

MRS Software manual 4.4







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1. User manual MR Cube

The MR Cube system includes:

- MR Cube
- Battery charger including manual of battery charge
- Velcro tape with D-ring
- Karabiner
- Magnet





The MR Cube exists of different parts and accessories. In the following paragraphs the working of those parts and accessories is explained.





The MR Cube cable

The MR Cube cable is the cable which makes the MR Cube measure the range of motion and the user's position during training. The cable is guided into the MR Cube by the yellow rollers. At the end of the cable an eye is attached which enables the user to use the MR Cube in many different ways. To pull out the cable a minimum Force of about 5 Newton (500 gram) is needed.



IMPORTANT:

DO NOT LET THE CABLE SNAP BACK. DO NOT TRAVEL OVERRANGE (max 2.3 meter). THIS CAN CAUSE DAMAGE TO THE MR CUBE.

The ON/OFF slide switch

At the same place where the LED'S are attached on top of the MR Cube, the ON/OFF slide switch is attached on the side. This button is a slide switch. The On and OFF position are indicated with the lines on top of the MR Cube.



Battery charger connector

Besides the ON/OFF slide switch, the connector for the battery charger is attached.

On top off the MRCube 4 LED's are attached. These LED's are:

Low battery LED

This LED will start burning if the supply voltage from the battery becomes low and the charger is not connected. After this led starts burning, the MR Cube can still be used for about one hour without the charger being connected.

Connected LED

This LED will start burning if a connection is established between the MR Cube and the computer which runs the MR Cube Software.

ON LED

This LED will start burning if the MR Cube is turned on. It makes no difference if the MR Cube is working with or without the charger connected.

OFF / Charge LED

This LED will start burning if the MR Cube is turned OFF and the charger is connected. If the MR Cube is turned on and the charger is connected, the OFF / Charge LED will not burn.



The Battery Charger

The battery charger can be connected to the battery charger connector and can be used as a charger as well as a voltage supply.

If the MR Cube is OFF and the battery charger is connected, the battery is charged and the OFF / Charge LED will burn.

If the MR Cube is ON and the battery charger is connected, the charger is used as a voltage supply and as a charger. In this case, only the ON LED will burn.

On the battery charger itself, another led is attached. The colors of this led will change depending on the status of the charge cycle.

Yellow: No battery connected/Idle state

Orange: Charging

Green: Ready

Orange/Green: Error (reconnect the charger)

Warning for MR Cube users in USA: Do not use MR Cube if battery charger is connected.



The Karabiner

The karabiner can be used to attach the cable from the MR Cube to the D-ring of the Velcro tape or to other equipment.



The Velcro tape with D-ring

The Velcro tape can be used to attach the MR Cube to a dumbbell, barbell or other equipment. Make sure the Velcro tape cannot slide of the equipment while being used. Snapping back the cable into the MR Cube can cause damage to the MR Cube.





The magnets

The magnet with moveable hook can be attached on top of a weight stack. The eye at the end of the MR Cube cable can be attached to the hook.

The two other magnets can be used to attach the MR Cube cable to other equipment.



IMPORTANT:

MAKE SURE THAT THE MR CUBE CABLE IS ATTACHED PROPERLY. LETTING THE CABLE SNAP BACK, CAN CAUSE DAMAGE TO THE MR CUBE.





2. Add Bluetooth connection

This Chapter will explain how to add a connection between the MR Cube and a computer.

To connect the MR Cube to a computer, the computer needs to be provided with Bluetooth. This can be a default function on your computer, or you can add this function by installing a Bluetooth USB converter. The following instructions are about installing the MR Cube on a computer which is provided with Bluetooth. The pictures in these instructions may vary from the screens you will see during installation. This is because the different Microsoft operating systems and the different Bluetooth configuration programs.

If the MR Cube is connected to another than the default computer, the Bluetooth pairing should be done again. The MR Cube should be switched off before re-use. We do not recommend to use one MR Cube on more computers according the above extra actions.

2.1 Bluetooth installation Windows XP

To start the installation, open My Bluetooth Places by double clicking the Bluetooth icon on your desktop, taskbar or in the Control Panel.



Make sure the MR Cube is turned on and that the serial number of the MR Cube is known. The serial number can be found at the bottom of the MR Cube.

In My Bluetooth Places, click "Add a Bluetooth Device".



The Bluetooth Setup Wizard will start:



Bluetooth Setup	
ASKED.	Welcome to the Bluetooth Setup Wizard
117-2-53	This Wizard will help you set up your Bluetooth environment.
	Remote devices must be in Discoverable mode for this computer to find them.
	For assistance in making a remote device discoverable, refer to the device's documentation.
	< <u>B</u> ack <u>Next></u> Cancel

Press <Next> to continue.

The wizard will show all available devices. If your MR Cube is found by the wizard, it will be shown on the Bluetooth Device Selection screen. The name of the device must be MR Cube +"serial number". In this case MRCube014. If your computer cannot find the MR Cube, make sure the MR Cube is turned on and try again.

If your MR Cube is found, double click it or select it and press <Next> to continue. If your MR Cube is still not found, please contact your dealer.

Bluetooth Device Selection			
Select a device Remote devices must be in Discoverable For assistance in making a remote device device's documentation.	e mode for this (e discoverable,	computer to find th refer to the remot	nem. e
BB Jim MRCube014			
<u>S</u> earch Again	Show all devi	ces	•
If the device you are looking for is not in the operational. On some devices, you must pres discoverable.	list, verify that th is the Connect I	ne device has pov outton to make the	ver and is e device
	< <u>B</u> ack	. <u>N</u> ext>	Cancel

The Bluetooth Security Setup appears. In the field "Bluetooth security code:" field the security code must be typed.

For the MR Cube, this code is 2031. After typing the code, press <Pair Now>.



Bluetooth Security Setup
Bluetooth Pairing Paired devices exchange a secret key each time they connect. This key is unique for each pair of devices; it is used to verify identity and to encrypt the data that the devices exchange.
To pair with the selected device you must know that device's More Info security code.
If the selected device does not require a security code, or to pair with the device later, click Skip.
Pair Now
Enter the security code and then click Pair Now.
Bluetooth security code: •••• Pair Now
< <u>B</u> ack Skip Cancel

The "Bluetooth Service Selection" screen appears. This screen shows the available services. Select "Serial-Port" and press <Next> to continue.

Bluetooth Service Selection			
Select the services you are interested in The following services are available through	n. 1 the selected Bluet	ooth Device.	
Select the service that you want to access	on the selected dev	vice.	
🔲 🔖 SerialPort			<u> </u>
Establish a virtual serial port conne Bluetooth device. The connection application that supports the COM	action with a remot can then be used b port number assig	e iy any Con ned.	figure
			<u>▼</u>
<u>H</u> etresh			
	< <u>B</u> ack	Finish	Cancel

The following message may appear. Press <OK>.





The "Bluetooth Setup Wizard Completion Page" appears.

Bluetooth Setup Wizard Comp	pletion Page
E Star	Completing Bluetooth Setup Wizard
X I YY	MRCube014 SerialPort
	Connect to the remote device using this connection shortcut.
	□ Create a shortcut and then restart this wizard so that I can create additional shortcuts.
	To complete this connection, click Finish.
	< <u>B</u> ack Finish Cancel

Press <Finish> to continue. The screen closes and the MR Cube is installed.

Open" My Bluetooth Places". The MR Cube is shown and connected. Right click the MR Cube and select <Disconnect>.



Right click again and select "Properties".



3 My Bluetooth Places		X
Ele Edit Vew Bluetooth Fgvorite	s Iools Help	ar 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 199
🛛 😋 Back 🔹 🕥 🖂 🏂 🔎 Seard	- 🌮 Folders 🛛 🎫 🔹	
Address 🚺 My Bluetooth Places		💌 🄁 😡
	MRCube014	

"Bluetooth Properties" appears and the COM Port is shown. This COM Port number must be used in the MRS software. Press <0K> to continue.

Bluetooth Properties	×
General	
MRCube014 SerialPort	
Secure Connection	
COM Port: COM8	
OK Cancel	Apply



2.2 Bluetooth installation Windows Vista

How to add a connection between the MR Cube and a computer.

To connect the MR Cube to a computer, the computer needs to be provided with Bluetooth. This can be a standard function on your computer, or you can add this function by installing a Bluetooth USB converter. The following instructions are about installing the MR Cube on a computer which is provided with Bluetooth. The pictures in these instructions may vary from the screens you will see during installation. This is because the different Microsoft operating systems and the different Bluetooth configuration programs. To start the installation, open My Bluetooth Places by double clicking the Bluetooth icon on your desktop, taskbar or in Control Panel.



Make sure the MR Cube is turned on and that the serial number of the MR Cube is known. The serial number can be found underneath the MR Cube.

In Bluetooth Devices, click <Add...>

1	Options	COM Ports	Hardware	
		-		

The Add Bluetooth Device Wizard will start.

Make sure the MR Cube is turned on and select "My device is set up and ready to be found". Press <Next> to continue.



Welcome to the Add Bluetooth Device Wizard Before proceeding, refer to the "Bluetooth" section of the device documentation. Then set up your device so that your computer can find it: - Tum it on - Make it discoverable (visible) - Give it a name (optional) - Press the button on the bottom of the device (keyboards and mice only)
My device is set up and ready to be found Add only Bluetooth devices that you trust. < Back Next > Cancel

The wizard will show all available devices. If your MR Cube is found by the wizard, it will be shown on the Bluetooth Device Selection screen. The name of the device must be MRCube +"serial number". In this case MRCube014. If your computer cannot find the MR Cube, make sure the MR Cube is turned on and search again.

If your MR Cube is found, double click on it or select it and press <Next>.

Select the Bluetooth device that you want to add.		
test laptop New device	MRCube014 New device	
 If you don't see the device t turned on. Follow the setup and then click Search Agair 	that you want to add, make sure that it is instructions that came with the device, <u>S</u> earch Again	

Select "Use the passkey found in the documentation:" For the MR Cube, this code is 2031. After typing the code, press <Next> to continue.



Do you need a passkey to add your device?			
Fo answer this question, refer to the "Bluetooth" secti your device. If the documentation specifies a passkey	ion of the documentation that came with y, use that one.		
© Qhoose a passkey for me			
<u> Use the passkey found in the documentation:</u>	2031		
Let me choose my own passkey:			
© <u>D</u> on't use a passkey			
You should always use a <u>passkey</u> , unless your de recommend using a passkey that is 8 to 16 digits l more secure it will be	vice does not support one. We long. The longer the passkey, the		

The assigned COM ports are shown in the following screen. The outgoing COM port is the COM port to use in the Monitored Rehab Systems Software. In this case COM 4. Press <Finish> to continue.



The installed MR Cube is shown in the Bluetooth Devices. Press <OK> to continue.

Devices	Options	COM Ports	Hardware			
All o	ther devi	ces				
8	MRCube	014				
•	rasakey	enableu				
Ad	d	Remove		1	Properties	ī
		-			and the second	





2.3 Bluetooth installation Windows 7

How to add a connection between the MR Cube and a computer.

To connect the MR Cube to a computer, the computer needs to be provided with Bluetooth. This can be a default function on your computer, or you can add this function by installing a Bluetooth USB converter. The following instructions are about installing the MR Cube on a computer which is provided with Bluetooth. The pictures in these instructions may vary from the screens you will see during installation. This is because the different Microsoft operating systems and the different Bluetooth configuration programs. To start the installation, open My Bluetooth Places by double clicking the Bluetooth icon on your desktop, taskbar or in Control Panel.



Make sure the MR Cube is turned on and that the serial number of the MR Cube is known. The serial number can be found at the bottom of the MR Cube. In Bluetooth Devices, click <Add a device>.

🕞 🗊 Add a device	G 🖉 Add a device
Select a device to add to this computer Windows will continue to look for new devices and display them here.	Select a pairing option Create a pairing code for me The device has a keypad.
Arnold Bluetooth Phone Nathalie Bluetooth Phone What if Windows doesn't find my device?	 Enter the device's pairing code The device comes with a pairing code. Check for one on the device or in the device manual. Pair without using a code This type of device, such as a mouse, does not require a secure connection. How can I tell if my device has a pairing code?
Net Cancel	Net Cancel

Make sure the MR Cube is turned on. Press <Next> to continue. Select "Enter the device's pairing code".





For the MR Cube, this code is 2031. After typing the code, press <Next> to continue.

To verify the correct COM port, open the Control Panel. Choose Hardware and Sound - Devices and printers. Double click the MRCube01 device.

The assigned COM ports are shown in the following screen. The outgoing COM port is the COM port to use in the Monitored Rehab Systems Software. In this case COM 4.





3. MRS Software: MR Cube module installation

3.1 Introduction

In this chapter the installation of Monitored Rehab Systems software is described. The server and the client installation are clearly explained step by step. Keep this installation manual next to you during the installation.

A number of terms, which are used in the manual, are explained here:

Server: The computer in the network where the database is stored, it is the most important computer. The client computers are connecting to this database.

Client: A workstation. Clients make connection with the database, which is located on the server.

Firebird Server: A program that enables the communication between MRS software and the database.

IP address: A kind of address from the computer, every computer in the network has his own IP address. (For example 192.168.0.1)

Database path: a routing to the location where the database is stored on the hard disk. The default path is generally: "C:\Program Files\MRS Software\Database\MRS.gdb".

3.2 Minimal requirements:

Processor: Pentium IV or compatible AMD processor Operating system: Windows XP/Windows Vista/Windows 7 Memory: 2048 Mb Hard disk: 2 Gb available Screen resolution: 1024 x 768 Graphic adaptor: ATi of Nvidia DirectX 10 comp. Vertex Shader 3.0 comp. with at least 256 MB VRAM Extra for MR Cube: Bluetooth (onboard or USB)

3.3 Permissions

You need administrator rights to install the MRS software. Users of the software needs permissions (full control) on the following folders:

Windows XP:

- C:\Program Files\MRS Software
- C:\Program Files\Firebird
- C:\Documents and Settings\All users\Application data\MRS
- C:\Documents and Settings\[USER]\Application data\MRS

Windows Vista/Windows 7:

- C:\Program Files\MRS Software*
- C:\Program Files\Firebird*
- C:\ProgramData\MRS
- C:\Users\[USER]\AppData\Roaming\MRS

* If you are using a 64 bit version of windows the "Program Files" folder is named: "Program Files (x86)".

Windows Vista/Windows 7: User Account Control (UAC) must be turned off.



How to add permissions

To add permissions, browse to the "MRS Software" folder:

Right click the "MRS Software" folder and choose properties.

Select the tab "Security".

📜 MRS Software Properties 📃 🔀	📜 MRS Software Properties 📃
General Sharing Security Previous Versions Customize	General Sharing Security Previous Versions Customize
MRS Software	Object name: C:\Program Files\MRS Software
Type: File Folder Location: C:\Program Files Size: 1,04 GB (1.118.800.501 bytes) Size on disk: 1,04 GB (1.119.752.192 bytes) Contains: 397 Files, 28 Folders	Copy of dear maintes. Copy of dear mai
Created: woensdag 26 augustus 2009, 11:51:07 Attributes: Fead-only (Only applies to files in folder) Hidden Advanced	Full control Addity Modify Read & execute List folder contents Read Write \checkmark
OK Cancel Apply	For special pemissions or advanced settings, Advanced click Advanced. Leam about access control and pemissions OK Cancel Apply



Click <edit>.

X X 📙 MRS Software Properties Permissions for MRS Software General Sharing Security Previous Versions Customize Security Object name: C:\Program Files\MRS Software Object name: C:\Program Files\MRS Software Group or user names: Group or user names: & SYSTEM . & CREATOR OWNER & Administrators (MRSystems\Administrators) & SYSTEM S. User & Administrators (MRSystems\Administrators) 😡 Triotadinetallar • SR Llears (ME 8 TrustedInstaller To change permissions, click Edit. Edit.. Permissions for Users Allow Deny Add... <u>R</u>emove Full control . Modify Deny Permissions for Users Allow ш Read & execute Full control 1 . List folder contents \checkmark Ш 1 Modify Read Read & execute 1 Write 1 List folder contents For special permissions or advanced settings, Ad<u>v</u>anced ÷ click Advanced. Read 1 Learn about access control and permissions Learn about access control and permissions OK Cancel Apply OK Cancel <u>Apply</u>

Select Full control and click < Apply>. All users have all permissions on the "MRS Software folder".

How to turn off user account control (UAC) To turn off user account control, browse to Control Panel and select "User Accounts".

								x
Control Panel >)		_		r 4y Sean	ch 👘	~	9
Control Panel Home	Name	Category						_^
Classic View			0		2.2	シア		
	Nokia Connecti	NVIDIA Contr	Offline Files	Pen and Input Devices	People Near Me	Performance Informatio	Personaliz	
	Phone and Modern	Power Options	Printers	Problem Reports a	Programs and Features	Regional and Language	Scanners and Cameras	
	Security Center	SigmaTel Audio	Software Updates	Sound	Speech Recogniti	Sync Center	System	
	Tablet PC Settings	Taskbar and Start Menu	Text to Speech	User Accounts	Welcome Center	Windows Anytim	Windows CardSpace	Ű.
	Windows Defender	Windows Firewall	Windows Mebilit	Windows Sidebar	Windows SideShow	Windows Update		•

Click "Turn User Account Control on or off".

Select "Users"





If Windows asks permission, choose <Yes>. The following screen will appear. The checkbox needs to be unchecked. If it is already unchecked, leave it this way. Otherwise, uncheck the checkbox and press <OK>. The computer will ask to restart. Choose <Yes>.



3.4 Autorun

Put the installation CD in the CD-Rom player of the computer. If "Autorun" is switched on, the following screen appears:

MRS Software Installation	×
MONITORED REHAB SYSTEMS Software Install Net Install XNA Install Server/Stand Alone	FysioRoadmap Ó
Manual MONITORED REHAB SYSTEMS	×



If the screen doesn't appear, double-click on the icon "my computer" on your desktop. Select the CD-Rom player (generally the D-disk) and click on your right mouse button. Choose <Open> in the menu that appears. Now double-click on the icon "Autorun.exe".

The following software is required:

- .NET Framework 4.0
- XNA Framework 4.0

If they are not installed, press the buttons to install the software.

If you see the button Install XNA version 4.0 this means you don't have this version and you have to click this button.

If the button Install XNA version 4.0 or Framework .Net 4.0 appears, this means you don't have this software or correct version and you have to click this button.

The following screen will appear:

😸 Microsoft XNA Framework R	edistributable 4.0 Setup 📃 🗖 🔀
W Fr W Th Re or	elcome to the Microsoft XNA amework Redistributable 4.0 Setup izard e Setup Wizard will install Microsoft XNA Framework distributable 4.0 on your computer. Click Next to continue Cancel to exit the Setup Wizard.
The	Back Next Cancel

Press <Next> to continue.



📸 Microsoft XNA Framework Redistributable 4.0 Setup
End-User License Agreement Please read the following license agreement carefully
MICROSOFT SOFTWARE LICENSE TERMS
MICROSOFT XNA FRAMEWORK 4.0
These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. Please read them. They apply to the software named above, which includes the media on which you received it, if any. The terms also apply to any Microsoft
• updates.
I accept the terms in the License Agreement
<u>B</u> ack <u>N</u> ext <u>C</u> ancel

Check "I accept the terms in the License Agreement". Press <Next> to continue.

👹 Microsoft XNA. Framework Redistributable 4.0 Setup	
Ready to install Microsoft XNA Framework Redistributable 4.0	na
Click Install to begin the installation. Click Cancel to exit the wizard.	
Back Install	Cancel

Press <Install>. This installation take several minutes.





The following screen will appear when the installation has been successful:



Press <Finish> to continue.

The button in the start up screen will disappear.





In the menu can be chosen between the server and the client. Always start with installing the server. Click therefore on the button <Install Server/Stand Alone>.

Attention!

Always install the server first, with a new installation or update. After this, install the clients.



3.5 Server Installation

The software detects if there is a Firebird Server installation available. If there is an old version installed, a message appears. Please stop the Firebird server (Control panel - Firebird service manager - Stop). Press <OK> to continue the installation, a newer version of Firebird will be installed.

If "Install Server" is chosen in the autorun menu, the preparation of the installation starts:

MRS Software Modules		
Please check the required modules. This can be changed afterwards in the software.		
 ☐ FysioRoadmap ☐ MRS Software ☐ KneeLax ■ MR Cube 		
<u>D</u> k <u>Cancel</u>		

Please check the "MR Cube" box.

🔀 MRS Software - InstallShield Wizard			
	Welcome to the InstallShield Wizard for MRS Software		
Systems	The InstallShield(R) Wizard will install MRS Software on your computer. To continue, click Next.		
	WARNING: This program is protected by copyright law and international treaties.		
	< Back Next > Cancel		

Choose <Next> to select the folder where the Monitored Rehab Systems software must be installed.



B MRS Soft	ware - InstallShield Wizard
Destinati Click Nex	on Folder At to install to this folder, or click Change to install to a different for the second
	Install MRS Software to: C:\Program Files\MRS Software\
InstallShield –	< Back Next > Cancel

With the button <Change> the location can be changed. It is advised to install the software in the standard folder. If this is chosen for this software it will be installed in the folder:

C:\Program Files\MRS software

Hereafter press the button <Next>.

😸 MRS Soft	ware - InstallShield Wizard	- • ×
Installing The prog	MRS Software ram features you selected are being installed.	
1	Please wait while the InstallShield Wizard installs MRS Softwark take several minutes. Status:	vare. This may
InstallShield –	< <u>B</u> ack Mext	> Cancel



🙀 MRS Soft	ware - InstallShield Wizard	×
Installing	MRS Software	
The prog	ram features you selected are being installed.	M-V
15	Please wait while the InstallShield Wizard installs MRS Software. This may take several minutes.	
	Status:	
	Copying new files	
InstallShield –		
	< <u>B</u> ack <u>N</u> ext > Cancel	
🙀 MRS Soft	ware - InstallShield Wizard	×
	InstallShield Wizard Completed	
2		
MONIT	FORED REHAB	
51	The InstallShield Wizard has successfully installed MRS	
	Software. Click Finish to exit the wizard.	

< <u>B</u>ack

The installation is now almost ready. With the button <Finish> will the installation be completed and can possible client updates be started.

Cancel

Finish



3.6 Conversion MR Cube 1.3 to MRS Software 4.4

If you have MR Cube 1.3 software installed, the database must be converted to the MRS Software 4.4 database. In the next steps is explained how to do this:

Install the MRS Software 4.4 as described in part 3.5.

After the installation of MRS Software 4.4 in the autorun screen of the CD a new button <Import Cube> will appear.



Press the <Import Cube> button to start the conversion

ing patients, time remaining: 0:05:59 (done at 17:07:35) (reageert niet)	
26%	Abort
Karel Batvoort IHID[2].ID=69(F) with 0 rehabs and 0 tests and 0 exercises Karel Batvoort IHID[3].ID=70(F) with 0 rehabs and 0 tests and 0 exercises	*
Karel Batvoort IHID[4].ID=71(F) with 0 rehabs and 0 tests and 0 exercises Karel Batvoort IHID[5].ID=74(F) with 1 rehabs and 10 tests and 12 exercises	
Karel Batvoort IHID[6].ID=112(F) with 9 rehabs and 41 tests and 3 exercises	

The conversion starts. You can see the progress in the conversion screen.

This can take a while. When the conversion is ready you see the message "Import successfully completed". The MR Cube patients are now converted in the new MRS Software.





3.7 Client Installation

If "Install Client" is chosen in the autorun menu, the preparation of the installation starts:

Client settin	ıgs	×
IP-Address	192.168.50.10	Test
Database	C:\Program Files\MRS Software\Database\MRS.GDB	
	<u>C</u> ancel <u>O</u> k	

A client settings screen appears. Please enter the IP Address and database path. Please use the direct path which is used on the server (you can't use a network shared drive). You can test the connection with the <Test> button. The <OK> button is enabled when the server can be reached.

start 💌		
Client settings correct		
ОК		
MRS Software Modules		
Please check the required modules. This can be changed afterwards in the software.		
☐ FysioRoadmap ☐ MRS Software ☐ KneeLax ■ MR Cube		
<u>D</u> k <u>Canc</u>	el	

Check the "MR Cube" box. Hereafter the welcome screen opens:

🙀 MRS Software - InstallShiel	d Wizard 🔀
MONITORED REHAB	Welcome to the InstallShield Wizard for MRS Software
Systems	The InstallShield(R) Wizard will install MRS Software on your computer. To continue, click Next.
	WARNING: This program is protected by copyright law and international treaties.
	< <u>B</u> ack <u>Next</u> Cancel



Choose <Next> to select the folder where the Monitored Rehab Systems software must be installed in.

🛃 MRS Soft	tware - InstallShield Wizard
Destinati Click Nex	ion Folder kt to install to this folder, or click Change to install to a different folder.
	Install MRS Software to: C:\Program Files\MRS Software\ Change
InstallShield -	< <u>B</u> ack Next > Cancel

With the button <Change> the location can be changed. It is advised to install the software in the default folder. If this is chosen for this software it will be installed in the folder:

C:\Program Files\MRS software\

Hereafter press the button <Next>.

財 MRS Soft	ware - InstallShield Wizard	
Installing The prog	MRS Software ram features you selected are being installed.	
P	Please wait while the InstallShield Wizard installs MRS Softw take several minutes.	are. This may
	Status:	
InstallShield		
	< <u>B</u> ack Next >	Cancel



😸 MRS Soft	ware - InstallShield Wizard
Installing	MRS Software
The prog	ram features you selected are being installed.
15	Please wait while the InstallShield Wizard installs MRS Software. This may take several minutes.
	Status: Copying new files
InstallShield	< <u>B</u> ack Next > Cancel
🛃 MRS Soft	ware - InstallShield Wizard
Monit	InstallShield Wizard Completed The InstallShield Wizard has successfully installed MRS Software. Click Finish to exit the wizard.
	< <u>B</u> ack Einish Cancel

The installation is now almost ready. With the button <Finish> will the installation be completed and can possible client updates be started.



3.8 Uninstall

To safely remove he MRS software and avoid problems, follow the steps in this chapter.

Open the Control Panel via the <Start> button. Locate the icon "Firebird Service Manager" and double click it.



Firebird will open the following screen:



Press the <Stop> button.





The red text is changing into "Stopped". This means that Firebird is not active at this moment. Press <Close>.



Locate the icon "Add or Remove Programs" in the control panel. Double click on the icon.

🐻 Add or Rei	nove Programs			
5	Currently installed programs:	Show updates	Sort by: Name	~
Change or Remove	🛞 DivX		Size	105.00MB
Programs	💌 DivX Converter		Size	105.00MB
	DivX Converter		Size	105.00MB
Add New	DivX Player		Size	105.00MB
Programs	🐻 Easy CD Creator 5 Basic		Size	21.37MB
	😼 Intel(R) 845G Chipset Graphics Driver Software			
<u> </u>	😼 Intel(R) PRO Ethernet Adapter and Software			
Mindows	🛃 McAfee VirusScan		Size	19.61MB
Components	🔂 Monitored Rehab Systems Software		Size	<u>53.98MB</u>
	Click here for support information.		Used	<u>rarely</u>
Set Program	To change this program or remove it from your computer,	click Change or Remove.	Change	Remove
Defaults	😼 Windows Installer 3.1 (KB893803)			
	🔀 Windows XP Service Pack 2			

Select "Monitored Rehab Systems Software" and press the <Remove> button. The software is now definitely removed.



4. Registration

If you start the MRS Software, you have to log in. You can log in with:

tn: Username: mradmin

Password: mradmin

We advise to add your own user(s) with their own competences (we have user, superviser and administrator)

Before use, the MR Cube software needs to be registrated. This registration is valid for one year and will be renewed each calendar year. After installation, the software is in demo mode which is valid for 30 days. During startup, the software shows how many days you have left to register.

At the first start, the following message will appear:

🖋 MR Cube				
🔏 Demo v	version MR (Cube		
License valid to:	4-11-	2010 (30 days left)		
Obtain	license key	Enter license key	Continue	

Select <Continue> if you don't want to register at this time.

Select <Obtain License Key> if you do want to register. Enter your details:

obtain license 🎤 Obtain	i license key
Institute da	ita:
Name:	Demo Instituut
Address:	Claes Tillyweg 2
ZIP/State:	2031CW City: Haarlem
Country:	The Netherlands
Telephone:	023-5255050
Contact dat	a:
Name:	T. Test
Email:	test@demo.nl
	🚔 Print 📩 Email
	✓ OK X Cancel

Select <Print> to print the registration form.

Select <Email> to e-mail the registration form, your local e-mail program must be opened for this action (webbased e-mail will not work).



Obtain license key	
Send or fax this document to: Monitored Rehab Systems PO box 4959 2003 EZ Haarlem +31 (0)23 750 54 44	
Name: Address: ZIP/State: City: Country: Telephone:	Demo Instituut Claes Tillyweg 2 2031CW Haarlem The Netherlands 023-5255050
Name: Email:	T. Test test@demo.nl
Module:	MR Cube
Registration key:	11-21472

Print Preview. You can fax this to +31 (0) 23 750 5445 or save as PDF and email as an attachment to info@ mrsystems.nl

📭 🕼 🔊 😈 🐟 💓 🔻 Registration key - Demo Instituut - 💷 📼 🗙				
Message Insert O	pptions Format Text	0		
Paste J Clipboard 9 Basic Text	A A A A A A A A A A A A A A A A A A A A			
This message has not been sent.				
Send Cc Monitored	Rehab Systems ≺info@mrsystems.nl≥			
Account Subject: Registrati	ion key - Demo Instituut			
<comments></comments>				
Name: Demo Instituut Address: Claes Tillyweg 2 ZIP/State: 2031CW City: Haarlem Country: The Netherlands Telephone: 023-5255050				
Name: T. Test Email: test@demo.nl				
Module: MR Cube				

Example of an automatically generated e-mail.





After registration you will receive an e-mail from Monitored Rehab Systems (within 3 days), with a license key.

To enter the received key, start the software and choose <Enter license key>.

🖋 MR Cube	×		
🔏 Demo version MR Cube			
License valid to:	4-11-2010 (30 days left)		
Obtain license ke	ay Enter license key Continue		

The code provided by Monitored Rehab Systems can be copied/pasted in the text field under "License Key" (do not type, it gives error messages because the difference between I, I, L, L O, O o are not clear enough).

🖋 MR Cube	
Registration key: 11-21472	
License key: t+dJfzb/pJ4EDuqlwcmV3Tt9gK2m5Rm64	
Cancel	

Then, select the green check mark. Your software is now registered.

🖋 MR Cube		X
🔏 Valid license k	еу	
License valid to:	31-12-2010 (64 days left)	
Obtain license key	Enter license key	ОК
Obtain license key	Enter license key	ОК

At the end of each calendar year you will receive (depending on your agreement with your local dealer) an invoice for next year's license. After payment of the invoice you will automatically receive a new license key for the following year.

If you do not register, a message "License expired" will appear frequently.




5. Patient

To insert a new patient select the option "New patient" in the menu.



Fill in the fields of the form with the patients data. The information in these fields will be linked with all performance results of the executed test and training programs. The yellow fields are required.

Patient Patient		2	×
Last name: First name: Street: ZIP Code: Telephone: Work: Birth date: Length: Gender:	- 1 - 1 - 1980 ▼ C Male C Female	Middle name: Initials: No.: City: Mobile: Email: Aqe: Weight: ID:	
Farticulars:	n 		< 8
	6] Save	 🛞 Close

5.1 Indication

In the indication screen you can enter additional patient data like the diagnosis, involved side and more. This information is shown in the header on the printouts.

Indication				Þ
衝 Indication				
Diagnosis:	ACL			
Involved side:	Left	•		
Q, Clinician :	Heuperman, Joost	•		
Q General practitioner:	Beekers, I.H.	Q Referral:	Akkermans, J.C.	~
Q, Insurer:	ABNAMRO	Insurance no.:	123456	
Q Profession:	Accountant	C Employer:	Monitored Rehab Systems	~
Q, Sport:	Badminton	•		
Machine settings: These are footplate set X SO Y SO	tings:			
	🖌 🔨 ОК	🛞 Cancel		





5.2 Extended history

Choose "Patient" - "Extended History". Here you get an complete overview of all test-, rehab and training programs with belonging scores from the selected patient. Every overview can be printed out. To view the results of one specific test double-click on a test.

🞯 Extended histor	ry .	Þ		×
🛃 Extende	ed history	~v		
Date	Time	Test / Exercise	Device	
17-2-2012	14:54:51	Coordination	MR Cube	
17-2-2012	14:32:42	Random decelaration	MR-Cube op de Pulley	
17-2-2012	14:28:44	Random decelaration	MR-Cube op de Pulley	
17-2-2012	14:26:10	Random explosive	MR-Cube op de Pulley	
17-2-2012	14:25:11	Random explosive	MR-Cube op de Pulley	
17-2-2012	14:24:05	Random explosive	MR-Cube op de Pulley	
17-2-2012	14:19:56	Random reactive	MR Cube	
17-2-2012	14:19:56	Controlled route	MR Cube	
17-2-2012	14:19:56	Controlled position	MR Cube	
17-2-2012	14:17:29	Controlled position	MR-Cube op de Pulley	
17-2-2012	14:15:39	Controlled position	MR-Cube op de Pulley	
17-2-2012	14:10:36	Isometric gate	MR-Cube op de Pulley	
17-2-2012	14:09:33	Isometric gate	MR-Cube op de Pulley	
17-2-2012	14:08:18	Random reactive	MR-Cube op de Pulley	
17-2-2012	13:51:16	Rehab	MR Cube	
		1		
😑 Print		🖌 🗸 ОК		🗙 Cancel

Report Pr	eview			
Page Z	oom			
8		Page 1	of 6 🔍 🔍 🖹] Zoom 📶 % 📕
			Extende	ed history
	Name: Tes	at AaMonitore	А	Clinician: A P. Ergotherapeut (e)
	Birthdate:	29-5-1976		Referral: Lindenhovius
	Print date	: 18-6-2010		Involved side: Both
	Diagnosis	asdfasdf		
	Data	Time	Teet	Davias
	10.6.2010	11-41-00	Test IcomotricGato	DEMO
	10-6-2010	11:39:53	SkiGame	DEMO
	8-6-2010	9:19:17	SkiGame	DEMO
	8-6-2010	9:17:46	SkiGame	DEMO
	8-6-2010	9:15:15	SkiGame	DEMO
	8-6-2010	9:13:11	SkiGame	DEMO
	8-6-2010	8:44:05	Power test	DEMO
	8-6-2010	7:45:57	Power test	DEMO
	8-6-2010	7:32:12	Power test	DEMO
	7-6-2010	11:45:25	RandomReactive	Unknown device
	4-6-2010	11:19:26	Memory	DEMO
	4-6-2010	11:19:20	RecognitionGame	DEMO
	4.6.0010	11.10.10	NA-4-0	DEMO



6. Quick Start menu

When the Quick Start in the Settings menu is checked, the following screen will appear in the tab of the MR Cube.

Tests: Sets: Rest:	Random reactive 3 x 60 sec. 30 sec.	Side: Weight:	Both sides 20 🗸 kg	>	
Random reactive	Controlled route	Controlled p	position	Rehab	
Isometric gate	Random explosive	Random deci	eleration Level 4	Level 5	
	St	art			



1) Choose exercise/challenging program/test bij clicking on the yellow arrow and select button;

2) Choose side;

3) Choose weight;

4) Choose level;

5) Press start.

The exercise will continue starting the same way as in the advanced mode. Explanation about these exercises is described in the following chapters.



7. Rehab F5

In the main menu "MR Cube" the first option for training is Rehab (F5).



7.1 Rehab

😚 Start Rehab	2		
Rehab settings	,		
Type of equipment:	Rehab		
	Rehab type:	Repetitions	
Type of exercise:	Weight:		
	Number of sets:	1 👻	
	Duration of sets:	30	
⊙One side left	Number of repetitions:	10 🗸	
○ One side right ● Both sides	Rest time between sets:	30 👻	
O No side	Start position:	Bottom 🗸	
	Concentric speed:	20 🖌 cm/s	
	Eccentric speed:	20 💌 cm/s	
	ROM acceptance : 5	50%	
Mixed rehabs			
		· · · · · · · · · · · · · · · · · · ·	
	· · · · · · · · · · · · · · · · · · ·		incel

This training program ends after a number of repetitions or after a pre-set period of time.

How to set up a rehab training step by step

- 1) Select "type of equipment" where the computer is connected to
- 2) Describe the type of exercise in "type of exercise"
- 3) Select One side left/right, Both sides or No side (no use of legs) training
- 4) Select rehab type (time or number of reps)
- 5) Select the exercise weight
- 6) Select number of exercise sets
- 7) Select the number of repetitions
- 8) Select the rest time between sets
- 9) Select start position. Bottom starts with concentric movement, top starts with eccentric movement
- 10) Select the concentric speed
- 11) Select the eccentric speed
- 12) Choose ROM acceptance. 50% means that 50% of the ROM should be done before this repetition is count as a repetition



13) This training program ends after a number of repetitions or after a pre-set period of time

14) To start the training press <OK> and press any key.

First set the range of motion by making 1 repetition:



After pressing <Enter> the exercise will start.



Displayed is the amount of repetitions (10) and the amount of sets (1).

The "Preferred" speed (orange) is set in the software for both concentric and eccentric.

The "Actual" speed (green) is the actual speed of the client/patient.

Task of the patient is to get the green ball (right side) moving with the same speed as the orange ball (left side).

If the training is finished the following screen will appear:





The graphics show the range of motion. Blue is the concentric part of the repetition, red is the eccentric part.

"Preferred speed" is the speed that has been set by the settings.

"Average speed" is the average speed of the exercise.

"Deficit speed" is the difference between preferred and average speed.

- : is too slow

+ : is too fast

0% : is perfect

"Total work" is the total work performed by the patient during the exercise in Joules. "Total power" is the total work performed by the patient during the exercise in Watt.

To add remarks, press the button <Remarks> and enter your text.

Remark		×
ң Remark about th	nis training.	•
[]		
V OK		Cancel



7.2 Mixed Rehab



S Mixed rehab	k Karala kara
Mixed rehab	
Type of equipment	Exercises
V	Rehab Weight Vcon Vecc Rest time
Type of exercise	
	V OK

With Mixed rehab it is possible to plan several different exercises, with different settings, for example:

3x10 repetitions 10cm/s up and 15cm/s down (10kg) 2x5 repetitions 20cm/s up and 20 cm/s down (20kg) 1x30 sec. (Time) 15cm/s up and 20cm/s down (30kg)

You can use these settings:

- Rehab type: repetition or Time
- Weight
- Number of sets
- Duration of sets
- Number of repetitions (not with "Time")
- Rest time between sets
- Start position
- Concentric speed
- Eccentric speed
- ROM acceptance in %
- Side: left, right, both or none

By pressing the + icon the following screen appears:



S Mixed rehab				×
🔊 Mixed rehab				
Type of equipment	Exercises			
Rehab typ	e: R	Repetitions 🗸 🗸	Side	time
Type of exercise - Weight:	1	10 🖌	One side right	
Number of	f sets:	✓	Both sides No side	×
Duration	of sets: 3	30 🗸		
Number o	f repetitions: 5	5 💙		
Rest time	between sets: 3	30 🗸	Ν	
Start pos	tion: B	sottom 🖌	15	
Concentr	c speed: 2	20 🖌 cm/s		
Eccentric	speed: 2	20 🔽 cm/s		
ROM acco	ptance: 50%	90%		
		OK X Cancel		
				Lancel

By pressing the pencil, the exercises can be changed.

By pressing <Ok> the exercises will start.

Everything else works the same as the Rehab exercises.

7.3 Rehab History



In this menu you can see all sets done in the rehab training. Double click on the rehab to see the results.



Rehab history		R			
🛃 Rehab h	history				
~					
Date	Time	Rehab	Device	Device	
4-7-2012	10:19:52	Rehab (4 x 5 Repetitions)	Both side	s DEMO	
4-7-2012	10:19:51	Rehab (1 x 5 Repetitions)	Both side	s DEMO	
		Rehab:	4 x 5 repetitions		
		Weight:	13		
		-			
		Number of sets:	4		
		Number of sets: Number of repetitions:	4 5 repetitions		
		Number of sets: Number of repetitions: Side:	4 5 repetitions Both sides		
		Number of sets: Number of repetitions: Side: Concentric speed:	4 5 repetitions Both sides 20 cm/s		
		Number of sets: Number of repetitions: Side: Concentric speed: Eccentric speed:	4 5 repetitions Both sides 20 cm/s 20 cm/s		
		Number of sets: Number of repetitions: Side: Concentric speed: Eccentric speed:	4 5 repetitions Both sides 20 cm/s 20 cm/s		
		Number of sets: Number of repetitions: Side: Concentric speed: Eccentric speed:	4 5 repetitions Both sides 20 cm/s 20 cm/s		

To print to paper use the "Print" button.

		Rehab histo	ory	
Name: Joos Birthdate: Print date:	st de Konings 21-3-1974 30-6-2010	scobra Cliniciar Referral Involved	n: Joost Heupern : Akkermans I side: Left	nan
Date	Time	Rehab	Device	Device
30-6-2010	15:01:16	Rehab (1 x 10 Repetitions)	Both sides	DEMO
17-6-2010	15:25:41	Rehab $(1 \times 2 \text{ Repetitions})$	Both sides	DEMO



8. Exercises



8.1 Functional exercises

S Functional Exercises	<u>N</u>	
🔊 Functional Exerc	ises	
Type of equipment:	Exercises	
Type of exercise:	Number of sets:	
Speed	Rest time between sets:	
O Slow ⊙ Normal		
One side right Both sides	Random reactive Isometric gate Controlled route	
Mixed exercises	Random explosive Controlled position Random decelaration	
		Cancel

How to set up a Functional Exercise training step by step:

- 1) Select "type of equipment" (optional)
- 2) Choose the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right or both sides leg training
- 5) Select the exercise weight
- 6) Select number of sets
- 7) Select the rest time between sets

First set the range of motion by making 1 repetition:



After pressing <Enter> the exercise will start.





Random Reactive

In this exercise yellow balls will fall down from the screen "at random". The red square can be moved by the patient. Making concentric or eccentric movements will shift the red square to the right (concentric) or to the left (eccentric). The goal is to avoid the yellow balls.



Isometric Gate

The isometric training has concentric, eccentric and isometric moments. The red ball must fit in the isometric (hold) position. The required force is challenging both coordination and proprioceptive skills. The red ball has to find its way by maneuvering it between the gaps in the bars. The spaces between the bars are random. If the exercise is carried out well, the difficulty level will increase. The red ball will move higher, giving the patient less time to spot the gates. As with the other exercises the concentric and eccentric movements will shift the red ball to the right (concentric) or to the left (eccentric).







Controlled Route

In this exercise the red circle has to stay on the yellow line (path). The yellow line moves over the screen at random. Concentric/eccentric movements will shift the circle to the right or left. This exercise activates the eccentric/concentric muscle control and invigorates the coordinate abilities.



Random Explosive

In this exercise yellow balls will drop at random slow, normal or fast. These balls have to be caught and bounced back. Fast reaction (explosivity) is necessary to get good results. Concentric/eccentric movements will shift the red plate to the left and to the right.





Controlled position

This exercise copies "simulation". Target is to keep the red ball on the road. The "road" moves at random up and down with unexpected acceleration. Concentric/eccentric movements will shift the red ball to the left and to the right.



Random Deceleration

In this exercise little green stars with individual changing speeds will drop down the screen at random. The red plate symbolizes the catcher. Concentric/eccentric movements will shift the catcher to the left or to the right. The goal is to catch the green stars before they arrive at the bottom of the screen and avoid the unexpected red stars.





8.2 Functional exercises: the scores

The number of points at the start is based on the duration of the exercise. The end score is calculated and influenced by:

- performance
- exercise weight
- speed level (slow, medium or high)

- if you perform a perfect exercise for 10 seconds, you get bonus points

The score is kept in the patient file and can be viewed in the exercise history.

8.3 Mixed Excercises

In this window you can create an individual combination of different exercises

💙 Mixed exercises	N			
ixed exercises	42			
Type of equipment:	Exercises			
✓	Exercise	Sets	Set duration Rest time	
Type of exercise:				
Speed				
 Normal 				
○Fast				
Side	Weight:	10 -		
One side left	Number of sets:	1 -		
One side right One side sides	Duration of set:	30 💌		
◯ No side	Rest time between sets:	30 💌		
Reversed	Rest time between exercises:	30 💌		
	Random reactive	Isometric gate	Controlled route	
	Random explosive	Controlled position	Random decelaration	
	L			
	🖉 🗸 ок		Cancel	

Option 1: how to create an individual mixed exercise training program

- 1) Select "type of equipment" where the MR Cube is connected to (optional)
- 2) Describe the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right or both sides leg training
- 5) Select the type of feedback 2D or 3D (preferred) and start position (reversed starts with eccentric movement)
- 6) Select the exercise weight
- 7) Select number of sets
- 8) Select the rest time between sets
- 9) Select the rest time between exercises
- 10) After starting, the range of motion has to be set by doing one repetition:





After pressing <Enter> the exercise will start automatically. In between exercises, when there is rest time, this screen appears:

Exercise complete!					
Press any k	ey to co	ontin	ue		
Random Reactive	TIME: 4	1:30	SCORE:	3122	
Controlled Route	time: 1	:30	SCORE:	459	
Random Deceleration	TIME: 1	:30	SCORE:	128	
	โ	total	SCOFF	3709	

8.4 Exercise history

When a patient is selected, a concise list of all exercise programs with belonging scores will be shown. Scores and dates are shown in graphics and can be (de)selected.

😂 Rehab histor						
🛃 Rehal	b history					
				ß		
Date	Time	Rehab		Device	Device	
6-7-2012	14:27:51	Rehab (1 x 5 Repetitions)	1	Both sides	DEMO	
6-7-2012	13:25:57	Rehab (4 x 5 Repetitions)	·)	Both sides	DEMO	
6-7-2012	13:25:56	Rehab (1 x 5 Repetitions)	·	Both sides	DEMO	
4-7-2012	10:19:52	Rehab (4 x 5 Repetitions)	· 1	Both sides	DEMO	
4-7-2012	10:19:51	Rehab (1 x 5 Repetitions)		Both sides	DEMO	
		, , , , , , , , , , , , , , , , , , , ,				
		Rehab:	1 x 5 repetitions			
		Weight:	10			
		Number of sets:	1			
		Number of repetitions:	5 repetitions			
		Side:	Both sides			
		Concentric speed:	20 cm/s			
		Eccentric speed:	20 cm/s			
🔗 Print			✔ ОК			Cancel



9. Challenging Programs



9.1 Dual Tasks



9.1.1 Mathematics

🔍 Ərəni Mərin		
Exa Start Math		
Type of equipment:	Exercises	
~	Weight:	20 💌
Type of exercise:	Number of sets:	3 🗸
	Duration of set:	60 🗸
Speed	Rest time between sets:	30 🗸
 ○ Slow ● Normal 		
OFast	Kind of exercise:	Math 💌
rSide ○ One side left ○ One side right ● Both sides	Difficulty:	Normal
O No side		
	✓ OK	Cancel

How to set up a Math exercise step by step:

- 1) Select "type of equipment" where the equipment is connected to (optional)
- 2) Describe the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right, both sides or "no side" training
- 5) Select the exercise weight
- 6) Select number of sets
- 7) Select duration of set
- 8) Select the rest time between sets
- 9) Select your exercise: Math
- 10) Select difficulty

After starting, the range of motion has to be set by doing one repetition:





After pressing <Enter> the exercise will start.

Choose the correct answer by moving the arrow.

Auth Test		
TEST: Mathematics		TIME LEFT: 0:09
14 6	24-13	13

If a correct answer is chosen, a green check mark will appear. After this, the next equation will appear.



If a wrong answer is selected, a red cross will appear. After this, the next equation will appear. After finishing the exercise the results will be shown:





The preset settings are blue. The correct answers are green. Press any key and the following results are shown:

0	Exer	cise history					•		
	Exercise history								
	Sele	ct device :	DEMO			~			
		Date	Time	Exercise		Score	Device	Type of exercise	
	•	10-7-2012	8:38:33	Ski game		212	DEMO		
	•	10-7-2012	8:19:34	Race game		235	DEMO		
	•	6-7-2012	14:44:55	Memory		4	DEMO		
	٠	6-7-2012	14:42:57	Recognition game		9	DEMO		
	•	6-7-2012	14:38:46	Math game		12	DEMO		
	•	6-7-2012	14:37:15	Math game		2	DEMO		
				Exercise: Score: Weight: Number of sets: Duration of sets: Side: Speed:	Ski gam 212 5 kg 4 sets 20 seco Both sic Normal	e nds les			



9.1.2 Recognition

 Start vecoButton 			· · · · · · · · · · · · · · · · · · ·
Start Recognitio	n		
Type of equipment:	Exercises		
~	Weight:	20	
Type of exercise:	Number of sets:	з 🗸	
	Duration of set:	60 🖌	
Speed	Rest time between sets:	30 🗸	
O Slow			
OFast	Kind of exercise:	Recognition 🖌 🖌	
Side			
○One side left ○One side riaht	Difficulty:	Normal 💙	
Both sides	Recognition mode:	SingleImage 🖌 🖌	
	NOK.	Cancel State	
			51

How to set up a Recogition exercise step by step:

- 1) Select "type of equipment" where the equipment is connected to (optional)
- 2) Describe the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right, both sides or "no side" training
- 5) Select the exercise weight
- 6) Select number of sets
- 7) Select duration of set
- 8) Select the rest time between sets
- 9) Select your exercise: Recognition
- 10) Select difficulty
- 11) After starting, the range of motion has to be set by doing one repetition:

Set Range of I	Motion:
I	
CONFIRM (ENTER)	RESET (R)

After pressing <Enter> the exercise will start.



Recognition Test				
TEST: Recognitio	on		TIME LEFT:	0:10
		Da	24	

Choose the correct figure by moving the arrow. If a correct figure is chosen, a green check mark will appear. After this, the next figure will appear.



If a wrong answer is selected, a red cross will appear. After this, the next figure will appear. After finishing the exercise the results will be shown:



The preset settings are blue. The correct matches are green. Press any key and the following results are shown:



Tin 012 8:3 012 8:1 12 14 12 14 12 14 12 14	me 38:33 19:34 :44:55 :38:46 :37:15	Exercise Ski game Race game Memory Recognition game Math game	212 235 4 9	Pevice DEMO DEMO DEMO DEMO	Type of exercise	
012 8:3 012 8:1 12 14 12 14 12 14 12 14 12 14 12 14	38:33 \$ 19:34 \$:44:55 \$:42:57 \$:38:46 \$:37:15 \$	Ski game Race game Memory Recognition game Math game Math game	212 235 4 9	DEMO DEMO DEMO DEMO		
012 8:1 12 14 12 14 12 14 12 14 12 14	19:34 (:44:55 (:42:57 (:38:46 (:37:15 (Race game Memory Recognition game Math game	235 4 9	DEMO DEMO DEMO		
12 14 12 14 12 14 12 14 12 14	:44:55 :42:57 :38:46 :37:15	Memory Recognition game Math game	4 9	DEMO DEMO		
12 14 12 14 12 14	:42:57 F :38:46 F :37:15 F	Recognition game Math game	9	DEMO		
12 14 12 14	:38:46 :37:15	Math game Math gamo	12			
12 14	:37:15	Math game		DEMO		
		Maurganie	2	DEMO		
		Exercise : Score : Weight : Number of sets : Duration of sets : Side : Sneed :	Ski game 212 5 kg 4 sets 20 seconds Both sides Normal			
			Exercise: Score: Weight: Number of sets: Duration of sets: Side: Speed:	Exercise: Ski game Score: 212 Weight: 5 kg Number of sets: 4 sets Duration of sets: 20 seconds Side: Both sides Speed: Normal	Exercles: Ski game Score: 212 Weight: 5 kg Number of sets: 4 sets Duration of sets: 20 seconds Skie: Both sides Speed: Normal	Exercise: Ski game Score: 212 Weight: 5 kg Number of sets: 4 sets Duration of sets: 20 seconds Side: Both sides Speed: Normal

9.1.3 Memory

🕏 Start Memory		
阿 Start Memory		- M
Type of equipment:	Exercises	
	Weight:	20 💌
Type of exercise:	Number of sets:	3 💙
	Duration of set:	60 💌
[Speed	Rest time between sets:	30 💌
Oslow		
Normal East	Kind of exercise:	Memory 🗸
Side		
One side left One side right	Difficulty:	Normal
Both sides		
U NO SIDE		
	🖌 🗸 ОК	Cancel

How to set up a Memory exercise step by step:

- 1) Select "type of equipment" where the equipment is connected to (optional)
- 2) Describe the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right, both sides or "no side" training
- 5) Select the exercise weight
- 6) Select number of sets
- 7) Select duration of set
- 8) Select the rest time between sets
- 9) Select your exercise: Memory
- 10) Select difficulty
- 11) After starting, the range of motion has to be set by doing one repetition:





After pressing <Enter> the exercise will start.



Cards (colors or numbers) are laid out face up, they turn black after a number of seconds. A new card will appear. Choose the matching card by moving the new card and place it under the correct card. If the two cards match, the player scores one point.

Level settings:	Easy	Normal	Hard
Time (in seconds) to show cards	5	4	3
Retry after wrong answer	3	2	1
Number of questions per set	4	3	3

Time of selection is depending on speed:

Slow	2 sec.
Normal	1 sec.
Fast	0.5 sec.

If a correct match is chosen, a green check mark will appear. After this, the next new card will appear. If a wrong answer is selected, a red cross will appear. After this, the next set of cards will appear.





After finishing the exercise the results will be shown:



The preset settings are blue. The correct matches are green. Press any key and the following results are shown:

	Exercise	history	1	13		
6ele	ct device:	DEMO		~		
	Date	Time	Exercise	Scor	e Device	Type of exercise
٠	10-7-2012	8:19:34	Race game	235	DEMO	
٠	6-7-2012	14:44:55	Memory	4	DEMO	
٠	6-7-2012	14:42:57	Recognition game	9	DEMO	
٠	6-7-2012	14:38:46	Math game	12	DEMO	
٠	6-7-2012	14:37:15	Math game	2	DEMO	
			Exercise: Race ge Score: 235 Weight: 5 kg Number of sets: 4 sets Duration of sets: 20 seco Side: Both side			
			Speed:	Normal		



9.2 Sports

2x4 Dual tasks ▼	Spo) rts		Show tests	Test history
Challenging	🕘 Ra			e game	
	💐 Ski game				
	Football game				

9.2.1 Race Game

Start race		
Type of equipment:	Exercises Weight: Number of sets: Duration of set: Rest time between sets: Kind of game: Traffic:	20 V 3 V 60 V 30 V Race game V Average V
	🖌 🔨 ОК	

How to set up a race game step by step:

- 1) Select "type of equipment" where the equipment is connected to (optional)
- 2) Describe the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right, both sides or no side leg training
- 5) Select the exercise weight
- 6) Select number and duration of sets
- 7) Select the quantity of traffic
- 8) After starting, the range of motion has to be set by doing one repetition:



After pressing <Enter> the exercise will start.

Start driving and avoid other vehicles. Collecting coins by driving through them. A yellow coin gives you extra time, a red coin gives you a temporary speed boost. Driving on the emergency lane will diminish the speed.





If you touch another vehicle you will crash and you have to restart.



After finishing the game, the scores will be shown.





Press any key and the following results are shown:

	exercise history Exercise	history	1		R			
-	Select device:	DEMO			~			
	Date	Time	Exercise		Score	Device	Type of exercise	
	• 10-7-2012	8:19:34	Race game		235	DEMO		
	• 6-7-2012	14:44:55	Memory		4	DEMO		
	• 6-7-2012	14:42:57	Recognition game		9	DEMO		
	• 6-7-2012	14:38:46	Math game		12	DEMO		
	• 6-7-2012	14:37:15	Math game		2	DEMO		
	Exercise: Race ga Score: 235 Weight: 5 kg Number of sets: 4 sets Duration of sets: 20 seco Side: Both sid Speed: Normal		me nds es					
								iuse



9.2.2 Ski game

🕝 Start Ski game			
🜆 Start Ski game		μς.	
Type of equipment:	Exercises Weight: Number of sets: Rest time between sets: Kind of game:	20 V 3 V Ski game V	
	✓ ок	× G	ancel

How to set up a ski game step by step:

- 1) Select "type of equipment" where the equipment is connected to (optional)
- 2) Describe the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right, both sides or no side leg training
- 5) Select the exercise weight
- 6) Select number of sets
- 7) Select rest time between sets
- 8) After starting, the range of motion has to be set by doing one repetition:



After pressing <Enter> the exercise will start.





Start skiing and try to stay within the two flags but also to ski as fast as possible to the finish.

If you do not ski between the flags, you get 10 seconds added to your time.



After a crash you have to restart skiing.





After finishing the game, the scores will be shown.



Press any key and the following results are shown:



Exe	xercise listory							
Sele	act device :	DEMO		~]			
	Date	Time	Exercise	Sc	ore Device		Type of exercise	
•	10-7-2012	8:38:33	Ski game	21	2 DEMO			
•	10-7-2012	8:19:34	Race game	23	5 DEMO			
٠	6-7-2012	14:44:55	Memory	4	DEMO			
•	6-7-2012	14:42:57	Recognition game	9	DEMO			
•	6-7-2012	14:38:46	Math game	12	DEMO			
•	6-7-2012	14:37:15	Math game	2	DEMO			
		Exercise: Ski game Score: 212 Weight: 5 kg Number of sets: 4 sets Duration of sets: 20 seconds Side: Both sides Speed: Normal		5				
								Close

9.2.3 American Football game

💙 Start football	<u>N</u>		_ 🗆 🗙
💽 Start Football	-//		
Type of equipment	Game settings		
	Weight:	20 🖌	
Type of exercise	Number of sets:	3 🗸	
	Duration of set:	60 🗸	
Speed	Rest time between sets:	30 🗸	
OSlow			
Normal Fast	Player outfit:	Red/White/White	
Side	Opponent outfit:	Black/Blue/Yellow	
One side left			
One side right One sides			
O No side			
	🔷 ОК	X c	ancel

How to set up a football game step by step:

- 1) Select "type of equipment" where the equipment is connected to (optional)
- 2) Describe the type of exercise in "type of exercise" (optional)
- 3) Select the speed of the exercise
- 4) Select one side left/right, both sides or no side training
- 5) Select the exercise weight
- 6) Select number and duration of sets
- 7) Select rest time between sets
- 8) Choose the outfit of the player and the opponent
- 9) After starting, the range of motion has to be set by doing one repetition:





When confirmed, the game will start.



The aim of the game is to make a touchdown. You have to cross the field without being tackeled. Every game you have to run 100 yards, the time to achieve this, can vary.

If you get too close to your opponent, you get tackeled. You have to start over, at the last position.





The score will be shown and you can try again. The amount of yards run will be added. You start at the total amount of yards you ran.

When the duration time has been achieved, you get a time-out. This screen appears:



You can also see how many seconds of rest time you still have left.



This is the goal: achieving Touchdown:



10. Testing with the MR Cube

K					
Test	s	Test history			
	Coordination test				
	Proprioceptive test				
	Response time test				
	Po	Power test			

Choose 'Show tests'. Choose a test in the following screen:

	Tests:		
4	Coordination test	Proprioceptive test Response time test Power test	

10.1 Coordination Test

The coordination test can be done safely in early rehabilitation since it is not related to strength. With the coordination we want to look at the quality of movement, we can see both concentric and eccentric and absolute strength is not important. The first screen of the coordination test:

Start coordination test		b	X
🔊 Coordination test		~\ <u>\</u>	
Type of equipment:	Settings		
✓	Weight:	10 💙	
Type of exercise:			
	Mode:	Vertical 💌	
Side			
One side left			
One side right Both sides			
O No side			
		🖌 ОК	Cancel



The amount of weight you select can be minimal. The test should always be easily achievable; you are not looking for strength but for coordination. 5 or 10 kg is enough weight in most of the tests you will do.

Mode: Choose "Vertical" or "Horizontal" moving of the yellow line.

Set min/max: Where in the previous max. force test and endurance strength test the range of motion was not so important, in the Coordination test it is extremely important to select the proper range of motion. Make sure the foot does not come off of the foot plate when setting the Min/Max.

After starting, the range of motion has to be set by doing one repetition:

Set Range of Motion:				
CONFIRM (ENTER)	RESET (R)			

The Min value should be around "0" the max value is the end of the range. If the "min" value is not "0" please reset the electronics (Reset button). Then make the repetition (to set min/max) again, ending in the "min" position.

The test will start in the "min" position. Press <Enter> to start the test.

Test instructions: keep the red crosshair on the yellow line as exact as possible. The test starts with the Non-Involved side and afterwards the Involved side.

TEST: Coordination Test	TIME LEFT: 0:46
\langle	
*	

After the test (one side) the following results will appear:





After the test (both sides) the following results will appear:



To print to paper use the <Print> button. If you want a print preview on the screen use the command; "Ctrl+p". To add a note use <Remarks>.

To view a line chart, use <Toggle chart>.

To compare results use <Overlay>. Choose the test results you want to compare and press <OK>. The results will be displayed.



Name: Joost de Koningscobra Birthdate: 21-3-1974 Test date: 1-7-2010 Weight: 10 kg.		Clinician: Joost Heupe Referral: Akkermans Involved side: Left Side: Both sides	rman
Concentric	Involved	Non involved	Deficit
Correct position (%):	2	10	-80 %
Average (mm):	3.42	-1.11	
Deviation (mm):	12.62	2.92	
Eccentric	Involved	Non involved	Deficit
Correct position (%):	2	9	-78 %
Average (mm):	-1.54	-0.91	
Deviation (mm):	14.36	3.08	
Concertify It:		Eccentric	


10.2 Interpretation Coordination Test

Directly after the test the shape of the graphics will be shown;



First we look at the bar graphs. What we want to see in both Concentric and Eccentric is that the highest bar is around zero.

In the graphic the "o" point means that during the test the crosshair was exactly on the blue line. In the graph left from zero (minus region) means at during the test crosshair was at the left side of the blue line. In the graph right from zero (plus region) means that during the test the crosshair was at the right side of the blue line. The height of the bars in the graphs represents the amount of time the red crosshair was in that specific position during the total test time (% exercise time).

What we expect to see, in an ideal test, is one bar at the zero position, with a score of 100% of the test time. This ideal test result is not likely.

The above (involved) test is an example of a test result which would indicate poor coordination: - a low bar on the "0" position means the test person was not able to keep the red crosshair at the yellow line for a longer time

- many small bars spread left and right from the zero position means the test person was not even able to keep the red crosshair on the yellow line but was moving around the yellow line. The more bars we see at a bigger distance from the "0" point (left and/or right) the more moving around the yellow line was registered and therefore less control was demonstrated.

The numbers we see on screen for both concentric and eccentric:

Weight:	The weight selected for this test
Duration:	The time in seconds selected for this test
	For a reproducible test it is important to have the same weight and duration in the next
	test of the same person.
Average:	We get a separate value for Average Concentric and Eccentric for both Involved
	and Non-Involved

The blue line is the zero point. The average is calculated by adding all the deviations and dividing them by the number of measurements (25 Hz). If the average is "0", or nearby, this normally means (if also the deviation is low) the patient demonstrated good coordination.



Some examples :



In this test the average will be around "0"



In this test the average will be above "0" i.e. 5 cm



In this test the average will be minus "0" i.e. -5 cm

Deviation: The deviation is a value for the variation in the measurements. A higher value means there is a greater spread in the positions during the measurement. The test person with a high deviation has been moving far above or under the yellow line a lot and did not stay close enough (or on) to the yellow line.



Low Deviation



If you have an average around "0" you could think this is a good test but when the Deviation is high, this "good" average is a lucky shot and the test person did not perform well.

Some examples:

	Small Average
Low Deviation	Very good
High Deviation	Can not stay stable on track

Big Average Steady, but not at track Unstable and can not stay on track

In the perfect test we see that both the Average and the Deviation are close to "0"

The Correct position: is the amount of time the crosshair is on the yellow line expressed as an percentage of the overall test time. The larger this percentage, the better the test person performed.



10.3 Power Test



😂 Start power test			×
Power test Type of equipment: Type of exercise: Type of exercise: Side One side left One side left Both sides No side	Settings Rehab type: Weight: Number of repetitions: Duration of sets: Start position: ROM acceptance: 50%	Repetitions	LS.
	🔷 ОК		Cancel

1) Select Type of equipment (optional).

2) Choose Number of repetitions or Repetitions per time. After choosing Repetitions per time fill in the Number of sets and Rest time between sets.

4) Select weight.

4) Select number of repetitions or duration of sets.

5) Select start position.

6) Set Range of Motion acceptance, this is the percentage of deviation when the software registers the repetition.

Choose <OK> to begin the test.

After starting, the range of motion has to be set by doing one repetition:



After pressing <Enter> the test will start.





After finishing the test, the following screen will appear:



If the repetition of the test is activated, these results will be counted into the Total work and Total power. Press the next tab for going to the next page.



10000	esuns							
wer tes	st results							
Range of mo	tion Range of m	otion with speed Accel	leration/Decele	ration				
	_		_	_	_	-	_	
-								
	And a state of the			-=		—		
				-			==	
				1.1.1.1				
1	2	3 4	5	6	1	0	9	10
1 Repetition	2 Direction	Range of motion	Average sp	6 eed		•	9	10
1 Repetition	2 Direction Concentric	Range of motion	Average sp 28.80 cm/s	eed		•	3	10
1 Repetition	Direction Concentric Eccentric	Range of motion 19.70 cm 16.10 cm	Average sp 28.80 cm/s 26.88 cm/s	eed	r	•	3	10
1 Repetition	2 Direction Concentric Eccentric Concentric	Range of motion 19.70 cm 16.10 cm 15.80 cm	5 Average spi 28.80 cm/s 26.88 cm/s 38.07 cm/s	eed		•	3	10
1 Repetition 1	2 Direction Concentric Eccentric Concentric Eccentric	Range of motion 19.70 cm 16.10 cm 15.80 cm 18.10 cm	Average sp 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s	eed			Change	legend speed:
1 Repetition V1 V2	2 Direction Concentric Eccentric Concentric Eccentric Concentric	Range of motion 19.70 cm 16.10 cm 15.80 cm 18.10 cm 19.20 cm	Average sp 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s	eed			Change	legend speed:
1 Repetition	2 Direction Concentric Eccentric Eccentric Eccentric Eccentric Eccentric	Range of motion 19.70 cm 16.10 cm 15.80 cm 18.10 cm 19.20 cm 17.60 cm	s Average spi 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s 34.11 cm/s	eed			Change	legend speed:
1 Repetition V1 V2 V3 V4	2 Direction Concentric Eccentric Concentric Eccentric Eccentric Eccentric	Range of motion 19.70 cm 15.10 cm 15.80 cm 18.10 cm 19.20 cm 17.60 cm 17.90 cm	S Average sput 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s 34.11 cm/s 34.69 cm/s	eed			Change	legend speed:
1 Repetition V1 V2 V3 V4	2 Direction Concentric Eccentric Eccentric Eccentric Concentric Eccentric Eccentric Eccentric	Range of motion 19.70 cm 16.10 cm 18.10 cm 19.20 cm 17.60 cm 16.60 cm	S Average sput 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s 34.11 cm/s 34.69 cm/s 30.18 cm/s	eed			Change	legend speed: eed < 30 cm/s eed > 30 cm/s eed > 45 cm/s
1 Repetition 1 1 2 2 3 4 Average sp	2 Direction Concentric Eccentric Concentric Eccentric Concentric Eccentric Eccentric Eccentric Eccentric	Range of motion 19.70 cm 16.10 cm 15.80 cm 19.20 cm 17.60 cm 17.90 cm 16.60 cm Concentric: 36.6	S Average spi 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s 34.11 cm/s 30.18 cm/s 30.18 cm/s	eed	·		Change	legend speed:
1 Repetition ♥ 1 ♥ 2 ♥ 3 ♥ 4 ¥ ¥verage st	2 Direction Concentric Eccentric Concentric Eccentric Concentric Eccentric Concentric Eccentric Concentric Eccentric Eccentric	Range of motion 19.70 cm 16.10 cm 15.80 cm 18.10 cm 19.20 cm 17.60 cm 16.60 cm Concentric: 36.4 Eccentric: 34.4	S Average sp. 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s 34.11 cm/s 30.18 cm/s 30.28 cm/s	6 eed			Gradi	legend speed:

The average speed is shown per repetition. The second repetition of the fatique section is always set at 100%.

The other repetitions are calculated on this percentage. Change legend speed can be adjusted in steps of 15 cm/s. Press the next tab for going to the next page.

	adding ridinge of fi	iodorr with speed	Acceleration/De	eleration
Repetition	Acceleration	Deceleration	Total time	Repetition: 1
1	0.17 s	0.13 s	1.70 s	
2	0.13 s	0.10 s	1.50 s	Concentric
23	0.10 s	0.12 s	1.48 s	
4	0.13 s	0.13 s	1.40 s	
25	0.13 s	0.12 s	1.45 s	
6	0.12 s	0.15 s	1.62 s	
7	0.15 s	0.13 s	1.52 s	
8	0.15 s	0.12 s	1.47 s	
29	0.13 s	0.12 s	1.52 s	Treaster in
10	0.13 s	0.13 s	1.52 s	Eccentric
				Acceleration: 0,17 s Deceleration: 0,13 s Use X percent of range of motion X = 20%

This screen shows per repetition the deceleration and acceleration of the test.

"Use x% of range of motion" shows the area of the motion in which the deceleration and acceleration is calculated per second.

To view the visual image of the motion, click on the specific repetition in the grid.

Press <Print> or "Ctrl+p" to print the report. To add a note use <Remarks>.





Name: Joost de Koningscobra Clinician: Joost Heuperman Birthdate: 21-3-1974 Referral: Akkermans Test date: 26-5-2010 Involved side: Left Weight: 10 kg. Side: Both sides Diagnosis: ACL						
Concentric	Involved					
Total work:	177.77	J				
Total power:	361.64 W	1				
Average speed:	36.90 cm/	s				
Average acceleration time:	0.13 s	S				
Eccentric	Involved					
Total work:	172.48	נ				
Total power:	333.55 W	1				
Average speed:	36.90 cm/	s				
Average deceleration time:	0.13 s	5				
		2012				
				_		
					_	
	4 5	6	7			10

10.4 Proprioceptive Test



The Proprioceptive Test can be done safely in early rehabilitation since it is not related to strength. With the Proprioceptive Test we want to look at the quality of reproducing a certain joint position.

The first screen of the Proprioceptive Test:



Start proprioceptive test	ive test	
Type of equipment:	Settings Weight: Duration of rest: Duration of position: Percent of ROM:	
		V OK

- 1) Select Side: One side left/right, Both sides leg or No side (no use of legs) training.
- The amount of weight you select can be minimal. The test should always be easily achievable; you are not looking for strength but for proprioception. 5 or 10 kg is enough weight in most of the tests you will do.
- 3) Duration rest: the amount of time the test person has to be in the rest position. The longer this time the more difficult to re-acquire the "correct position"
- 4) Duration position: the amount of time the test person has to be in the "correct" position.
- 5) Percent of ROM: The joint position where we test proprioception, expressed in terms of the % of the Range of Motion. We suggest a position between 30 % and 70%
- 6) After starting, the range of motion has to be set by doing one repetition:



After pressing <Enter> the exercise will start.

Test instructions:

- The test person is asked to replicate joint position (fixed % of the ROM) four times.

- The first and second repetition are with feedback

- The third and last repetition without feedback on the screen. We ask the test person to close their eyes in order to prevent the use of extra visual feedback (e.g. height of weight stack, joint angles) to replicate the joint position. The tester should give verbal cues when the test person should move from rest position to the desired joint position and back again.



TEST: Prop	prioceptive Test	TIME LEFT:	0:17
ſ			

The test person should move to the right vertical line before the horizontal line disappears and maintain the crosshair on that line until the next horizontal line disappears. Repeat the same process for all four positions. Remember the last two positions have no crosshairs.



The test person should follow the hypothetical red line and be in time at the "correct" position (black circle), at this point the measurement starts and the horizontal line disappears. After two times in position the red crosshair disappears and we ask the test person to close his/her eyes so no visual input at all is possible.



Test overview:



After the test the following screen appears:





To print to paper use the <Print> button. If you want a print preview on the screen use the command; "Ctrl+p"

To add a note use <Remarks>.

To compare results use <Overlay>. Choose the test results you want to compare and press <OK>. The results will be displayed.

Name: Joost de Koningscobra Birthdate: 21-3-1974 Test date: 26-5-2010 Weight: 10 kg. Diagnosis:	Cl Re In Si	inician: eferral:- volved side: - de: Both sides	
Visible	Involved	Non Involved	
Correct position (mm): Avg. 1st movement (mm): Dev. 1st movement (mm): Avg. 2nd movement (mm): Dev. 2nd movement (mm):	174.40 174.10 0.11 143.40 -30.65	174.10 0.06 173.60 -0.42	
Non visible	Involved	Non Involved	
Correct position (mm): Avg. 1st movement (mm): Dev. 1st movement (mm): Avg. 2nd movement (mm): Dev. 2nd movement (mm):	174.40 174.80 0.81 104.10 -69.92	174.00 0.00 174.00 0.00	
Involved		Non Irvoly	ed
	180 1825		5 177.5 100 182.5



10.5 Interpretation Proprioceptive Test



Directly after the test we check the distribution of the bar graphs.

The green and blue marker (first and second) show us the actual position of the patient relative to the correct position when the crosshair was present (reps 1&2).

The red and purple marker (first and second) show us the actual position of the patient relative the correct position after the crosshair disappeared (reps 3&4).

Green and blue bar:

The green and blue bar do NOT tell us anything about the quality of Proprioception!!

If the patient is not capable of getting the green and blue marker in the correct position, this means the coordination is not OK. This information tells us that we are not ready to do a Proprioceptive test; but rather we should train to achieve better coordination ability first.

If the patient has both green and blue bar on or close to the correct position, we can interpret proprioceptive ability by reviewing the size and location of the red and purple bar.

Red and purple bar:

The red and purple bar tell us how well the patient can re-acquire the correct joint position (learned with the green and blue bar). The bars should be as high as possible, meaning a long time at a specific position, ideally in the neighborhood of the correct position. If you observe many small bars, the patient was moving around during the test time and uncertain about the correct position. In the graphical view, it may not always be possible to see all the bars, so we refer to the data including average and deviation.





In the above picture you see that the green and blue bar are on the correct position. Both the red and purple bar are moving during the test through a wider range of motion as expected.

To print to paper use the <Print> button. If you want a print preview on the screen use the command; "Ctrl+p". Press <OK> to get a preview.

Propr	ioceptive	test results			
Name: Test AaMonitored Birthdate: 29-5-1976 Test date: 18-6-2010 Weight: 10 kg. Diagnosis: asdfasdf	Clinician: Han Minjon Referral: Lindenhovius Involved side: Both Side: Both sides				
Visible	Involved	Non Involved			
Correct position (mm):	80,00				
Avg. 1st movement (mm):	80,00	80,00			
Dev. 1st movement (mm):	0,00	0,00			
Avg. 2nd movement (mm):	80,00	80,00			
Dev. 2nd movement (mm):	0,00	0,00			
Non visible	Involved	Non Involved			
Correct position (mm):	80,00				
Avg. 1st movement (mm):	83,47	83,87			
Dev. 1st movement (mm):	3,47	3,87			
Avg. 2nd movement (mm):	83,67	86,40			
Dev. 2nd movement (mm):	3,67	6,40			

In the above printed numbers the correct position was 80, both visible markers have an average of 80 and essentially no (or 0,1) deviation which is what we would expect of a person with good coordination. The non visible first movement average was 83,47 which tells us that the test person overshot the correct



position 3,47 cm to the right.

The non visible second movement average of 83,67 is 3,67 cm less than the expected position, but the deviation of 3,67 indicates the test person had uncertainty about their joint positioning.

The numbers in a good test :



In this case the correct position was 80 and both the green bars and the red bars are in the correct position (average 80) and without any deviation (stable during the test). This is the best score possible.

10.6 Response time test



The Response Time test is designed to measure the test person's reaction time using an unexpected movement and their ability to finely control the weight after moving it.



Start response time test		k	
Response time ter Type of equipment: Image: Construction of the system Type of exercise: Image: Construction of the system Side One side left One side right Both sides No side	Settings Weight: Number of repetitions: Mode:	10 Vertical V	
		OK	Cancel

The Start Position corresponds to the specific location (expressed as a percentage) within the full range of motion where the test will be performed.

Weight: Use 5 to 10 kg's for the performance of this test Choose <OK> to begin the test.

After starting, the range of motion has to be set by doing one repetition:



After pressing <Enter> the test will start.

TEST: Response Time Test	REPS:	1/3
	Þ	



Instruct the patient to move the orange circle into the empty box. When the circle is relocated to the center of the box, the box will turn green. After a couple of seconds (the time varies), the box will randomly move to either the left or right of its initial position. The patient should be instructed to relocate the circle into the box at the new position as fast as possible. The time that it takes for the test person to react and initiate movement of the circle is the "Response Time".



When the circle is properly located in the box, the box turns green. It is essential to control and hold that new position so that the box remains green. The time for this to occur is designated the "Time to Finish". The test administrator must then click the <Next Measurement> button or the "Enter" key on the keyboard. Each side is tested three times. (unless we are using the Back extension or Abdominal Crunch machines).



After three measurements are collected for the non-involved side, the following screen appears:





To print to paper use the <Print> button. If you want a print preview on the screen use the command; "Ctrl+p"

To add a note use <Remarks>.

To view a line chart, use <Toggle chart>.





10.7 Interpretation response time test

Response Time: is defined as the time that it takes for the test person to react and initiate movement of the stick figure in response to the moved box. The "Response Time" is sometimes represented as a negative number. This means that the test person initiated movement in the direction opposite of the box movement before eventually relocating the circle to the box.

Total time: is defined as the total time elapsed from the initial movement of the box to the point where the box has turned to red and remained red.

Three repetitions are performed for each side. The results are then averaged to facilitate the calculation of a deficit.

Deficit: Defined as the percent difference relative to the Non-Involved side, e.g. 5 sec

	Inv		Non involved
If there is no deficit the value is 0%	5	-	5
If the Involved side is 20% slower it will say "20%"	6	-	5
If the involved side is 20% faster (not expected) it say's "-20%	4	-	5

Clinical Relevance of the Data: The smaller the "Response Time", the faster the test person's ability to react to unexpected demands. Longer "Time to Finish" durations may mean less fine motor control abilities necessary for holding the moved weight.

11. Test history

In the main menu you find the option "Test history":



In this menu you can find all the tests the selected patient performed. You will either see all the tests on the machine selected or (use toggle) to see all tests the patient performed on all machines (if they are connected to a network).

Test history				
🚦 Test hi	story			
-				
Date	Time	Test	Device	
2-7-2010	14:18:54	Coordination	DEMO	
1-7-2010	13:16:23	Power	DEMO	
1-7-2010	13:00:48	Coordination	DEMO	
100000000000000000000000000000000000000		1963 196 726		

Select the test and press <OK>, the test results will be displayed. If you want to compare tests of the same type, select the first test and use F12 (overlay) to select the other test.



Ā	Pick a test for ove	rlay			\mathbf{X}
Overlay tests:					
Γ					
	Date	Time	Test	Device	
			Current		
	1-7-2010	12:39:15	Coordination test	DEMO	

Press <OK>. The results will be displayed in the following screen.



12. MR Cube Settings

The following settings can be found under the 'Settings' tab.

12.1 Show serial





🗣 Serial com	munication		×
Communi	cation		
COM Port:	1	Connect	
Distance:	0		
Processing da	ata. O	Disconnect	
Direction:	Up		
		Cancel	

COM Port: select the comport where the electronics of the machine are connected to the computer. Force: value force should be moving if the machine is being used. Distance: should be moving if the machine is being used. Direction: the direction of the cable, "up" or "down".

Press <Connect> to start communication with the electronics. Press <Disconnect> to stop communication with the electronics.



12.2 Settings



Enable Synchronization:
This enables or disables synchronization between the monitor refresh rate and the drawing of the graphics. Enabling this will try to prevent screen tearing, but might decrease the frame rate.
Enable Anti Alias:
When enabled this improves image quality at the cost of a minor hit in the frame rate.
Enable Blur:
background with blur (not sharp).
Screen resolution:
Choose the resolution of your screen to optimize your view.

Graphics		
Graphic settings		
Enable anti alias		
Enable blur		
rScreen resolution:		
0 1600 x 1200 (Window)		
○ 1280 x 1024 (Window)		
○ 1280 x 800 (Window)		
○ 1280 x 768 (Window)		
● 1024 x 768 (Window)		
○ 800 x 600 (Window)		
P	NOY.	
		l



12.3 Administrator Settings



Database

Database Modules Language Device	
😑 Database	
Server: localhost	
Database path: C:\Program Files\MRS Software\Database\MRS.gdb	æ
Protocol: OLocal	
© TCP	

Server: If you work with a central database on a server, the IP-address of the server should be entered in this field. If the computer is used as a server or stand alone, the setting is "localhost".

Database path:	displays the path to the database. (Both local or on a server).
Protocol:	TCP or local depending your network.

Modules:

Administrator settings	
Database Modules Language MR Cube	
A Modules	
Select modules:	
FysioRoadmap	
Monitored Rehab Systems Software	
✓ MR Cube	
□ Kneelax	
Start in module: MR Cube	
Minimal software requirements:	
VNA Framework 3.1	
V.NET Framework 3.5	
Refresh	
С СК	🔀 Close

Select modules: If the software will be used also for other equipment or FysioRoadmap, select the modules you need.Start in module: select the module you want the program to start.

Minimal software requirements: For the proper functioning of the software, additional software is required. Here is an overview of the specifications and whether the software is installed on your computer. (Green checkmark = succesfully installed, red cross = the software is not installed yet)



Refresh: after installing extra software while MRS Software is still in use, use the refresh button to update the overview.

Languages

Select your language and restart the software.



Device

Administrator settings	
Database Folders Modules Language Device MR Cube	
MR Cube	
Com port:	
✓ DEMO	
✓ Use "Quick start"	
🖌 🗸 ок	🔀 Close

Device: select what kind of machine you are using

COM port: select the COM port where the electronics of the machine are connected to the computer. DEMO: If there is no connection to electronics, but you want to see a demonstration of the software and use your mouse instead, use this option.

Use Quickstart: Select this option if you want to use the quickstart menu.



12.4 Institute Management

nstitute					
Institute m	anagement				
Name	Addres	s	Town/city	Telephone	
Demo Instituut	Claes 7	fillyweg 2 H	Haarlem	023-5255	
Demo Intitute 2	Demo	street 112 H	Haarlem	0237505444	
1					
	· · · · ·		L,		

One institute equals one administration in your software. Select the line <Wijzig Instituut> and choose <Edit>. Fill in your details and save. This information will appear automatically on your prints.

💐 Institute	X
🛄 Institute	e management
-	
Name:	Demo Instituut
Password:	**
Address:	Claes Tillyweg 2
ZIP Code:	2031CW City: Haarlem
Telephone:	023-5255 General Data Managen 1223456
	Save Cancel
New	✓ Edit X Delete

12.5 Choice of institute

This function is used to switch between multiple administrations. Choose the institute and confirm by password (Institute management).



12.6 Back-up database

Backup database		×
😑 Backup	database	
Folder:	C:\Program Files\MRS Software\Backup 20100412.gdz	
1.000	0	
	()	
	Backup	

Select at "Backup path" the desired path to store the database. Click the button <Backup>. If the backup is complete, a green text "backup done" will be shown.

12.7 Restore database

Restore database		X
😑 Restore		
Backup bestand:	C:\Program Files\MRS Software\Database\Backup 20100412.gdz 🗃	
	Restore	
-		

To restore the database choose the correct file and <Restore>. Restart the software. This operation will erase all data from the MRS Software and replaces it with data from the backup.



13. Shortcuts

F2 Ne	ew Patient
-------	------------

- F3 Edit Patient
- F4 Select Patient
- F5 Rehab
- F6 Functional exercises
- F7 Coordination test
- F8 Isometric training
- F10 Administrator settings
- F11 Test history
- Ctrl H Extended history



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