the detail menu.



Fox does not jump: The game reacts to hands that are stretched forwards and upwards. Stretching your hand by the side of your body does not trigger a jump. Keeping your arms above your head will not make the fox jump over and over: lower the arms and raise them again to make the fox jump.

Walking exercises, A Stroll: exercise overview

When to use, contra-indications

- Goal:** This game trains walking on the spot, lifting the knee. It trains this in an ADL/traffic environment.
- Used for:** Total knee, general fitness, alzheimer.
- Contra-indications:** Patient should be able to stand and bend/lift his knee.

Exercise description



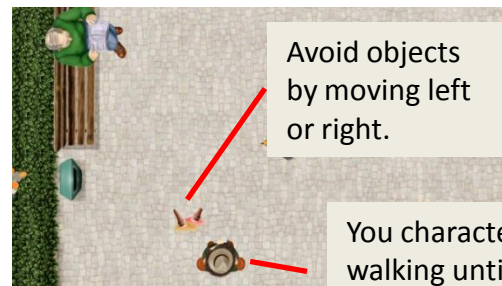
The patient stands in front of the screen and walks on the spot by lifting his knees.

He can move left or right to avoid objects. Any object he hits causes some time loss.

As an option, select high steps– the patient has to lift his knees up high to step over these.



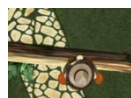
Rules



If you hit an object, you will get a warning and lose some time.



Wait to cross the street until the traffic light turns green.



To cross over obstacles like this trunk on the road, lift the knee as high as possible.

Scoring

Time spent



Number of steps taken

Obstacles hit

Obstacles avoided

Walking exercises, A Stroll : standard settings

Standard difficulty settings



This is a very short distance walk with only one traffic light and no further obstacles.



This is a somewhat longer walk. The patient has to step sideward to avoid stationary obstacles.



This walk is roughly the same length as in the previous setting. This time, the walk contains obstacles such as stairs and tree trunks that require the patient to make a high step.



This is a longer distance walk in which the patient needs to avoid a number of moving obstacles as well as stationary obstacles and high steps.

Alternative applications



Patients can use a stroller as long as the knees are visible to the camera.



Patient can hold on to parallel bars for support. This also helps them keep in the same spot.

Two patient mode



The game can also be played by two patients. Let the patients stand 50cm or more apart. They will walk the same distance and encounter the same objects, but they cannot influence each other.

Note that walking very fast/running is not possible.

Walking exercises, A Stroll : detailed settings

Detail menu

Challenges



Traffic lights

none a few multiple many

Set the number of traffic lights encountered. These require the patient to stop and wait.



Stationary obstacles

none a few multiple many

Set the number of stationary objects. These require the patient to step sideways.



Obstacles to step over

none a few multiple many

Set the number of obstacles that require a patient to make a high step (lift knee up high).



Obstacles moving towards you

none a few multiple many

Set the number of obstacles that move towards the patient. The patient has to step aside quickly.



Ball players you need to avoid

none a few multiple many

Set the number of obstacles that move left/right. The patient has to time his movement to cross.

Distance



10 blocks

Number of players



One player game

Set the number of patients (1-2)

Set the total distance to be walked. If the distance is very short, you may not see all the selected challenges.

Click to start exercise with current settings



Walking exercises, A Stroll : troubleshooting

Troubleshooting

OK



Character does not walk: the camera reacts to the knees of the patient. It has to be able to see the knees move. Any object (such as a stroller) blocking the knee from view will stop the game from working. Use the camera view to check if the knees are fully visible. Some forms of dark clothing are not seen very well by the camera; very wide dresses or skirts can also prevent the camera from properly detecting knee movements.

✗



“Too close” message: The camera has to see the knees of the patient, which is impossible if the patient is too close. Sometimes, patients walk closer and closer to the screen during play. To prevent this, you can place a line on the floor or even parallel bars in front of the patient and tell them not to cross the line.



Fast movement not supported: The game has a timer built in that prevents patients from trying to run or walk very fast.

Walking exercises, Flower game: exercise overview

When to use, contra-indications

- Goal:** This game trains walking in all direction. It requires very precise navigation in space.
- Used for:** Gait training, improving small-area coordination.
- Contra-indications:** Therapist should ensure safety of patients with increased risk of falling by standing behind them.

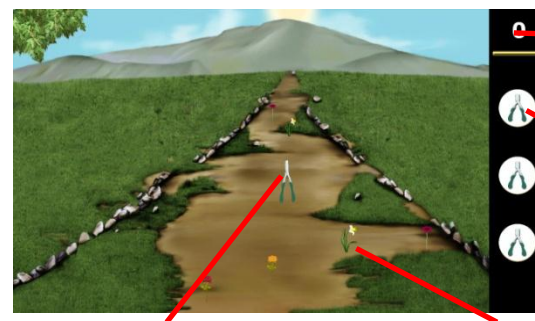
Exercise description



The patient stands in front of the screen and walks around in order to pick flowers. If the patient approaches a flower, it will be cut automatically. There is no need to move the hands.



Rules



Current score

Remaining scissors; if all are lost, the game ends.

Move the scissors by walking around

Approach a flower to cut it



Turtles and later on lambs try to eat the flowers as well. If they succeed, you will lose a pair of scissors, or some time. Beat them to the flower to prevent this.



Cactuses and hedgehogs should be avoided. If you hit them, you will lose a pair of scissors or some time. Walk around them to prevent this.

Scoring



Overall score, 1 per flower

Hedgehogs hit

Flowers lost to turtles

Cactuses hit

Flowers lost to lambs

Walking exercises, Flower game: standard settings

Standard difficulty settings



This is a very simple basic setting. The field contains only flowers and will be shown with simplified graphics. The game will end after the patient has completed one field.



This setting starts with just flowers, but will build up over time to include the other challenges. It uses more complex graphics. There is no time limit.



This setting is similar to the one above, but introduces a time limit.



This setting is starts at a higher level of difficulty and sets a more stringent time limit.

Alternative applications



Use simplified graphics if the full graphics are too difficult for the patient.

Walking exercises, Flower game: detailed settings

Detail menu:

Movement

Switch between normal graphics and simplified graphics that are easier to see



Full graphics.



Simplified graphics.

Playing field



Set the size of the playing field left/right and front/back

Level

Easy

Hard

You will start at a calm pace

Determine which challenges (none, turtles, cactuses, lambs, hedgehogs, all of these) will appear during the game

Here you can see which challenges will occur

Buildup

☒ Clear one field.

☐ Repeat the same field.

☐ Increase difficulty over time.

One field: game ends after 1 field is cleared
Repeat: game ends after 3 identical fields
Increase difficulty: play on until time runs out

Duration

☐ Limited amount of time

10 sec

1 min

Set duration here

Click to start exercise with current settings

Select to play with a timer. If this box is not checked, the game lasts until 3 scissors are broken.



Walking exercises, Flower game: troubleshooting

Troubleshooting



Scissor makes strange jumps: the exercise requires the patient to use a large area. This may bring the patient close to walls or other objects that may interfere with the camera. Move the objects that are in the way; or, place the SilverFit in a larger open space; or, adjust the playing field in the detail menu.

Balance exercises, The Mole: exercise overview

When to use, contra-indications

- Goal:** This game trains the dynamic balance of the patient. It can be used as a fall prevention exercise or to train the short-distance mobility of the patient.
- Used for:** Post-orthopedic surgery lower extremity, post-CVA, Parkinson, MS
- Contra-indications:** There is a relatively high risk of falling. A physiotherapist should be behind the patient to catch him/her in case of impaired balance or falling risk.

Exercise description

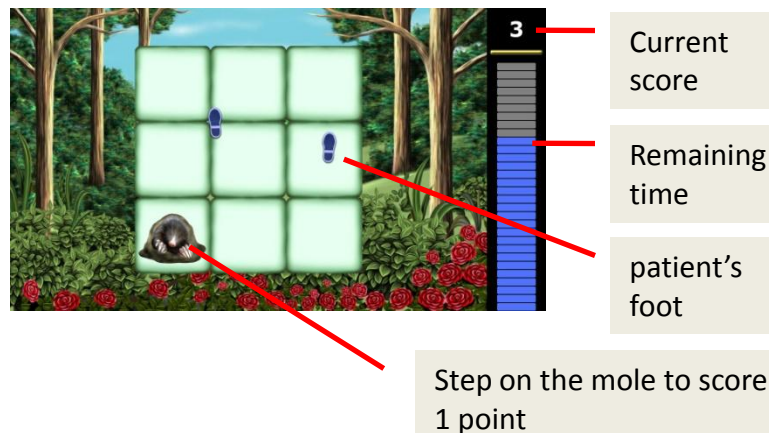


The patient stands about 2-3m from the screen so that his feet appear in the middle square. When a mole appears, the patient taps with his foot to chase it away.



If the patient cannot tap, he or she can walk towards the mole to chase it off.

Rules



Ladybugs should be avoided. Hitting them costs 2 points.

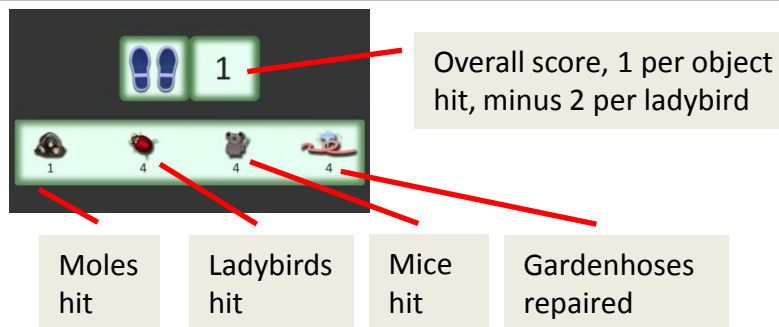


The mouse moves and should be caught before it disappears.



Put one foot on top of each of the leaks to score points.

Scoring



Balance exercises, The Mole: standard settings

Standard difficulty settings



This is the basic setting. Only the mole will appear. The game will last one minute. Always start a patient on this setting.



This setting adds the ladybirds. The patient has to avoid stepping on them. Use this to elicit a more careful movement, especially if the patient is very fast.



This setting adds the mouse and the garden hose. Use it with patients who are very good at the game to train speed and maximum step size.



This is the basic game, played by two patients. Both patients should have learned the one-patient game first before trying the two-patient game.

Alternative applications



Patient can stand between vertical bars and support him/herself while training. Shown here is a patient whose right leg has been amputated.



Turning only the middle three boxes on in the detail menu creates an easy lateral stepping game, or an easy front/backward stepping game.

Two patient mode

Score of orange patient (on left)

Score of blue patient (on right)



Feet of left (orange) patient

Feet of right (blue) patient

Whoever hits the mole first scores a point. Blue just scored, so grid behind the mole turned blue.

Balance exercises, The Mole: detailed settings

Detail menu

Movement

Click to enable presets. You will see the effect in the grid on the right.

Full exercise

The mole and other challenges will only appear in the green areas. Click on an area to turn it on or off.

Set required step size in frontward/backward direction

Set required step size in lateral direction

Challenges

Here, you can choose the kind of challenges you want to appear

The game starts with the mole and will increase in difficulty.

Set the maximum number of ladybirds to appear with this trackbar

Move the trackbar to set the game's duration

01:40

Duration as currently set

Number of players

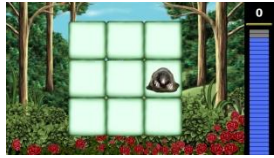
Two player game

Click to toggle between one and two patient game

Press to start exercise with current settings.

Balance exercises, The Mole: troubleshooting

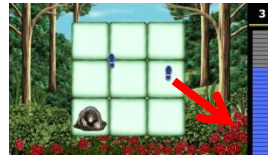
Troubleshooting



No feet appear: the patient is not in the right position, or the camera is following another person or object. Let the patient move to the playing area, let all others move away, and ask the patient to move around until he is detected. If this does not help, put your hand in front of the camera for 2 seconds and retry.



Only one set of feet appears: the legs are not well detected. A stroller or other object may be in the way, or the patient may be wearing non-reflective clothes. Remove objects and/or try with another patient. If appropriate, ask patient to wear lighter coloured clothes next time.



The feet sometimes suddenly “jump” out of the screen: some other object, or a wall, or the therapist is interfering. When the patient comes close, this object is interpreted as a leg. Place the SilverFit in a less constrained space if possible.



The feet are shaking so much it is hard to play: the camera is detecting interference from the floor and should be recalibrated.

Balance exercises, Puzzle: exercise overview

When to use, contra-indications

- Goal:** This game trains upper body balance and lateral flexibility.
- Used for:** MS patients, general fitness/ flexibility training of people with good motor and cognitive skills.
- Contra-indications:** Requires good balance, motor skills, and flexibility.

Exercise description



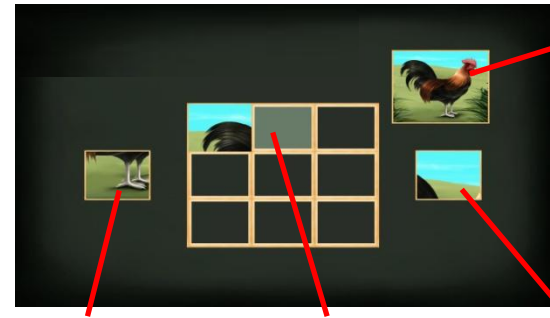
The patient stands in front of the system and leans left/right with his/her full body.



To start:

Select a picture from the range of easy-very hard pictures. Press “OK” (left mouse button) when patient is ready to start.

Rules



Target picture

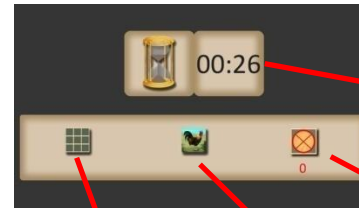
Lean left for this piece

The next piece should go here

Lean right for this piece

The screen shows a 3x3 (or larger) grid with one piece in grey. There are 2 pieces around the grid. The patient has to choose which piece fits in the grey area. To do so, he leans towards the correct piece to get the pieces on the left or right, or he stands up to get the piece on top. On the easy settings, only the correct piece is shown. On difficult settings, the patient has to choose.

Scoring



Time taken to complete puzzle

of pieces

Picture chosen

of mistakes

Balance exercises, Puzzle: standard settings

Standard difficulty settings



This is a basic setting from both a cognitive and a physical point of view. Only one puzzle piece will appear. The patient does not have to lean very far.



Two puzzle pieces will appear. More difficult from a cognitive point of view, but similar on a physical level.



Similar to the previous setting, but the patient has to stretch further



This setting shows a more challenging 4x4 puzzle and is only applicable for people with strong visual acuity and puzzle experience.

Alternative applications



Patient can hold on to parallel bars for support.

Balance exercises, Puzzle: detailed settings

Detail menu

Movement

Bend to the left

None

Slightly

Stretch

Bend to the right

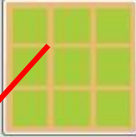
None

Slightly

Stretch

Puzzle size

Choose the number of total puzzle pieces (3x3, 4x4, 5x5) by clicking on the right puzzle







Choice of pieces

1 answer

Choice

Click to start exercise with current settings

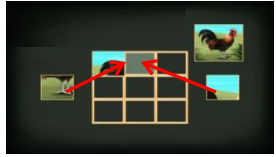


Choose slightly vs stretch/fully to set the distance the patient has to lean/ stand up

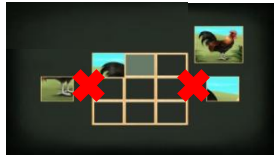
Choose "1 answer" to have only the one puzzle piece appear; the patient will not have to choose, so the cognitive element of the exercise is much easier. "Choice" displays 2 pieces, making the exercise harder.

Balance exercises, Puzzle: troubleshooting

Troubleshooting



Pieces move by themselves: this can happen if the patient is not well detected and the system is following another person or object. Make sure there are no other objects and people cluttering the view. Check if the patient is visible in the camera view (“i” on the remote or “▶” on the mouse). If not, place the chair at the right distance (2-3m) and ask the patient to move his body or arms until he shows up.



Pieces do not move: Check if the patient is visible in the camera view (see above). Also, make sure the therapist is not seen on camera.

If only the patient is visible and the pieces still do not move, check if the settings in the detail menu correspond to the movement made.

In the standard settings, the game reacts only to body movements, not to arm movements. If arm movements are selected, the game will not react to body movements.

Wheelchair exercises, Flower game: exercise overview

When to use, contra-indications

- Goal:** This game trains navigating in a wheelchair.
- Used for:** Wheelchair users with an intermediate level of wheelchair handling skills.
- Contra-indications:** The game requires fine motor control of the wheelchair. This is often difficult in large electric wheelchairs and only feasible in wheelchairs that turn easily.

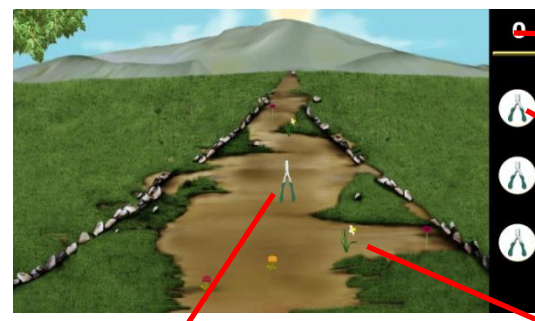
Exercise description



The patient sits in a wheelchair and moves the wheelchair around in order to pick flowers. If the patient approaches a flower, it will be cut automatically. There is no need to make any other movement except from navigating the wheelchair.



Rules



Current score

Remaining scissors; if all are lost, the game ends.

Move the scissors by using the wheelchair

Approach a flower to cut it



Turtles and later on lambs try to eat the flowers as well. If they succeed, you will lose a pair of scissors, or some time. Beat them to the flower to prevent this.



Cactuses and hedgehogs should be avoided. If you hit them, you will lose a pair of scissors or some time. Walk around them to prevent this.

Scoring



Overall score, 1 per flower

Hedgehogs hit

Flowers lost to turtles

Cactuses hit

Flowers lost to lambs

Wheelchair exercises, Flower game: standard settings

Standard difficulty settings



This is a very simple basic setting. The field contains only flowers. The game will end after the patient has completed one field.



This setting starts with just flowers, but will build up over time to include the other challenges. It uses more complex graphics. There is no time limit.



This setting is similar to the one above, but introduces a time limit.



This setting is starts at a higher level of difficulty and sets a more stringent time limit.

Alternative applications



Use simplified graphics if the full graphics are too difficult for the patient.

Wheelchair exercises, Flower game: detailed settings

Detail menu

Movement

Switch between normal graphics and simplified graphics that are easier to see



Full graphics.



Simplified graphics.

Playing field



Set the size of the playing field left/right and front/back

Level

Easy

Hard

You will start at a calm pace

Determine which challenges (none, turtles, cactuses, lambs, hedgehogs, all of these) will appear during the game

Here you can see which challenges will occur

Buildup

☒ Clear one field.

☐ Repeat the same field.

☐ Increase difficulty over time.

One field: game ends after 1 field is cleared
Repeat: game ends after 3 identical fields
Increase difficulty: play on until time runs out

Duration

☐ Limited amount of time

10 sec

1 min

Set duration here

Click to start exercise with current settings

Select to play with a timer. If this box is not checked, the game lasts until 3 scissors are broken.



Wheelchair exercises, Flower game: troubleshooting

Troubleshooting



Scissor makes strange jumps: the exercise requires the patient to use a large area. This may bring the patient close to walls or other objects that may interfere with the camera. Move the objects that are in the way; or, place the SilverFit in a larger open space; or, adjust the playing field in the detail menu.



Turning the wheelchair leads to unexpected jumps: if the patient uses a very large wheelchair, as shown to the left, the camera cannot interpret the difference between a front view and a side view. This leads to strange “jumps” of the scissors whenever the wheelchair turns. The exercise cannot be performed with this kind of wheelchair.

Arm exercises, Memory: exercise overview

When to use, contra-indications

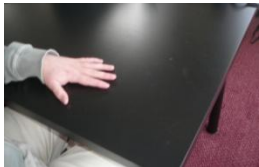
Goal: This game trains strength and functional use of the upper extremity: moving the arm forward, upward, and reaching for objects.

Used for: Post-CVA, new shoulder

Contra-indications: The exercise may strain the arm if done for too long. The exercise requires good short term memory skills.

Exercise description

This exercise can be done in three ways:



1. The patient places his hand on a table and pushes the hand forward and backward.



2. In an alternative exercise, the patient rests his hand on the table and lifts it up when required

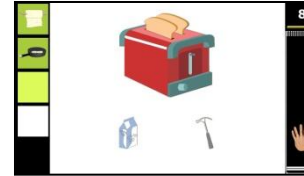


3. It is also possible to do the exercise without a table. It then trains reaching/grabbing ability.

Rules



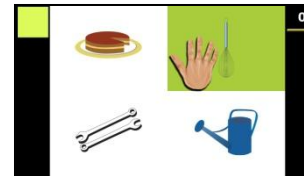
The game shows a number of objects that the patient should try to remember. The list of objects grows longer as the patient does better.



In the versions played on a table, the patient moves his hand forward/upward when the next object in the sequence is shown on top

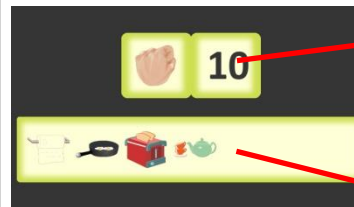


You can see the measured position of the hand on the track on the right. If green arrows appear, bring the hand back to the resting position first.



In the game without a table, the patient moves his until he reaches the correct object. Then he grabs the object by moving his hand forward in a grabbing movement.

Scoring



Overall score, 1 point each time an object is remembered

Longest sequence of objects remembered

Arm exercises, Memory: standard settings

Standard difficulty settings



This is an exercise where the hand rests on the table. The patient must move his hand forward on the table if the right object is shown on top.



This is an exercise where the hand rests on the table. The patient must lift his hand from the table when the right object is shown on top.



In this setting, the patient moves his hand freely to grab the right object.



This setting is similar to the one above, but the patient has to move his hand further. In addition, the set of objects to remember is more complex from a cognitive point of view.

Alternative applications

The upper extremity can be suspended in an anti-gravity suspension device.

Put a towel or a board with wheels between the upper extremity and the arm to facilitate movement.

Arm exercises, Memory: detailed settings

Detail menu

Basic movement

Choose the type of exercise (see exercise description)

 Move hand over table

 Lift hand from table

 Move hand and arm freely

Distance

MinStandardMax

Set how far the patient has to move his/her arm

If “move hand freely” is selected, select the number of objects the patient has to choose from here

Turning

Speed

In exercises with a table, the objects will turn. Set the turning speed here.

Picture level

Basic

Hard



Set the type of objects to remember. Basic objects can be described with one simple word, hard objects are less familiar or less easy to describe.

Press to start exercise with current settings.

START

SILVERFIT

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Arm exercises, Memory: calibrating a table

Calibration procedure



Place a table so that the patient can sit behind it at 2-3m from the SilverFit. The table should not be too small. Ideally, it should have straight edges and only one color. Make sure the chair is away from the table



Start the game. Normally, the table will show up as a line if you come close to it. Walk away from the table and make sure there are no other objects or people close to the table. Then press the left mouse button.



Now sit behind the table. If all is well, it should not show up as a line anymore. Put your hand on the table and move it around. The blue tag "hand" should follow your movements. If so, you are ready to start the game. If not, press the right mouse button and repeat the steps above.

Troubleshooting table calibration

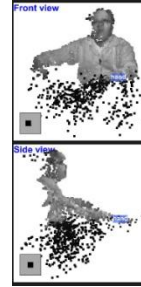


Table remains visible. Some tables do not show up as a clear line in step 1 and remain visible as collection of black dots after step 2. If the hand can still be detected, this is not a problem. However, if the hand is not detected well, see if you can use another table.



Hand jumps forward and backward. Make sure there are no objects on the table other than the patient's hand during the calibration or the exercise. Also, the patient's hand should not get too close to the other side of the table. If this does happen, use a bigger table.

If the table is very small and far from the camera, the camera may pick up the patient's knee. Put the table closer or put a piece of cloth in front of the table if this happens.

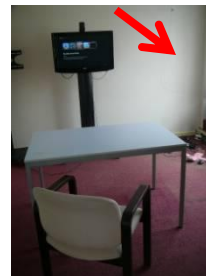


Table has moved. If the table accidentally moves after calibration, the calibration is lost. Start a game that does not use the table, stop it, and restart the table game to recalibrate.

Arm exercises, Eggs: exercise overview

When to use, contra-indications

- Goal:** This game trains lateral movement of the upper extremity
- Used for:** Post-CVA
- Contra-indications:** The exercise may strain the arm if done for too long. The exercise requires good timing skills.

Exercise description

This exercise can be done in three ways:

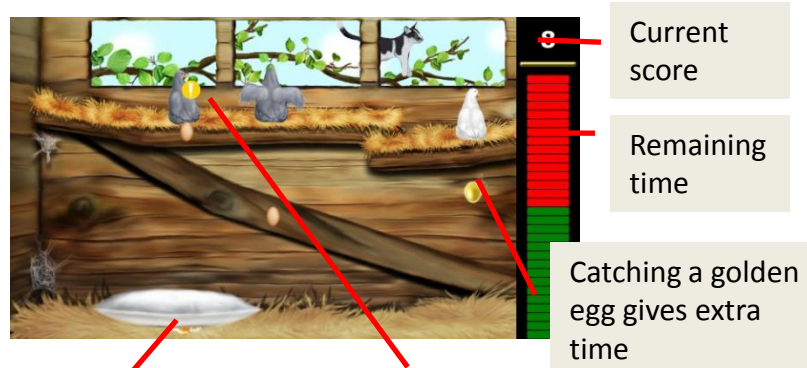


1. The patient places his hand on a table and moves it left and right. In some exercise settings, he may also need to lift his hand.



2. In an alternative exercise, the patient moves the hand left and right unsupported while sitting or standing 2-3m from the camera.

Rules



Move the pillow with your hand to catch the eggs

An ! Indicates you have dropped this chicken's egg. Be more careful or the chicken will leave

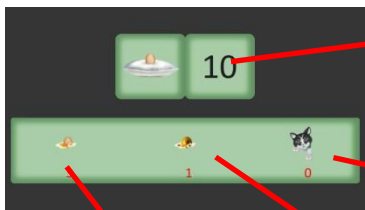


If a cat shows up close to the chickens, raise your hand up from the table to chase it away.



To make the game more challenging, you can opt for a smaller pillow

Scoring



Overall score, 1 point per egg caught

Eggs missed

Golden eggs missed

Chickens caught by cat

Arm exercises, Eggs: standard settings

Standard difficulty settings



This is an exercise where the hand rests on the table. The patient must move his hand left and right. There are no cats or golden eggs.



This is the same exercise as above, with the cat and golden egg added. If the cat appears, the patient has to raise his hand to chase it away. The golden egg gives extra time.



This setting adds a small pillow, making the exercise much harder.



This setting is played without a table. It uses the cat and the golden egg, but allows for a large pillow. Playing this exercise without any support is very strenuous.

Alternative applications

The upper extremity can be suspended in an anti-gravity suspension device.

Put a towel or a board with wheels between the upper extremity and the arm to facilitate movement.

Arm exercises, Eggs: detailed settings

Detail menu

Movement



Support hand on table



Train without table support

Choose the type of exercise (see exercise description)

Distance



Set how far the patient has to move his/her arm

Game elements



To chase the cat away, you have to raise your hand.

Turn the cat on/off. The cat must be chased away by raising your hand.



The golden egg falls faster and yields more points.

Turn the golden egg on/off. This makes the timing more challenging.



A smaller pillow requires more precision.

Turn on to select a small pillow. This makes the game very tough.

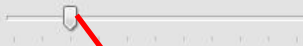
Set the number of chickens at the start of the game

~~Number of chickens~~ 2 6

☒ Adjust level to player

Check to let the number of chickens and the speed adapt to the performance of the patient.

Duration



Set the game's duration

01:00

Press to start exercise
with current settings.



Arm exercises, Eggs: calibrating a table

Calibration procedure



Place a table so that the patient can sit behind it at 2-3m from the SilverFit. The table should not be too small. Ideally, it should have straight edges and only one color. Make sure the chair is away from the table



Start the game. Normally, the table will show up as a line if you come close to it. Walk away from the table and make sure there are no other objects or people close to the table. Then press the left mouse button.



Now sit behind the table. If all is well, it should not show up as a line anymore. Put your hand on the table and move it around. The blue tag "hand" should follow your movements. If so, you are ready to start the game. If not, press the right mouse button and repeat the steps above.

Troubleshooting table calibration

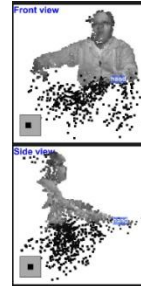


Table remains visible. Some tables do not show up as a clear line in step 1 and remain visible as collection of black dots after step 2. If the hand can still be detected, this is not a problem. However, if the hand is not detected well, see if you can use another table.



Hand jumps forward and backward. Make sure there are no objects on the table other than the patient's hand during the calibration or the exercise. Also, the patient's hand should not get too close to the other side of the table. If this does happen, use a bigger table.

If the table is very small and far from the camera, the camera may pick up the patient's knee. Put the table closer or put a piece of cloth in front of the table if this happens.

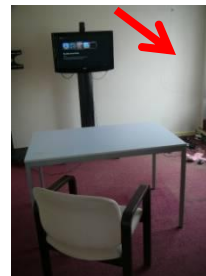


Table has moved. If the table accidentally moves after calibration, the calibration is lost. Start a game that does not use the table, stop it, and restart the table game to recalibrate.

Cardio exercises, The Fox: exercise overview

When to use, contra-indications

- Goal:** This game trains lateral (sideways) walking.
- Used for:** Fitness, cardiotraining.
- Contra-indications:** The patients should be fit enough for an intensive workout and suffer no balance issues.

Exercise description

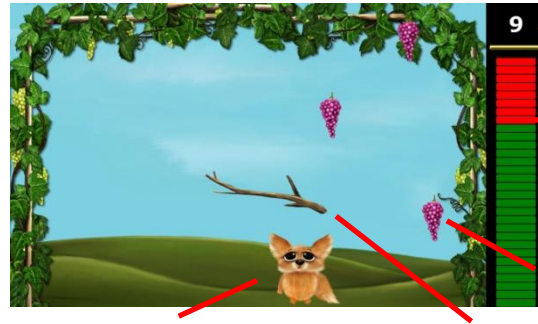


The patient stands 2-3m from the screen.

When grapes appear, the patient steps left or right to move the fox towards the grapes and catch them.

Branches should be avoided by leaning away. Chickens can be caught by raising one or both arms in the air.

Rules



Current score

Remaining time

Catch as many grapes as you can

Move the fox by leaning left and right

Avoid the branches



Raise both arms to make the fox jump and catch the chicken. This gives a small time bonus.

Scoring



Overall score, 1 per grape caught

Grapes caught

Grapes missed

Chickens caught

Branches hit

Cardio exercises, the Fox: standard settings

Standard difficulty settings

Basic

This is basic setting. Only one grape will appear at a time, and there are no branches or chickens. Compared to the walking fox exercise, the distance to be walked is doubled.

Steady pace

With this setting, the number of grapes and the speed at which they fall increases over time, based on the patient's performance. Branches and chickens are added.

Advanced

This setting is similar to the one above, but starts at a higher pace.

Maximum challenge

This setting is similar to the previous ones but starts at a very high pace.

Cardio exercises, the Fox: detailed settings

Detail menu

Movement

 Move short distance

 Move maximum distance

Set how far the patient has to walk to move the fox

Difficulty

Easy, 1 grape

Hard, many grapes

Adapt to player

Click here to let the game automatically adjust the difficulty based on the patient's performance. Turn off for fixed level

Set the starting level: number of grapes and speed

Game elements

 You have turned off the chicken.

 You have turned off the branch.

Choose the type of challenges you want to appear

Duration

Move the trackbar to set the game's duration

01:30

Currently set duration

Click to start exercise with current settings



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Cardio exercises, the Fox: troubleshooting

Troubleshooting



Fox makes small sudden moves to left and right: most probably, this happens when the patient comes close to an object, the wall, or the therapist. Make sure the patient has enough space to do the exercise.



The playing area is small and the fox jumps around: You have inadvertently selected the sitting version of the fox game. Select the cardio version instead from the main menu or choose the “3m” settings in the detail menu.



Fox does not jump: The game reacts to hands that are stretched forwards and upwards. Stretching your hand by the side of your body does not trigger a jump.

Cardio exercises, The Mole: exercise overview

When to use, contra-indications

- Goal:** This game trains fitness by providing a dynamic balance exercise.
- Used for:** Fitness, rehabilitation after cardiac intervention, COPD
- Contra-indications:** Patient should be fit enough and have good balance skills.

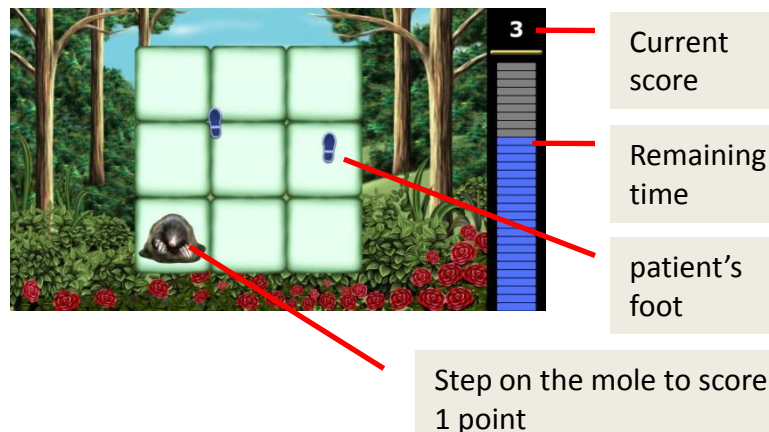
Exercise description



The patient stands about 2-3m from the screen so that his feet appear in the middle square. When a mole appears, the patient taps with his foot to chase it away.

If the patient cannot tap, he or she can walk towards the mole to chase it off.

Rules



Ladybugs should be avoided. Hitting them costs 2 points.

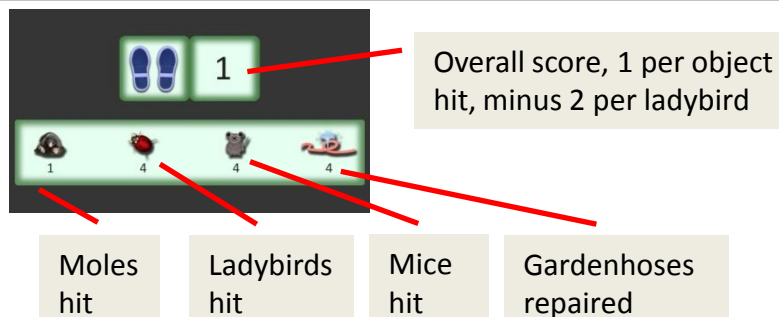


The mouse moves and should be caught before it disappears.



Put one foot on top of each of the leaks to score points.

Scoring



Cardio exercises, The Mole: standard settings

Standard difficulty settings



This is the basic setting. Only the mole will appear. The game will last one minute.



This setting adds the ladybirds. The patient has to avoid stepping on them. Use this to elicit a more careful movement, especially if the patient is very fast.



This setting adds the mouse and the garden hose. Use it with patients who are very good at the game to train speed and maximum step size.



This is the basic game, played by two patients. Both patients should have learned the one-patient game first before trying the two-patient game.

Alternative applications



Patient can stand between vertical bars and support him/herself while training. Shown here is a patient whose right leg has been amputated.



Turning only the middle three boxes on in the detail menu creates an easy lateral stepping game, or an easy front/backward stepping game.

Two patient mode

Score of orange patient (on left)

Score of blue patient (on right)



Feet of orange patient

Feet of blue patient

Whoever hits the mole first scores a point. Blue just scored, so grid behind the mole turned blue.

Cardio exercises, The Mole: detailed settings

Detail menu

Movement

Click to enable presets. You will see the effect in the grid on the right.

Full exercise

The mole and other challenges will only appear in the green areas. Click on an area to turn it on or off.

Set required step size in frontward/backward direction

Set required step size in lateral direction

Challenges

Here, you can choose the kind of challenges you want to appear

The game starts with the mole and will increase in difficulty.

Set the maximum number of ladybirds to appear with this trackbar

Move the trackbar to set the game's duration

01:40

Duration as currently set

Number of players

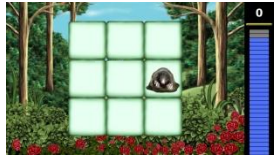
Two player game

Click to toggle between one and two patient game

Press to start exercise with current settings.

Cardio exercises, The Mole: troubleshooting

Troubleshooting



No feet appear: the patient is not in the right position, or the camera is following another person or object. Let the patient move to the playing area, let all others move away, and ask the patient to move around until he is detected. If this does not help, put your hand in front of the camera for 2 seconds and retry.



Only one set of feet appears: the legs are not well detected. A stroller or other object may be in the way, or the patient may be wearing non-reflective clothes. Remove objects and/or try with another patient. If appropriate, ask patient to wear lighter clothes next time.



The feet sometimes suddenly “jump” out of the screen: some other object, or a wall, is interfering. When the patient comes close, this object is interpreted as a leg. Place the SilverFit in a less constrained space if possible.



The feet are shaking so much it is hard to play: the camera is detecting interference from the floor and should be recalibrated.

Cardio exercises, Vegetable Garden: exercise overview

When to use, contra-indications

- Goal:** This is an intensive exercise where the patient has to move around and squat repeatedly.
- Used for:** COPD/Cardio exercises for fit patients.
- Contra-indications:** Requires a good level of general fitness and balance.

Exercise description

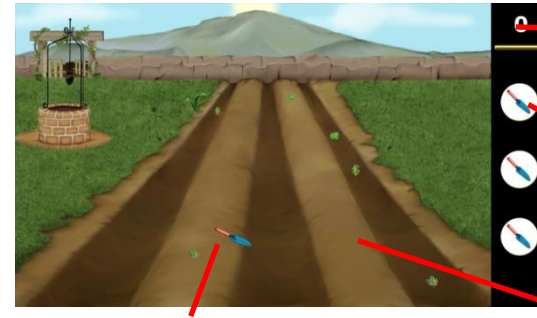


The patient stands 2-3m from the screen and walks around to move a tool on the screen.

If the tool hovers above a vegetable, the patient has to squat to pick the vegetable.



Rules

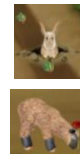


Current score

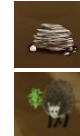
Remaining tools; if all are lost, the game ends.

Move the tool by walking around

Approach a vegetable and squat to pick it



Rabbits and later on lambs try to eat the vegetables as well. If they succeed, you will lose a tool, or some time. Beat them to the vegetable to prevent this.



Stones and hedgehogs should be avoided. If you hit them, you will lose a tool or some time. Walk around them to prevent this.

Scoring



Overall score, 1 per vegetable

Hedgehogs hit

Vegetables lost to rabbits

Stones hit

Vegetables lost to lambs

Cardio exercises, Vegetable Garden: standard settings

Standard difficulty settings



This is a basic setting. The field contains only vegetables. The game will end after the patient has completed one field.



This setting starts with just vegetables, but will build up over time to include the other challenges. It uses more complex graphics. There is no time limit.



This setting is similar to the one above, but introduces a time limit.



This setting starts at a higher level of difficulty and sets a more stringent time limit.

Cardio exercises, Vegetable Garden: detailed settings

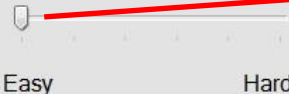
Detail menu

Movement

Set the size of the playing field left/right and front/back

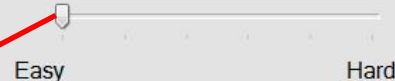


Crouching



Set how far the patient has to squat

Level



You will start at a calm pace



Here you can see which challenges will occur

Determine which challenges (none, rabbits, stones, lambs, hedgehogs, all of these) will appear during the game

Buildup

☒ Clear one field.

☐ Repeat the same field.

☐ Increase difficulty over time.

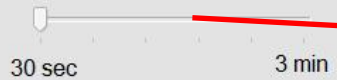
One field: game ends after 1 field is cleared

Repeat: game ends after 3 identical fields

Increase difficulty: play on until time runs out

Duration

☐ Limited amount of time



Set duration here

Click to start exercise with current settings



Select to play with a timer. If this box is not checked, the game lasts until 3 tools are broken.

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Cardio exercises, Vegetable Garden: troubleshooting

Troubleshooting



Tool makes strange jumps: the exercise requires the patient to use a large area. This may bring the patient close to walls or other objects that may interfere with the camera. Move the objects that are in the way; or, place the SilverFit in a larger open space; or, adjust the playing field in the detail menu.



Squatting to get vegetables at the back is too hard: in some cases with vegetables at the very back, the tool jumps when you try to squat so that you miss the vegetable. This happens especially for short people and is caused by the fact that the camera temporarily does not see the patient well. It can be solved by squatting more quickly or using a slightly smaller playing area.

The management module 1/2

Creating a menu for a new patient



You can create a custom menu for a specific patient. From the main menu, click on the “admin” button.



Click “new user”

Click to access different movements and games

Type patient name here

Click on the X to remove game



Access detailed settings for this game

Drag the required setting to the menu

The menu you are creating for this patient

Click to save menu

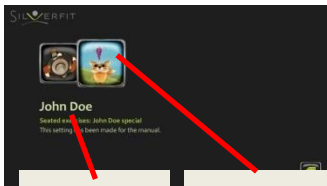
Sign in as a patient



From the main menu, click on the “sign in” button.



Select patient name and click “sign in”



The patient’s custom menu appears.

Patient name

Custom menu

Changing/deleting a patient menu

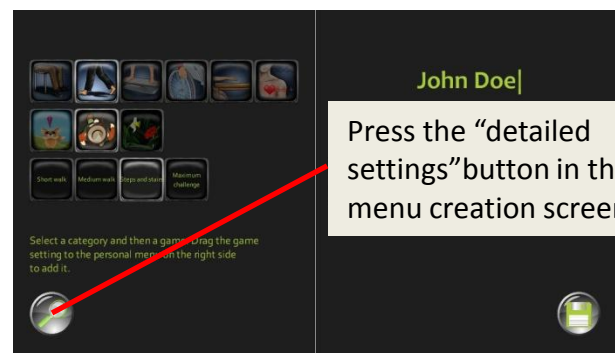


Select user and click “change” to change a menu

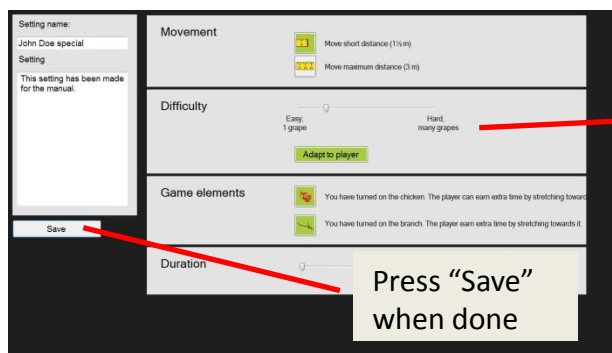
Select user and click “delete” to delete a menu

The management module 2/2

Making a detailed setting for a particular patient menu

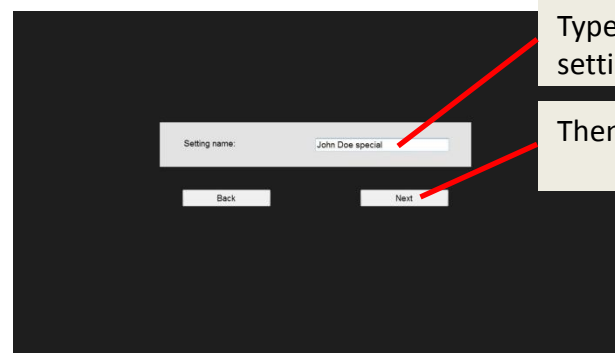


Press the “detailed settings” button in the menu creation screen



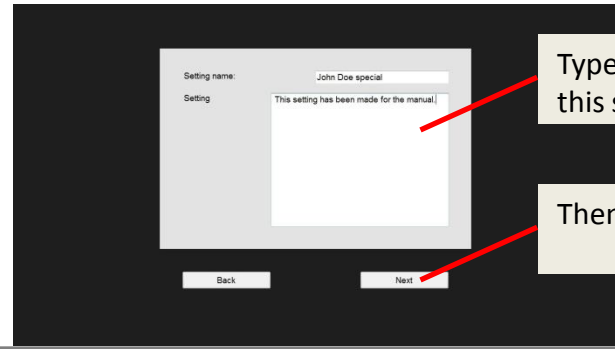
Create a custom setting

Press “Save” when done



Type in a name for this setting.

Then press “Next”

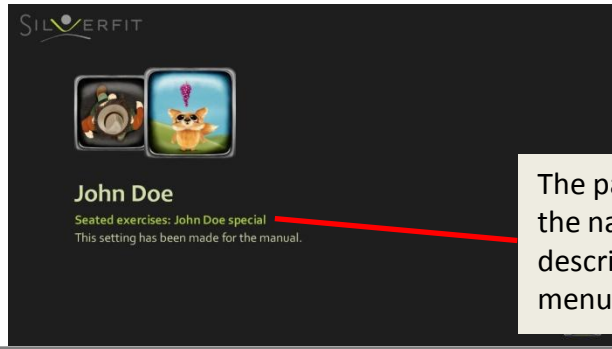


Type in a description for this setting

Then press “Next”



The new setting appears in the patient menu



The patient will see the name and description in his menu after signing in

Troubleshooting

How to start troubleshooting

Issue

One or two of the games do not work properly

A lot of the games do not work properly

The system gives an error as soon as you start a game

The system/ screen does not turn on



Solution

Refer to the game description for specific information on troubleshooting

Most likely, the camera needs to be recalibrated. See next chapter

Most likely, a cable has come loose. See chapter on hardware



Please contact SilverFit at 0172- 425 139 before making any changes to the camera calibration or the hardware



The SilverFit needs updates / service at least once a year. If this is not being done in the required frequency, SilverFit cannot guarantee the proper working of the SilverFit and its software.

Camera calibration guide 1/3

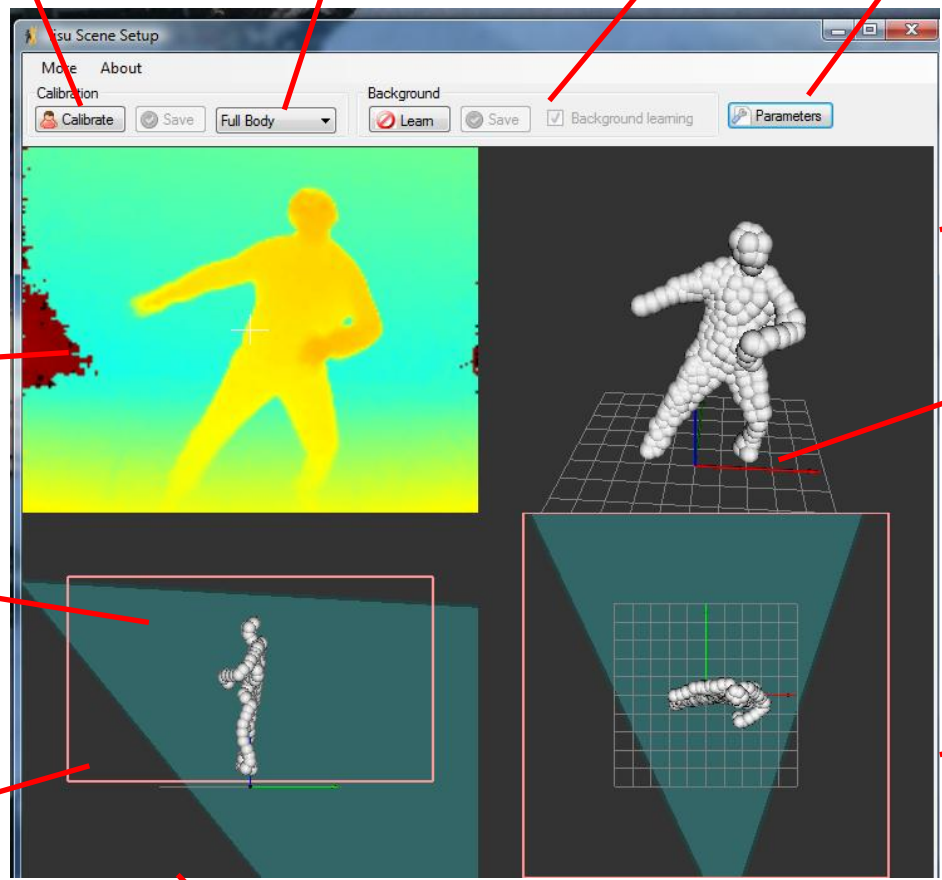


Please contact SilverFit at 0172- 425 139 before making any changes to the camera calibration

Explaining the camera check screen



- Click to calibrate
- Set to "full body"
- Leave box unchecked
- Click to set parameters



"Depth map", raw data as seen by the camera. This is not visible in some versions.

Camera view angle; camera cannot see outside the dark green area

Clipping area; things that happen outside the red box are ignored

Frontal view as interpreted by the camera

Height of the floor as set by the parameters

Top view as interpreted by the camera

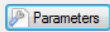
Side view as interpreted by the camera

Camera calibration guide 2/3



Please contact SilverFit at 0172- 425 139 before making any changes to the camera calibration

1. Set parameters

Click on the  Button to get the screen below.

Parameters

SwissRanger

Exposure[ms]

Threshold Amplitude threshold: 72

Clipping

<input type="range" value="1m"/>	<input type="range" value="1m"/>	<input type="range" value="3m"/>
<input type="range" value="3m"/>	<input type="range" value="0m"/>	<input type="range" value="3m"/>
<input type="range" value="3m"/>	<input type="range" value="0m"/>	<input type="range" value="3m"/>

Transform

Calibration

Mark Position

Set camera exposure time to 33 ms.

Set treshold between 60-100. This sets the minimum level of light the camera reacts to.

These trackbars set the red lines of the clipping area (see page 1/4). Set to maximum as shown.

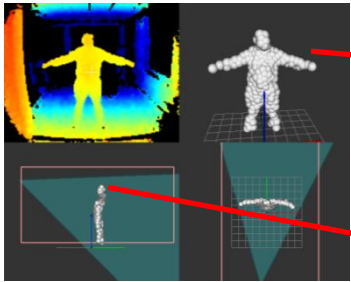
This trackbar sets the floor height. Set in the middle as shown

This trackbar sets the user position. Set in the middle as shown

Save after setting parameters

2. Set camera angle

Close the parameter screen. Stand 3m in front of the camera and assume "T" position as shown. Press the  button. Remain in "T" position for 5 seconds.



Repeat until the bubble man appears in a straight angle in all 3 views.

If after calibration the bubble man sticks out of the dark green area, the camera angle needs to be readjusted.

3. Adjust treshhold if needed

You can adjust for noise or unseen objects by adjusting the Treshold in the parameter screen.

- If you see a lot of noise, set the treshold higher.
- If you see holes in the bubble man, set the treshold lower.

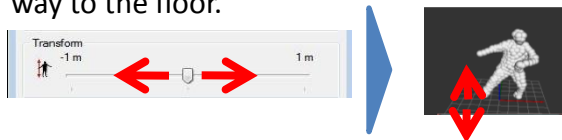
Camera calibration guide 3/3



Please contact SilverFit at 0172- 425 139 before making any changes to the camera calibration

4. Set floor height

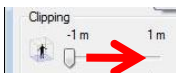
In the parameter screen, set the floor height so that the floor (checkered area) is at the right vertical level compared to the bubble man. It is OK if you do not see the legs go down all the way to the floor.



5. Adjust clippings



If you can see the floor, bring up the floor clipping until it disappears. Make sure the legs remain visible.

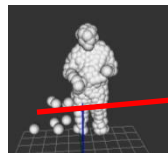


- The ceiling (top right clipping) can be brought down until the line is just above the bubbleman if he raises his hands
- The left/right clippings should be set so that the bubble man is visible everywhere in the playing area, but not outside of it. Move left and right to see if you remain within the clippings. If other objects (a table, a wall) just outside the playing field show up in the bubbles, set the clipping smaller so these disappear.
- The front clipping does not matter
- The back clipping should be set such that you do not see the back wall or objects behind the patient.

6. Test

While still in the camera test screen, walk around.

- If you see objects -> remove objects or adjust clippings
- If you see noise -> make threshold higher
- If you see incomplete bubbleman -> make sure there is no direct sunlight, and/or make threshold higher
- If the bubbleman disappears too early behind the red line -> adjust clipping to create larger area



An object is causing trouble. Remove the object or set the clippings.



Play Balance/Molegame/Basic setting

The feet should move smoothly without any jumps. If they jump a lot, reset the floor clippings



Play Walking/flowergame/3 fields

Walk to all of the edges of the field. The scissors should not make any jumps. If they do, there are probably objects in the way or you are close to a wall. Try readjusting the side and back clippings.



Play Walking/the fox/intensive

Stand 2-3m from the camera and raise your arms. The fox should jump. If not, check the ceiling clipping and camera angle.

Hardware check guide 1/2



Please contact SilverFit at 0172- 425 139
before making any changes to the hardware

First step



Before trying anything else, turn the system off and turn it back on.

Checking camera connection:



If the camera is powered, you should see a square of small red lights around the central lens



The camera is powered with a black wire. You can turn the ring on this wire to make sure it is attached well.



The camera connects to the computer through a USB cable.

Checking screen connections:

If the TV is turned on, there will be a blue backlight on the power button. The TV should have a power cable and a video cable that connects to the computer. In some cases, the TV also has a separate sound cable.

Checking computer connections:

If the computer is turned on, there will be a backlight on the power button.

The computer has the following connections:

- A power cable
- A video cable to the TV screen
- A USB cable to the camera
- A small USB stick, receiver for the mouse
- A small cable with an infrared receiver
- (Sometimes) an extra sound cable
- (Sometimes) a keyboard

Checking mouse issues



If the mouse is operational, you will see lights on the front.



If you see no lights, turn on the mouse with the switch on the back. If this does not work, the battery has to be charged. Put the mouse in the mouse holder to charge.



The computer should have a little stick to receive the mouse info in one of the USB ports.

Hardware check guide 2/2



Please contact SilverFit at 0172- 425 139
before making any changes to the hardware

Checking the remote



If the remote is operational, you will see a light turn on when pressing a button. If there is no light, change the batteries of the remote.



The remote must be received by an infrared eye. In order to work, the remote must be directly pointed at the infrared receiver. The receiver must be connected to a USB port in the computer. If the receiver reads the remote, it will blink with a red light when a button is pressed.

Contacts

Contact details



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Support@silverfit.nl

Why contact us?

Please feel free to contact us in case:

- Something does not work
- Something is not clear
- You would like to report a safety hazard
- We could improve a certain feature
- You have thought of an alternative application
- You have an idea for an additional exercise
- Any other topic you would like to share with us