

MRS Software manual



MRS-EI 305



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I. Introduction

What is power without control?

Treatment protocols are showing more interest upon coordination and proprioceptive elements in their approval. Specific functional demands can be challenged with the unique designed software. Re-programming and accelerated restoration of motor-skills are easily performed and obtained. Dual tasks with elements of math and recognition are unique.

The Monitored Rehab Systems Software is providing all elements to re-activate and restore function and motor-skills of the patient's impairments and disabilities. The different software exercises are stimulating and challenging at every level and phase of the

patients rehabilitations program.

Different testing methods will provide objective feedback and documentation of the patient's rehabilitation program.

We hope you all will experience value and pleasure of using the Monitored Rehab Systems Software as we love developing it!

Monitored Rehab Systems

American customers only:

Monitored Rehab Systems B.V.

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2. MRS software installation

2.1 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 as following:

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. If there is no network your stand alone computer is "the server".

Client: A workstation. These 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. Default: "C:\Program Files\MRS Software\Database\MRS.GDB".

2.2 Minimum 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)

2.3 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:

CO V I Computer > OS (C:) > Prog	ram Files 🕨 🔻	✓ Search		٩
🍨 Organize 🕶 🏢 Views 💌 🎞 Explore 👩 Share 🙆 Burn 🕐				
Favorite Links	Name	Date modified	Туре	*
Documents	Microsoft Synchronization Services	5-11-2008 16:15	File Folder	
P. p	Microsoft Visual Studio	3-5-2010 20:13	File Folder	
Pictures	Microsoft Visual Studio 9.0	3-5-2010 20:13	File Folder	
Music	Microsoft Web Designer Tools	5-11-2008 16:07	File Folder	
More »	Microsoft Works	24-11-2009 8:18	File Folder	
Folders 🗸	퉬 Microsoft XNA	13-1-2009 11:16	File Folder	
A 05 (C)	퉬 Movie Maker	30-3-2010 8:14	File Folder	
Data	퉬 Mozilla Firefox	3-4-2010 15:44	File Folder	
DELL	MRS Software	14-6-2010 7:54	File Folder	
doctemp	J MSBuild	3-2-2009 16:41	File Folder	
Drivers	Ja MSDN	5-11-2008 16:23	File Folder	=
export	퉬 Msdntrain	25-11-2008 8:13	File Folder	
ipetoub	MSXML 4.0	7-10-2008 8:01	File Folder	
Intel	퉬 Nokia	16-2-2009 8:13	File Folder	
mcc18	NTRU Cryptosystems	2-10-2008 5:39	File Folder	
MSOCache	OfficeRecovery	13-8-2009 10:47	File Folder	
Perflogs	OMNIKEY	19-3-2009 15:42	File Folder	
Program Files	PC Connectivity Solution	16-2-2009 8:12	File Folder	-
ProgramData	· · · · · · · · · · · · · · · · · · ·			•
MRS Software File Folder Date modified: 14-6-20	10 7:54			

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

Select the tab "Security".

MRS Softwa	re Properties	MRS Softv
General Shari	ng Security Previous Versions Customize	General Sh
	MRS Software	Object nam
Type: Location: Size:	File Folder C:\Program Files 1,04 GB (1.118.800.501 bytes)	SYSTI State St
Size on disk:	1,04 GB (1.119.752.192 bytes)	To change
Contains:	397 Files, 28 Folders	Permissions OWNER
Created:	woensdag 26 augustus 2009, 11:51:07	Full contr Modify
Attributes:	Read-only (Only applies to files in folder) Hidden Advanced	Read & d List folde Read Write For special click Advar
	OK Cancel Apply	





Click <edit>.

Select "Users"

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 A	CREATOR OWNER
Administrators (MRSystems \Administrators)	& SYSTEM
Users (MRSystems (Users) Tructed loctaller	Administrators (MRSystems \Administrators)
۰ (ا	Users (MRSystems\Users)
To change permissions, click Edit.	A TrustedInstaller
Permissions for Users Allow Deny	Add Remove
Full control	
Modify	Permissions for Users Allow Deny
Read & execute	Full control
List folder contents	Modify
Write T	Read & execute
	List folder contents
click Advanced.	Read 🔽
Leam about access control and permissions	Learn about access control and permissions
OK Cancel Apply	OK Cancel Apply

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".



Click "Turn User Account Control on or off".





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>.

			Le contra de la co
G O ♥ 😣 « Use	r Accounts 🕨 Turn User Account Contro	l On or Off 🔹 🍕	Search
Turr User J you le 17 Us	I ON USER ACCOUNT CONTROL (UAC) Account Control (UAC) can help prevent t save UAC turned on to help protect your o re User Account Control (UAC) to help pro) to make your computer mo anauthorized changes to your compu computer. stect your computer	ore secure iter. We recommend that
			OK Cancel

2.4 Firewall

If there is a firewall installed on the server, you need to add TCP port 3050. This is used for connection from a client computer to the database server. If you do not know how to add this port, please contact your system administrator.

2.5 Install USB driver

Put the installation CD in the CD-Rom player of the computer. Ignore the autorun screen. Connect the USB cable to the MRS Equipment and connect the other side of the cable to the computer. The following balloon appears in the screen:



After a few seconds the "Found new hardware wizard" appears:



Found New Hardware Wizard		
	Welcome to the Found New Hardware Wizard Windows will search for current and updated software by locking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission). Read our privacy policy	
132	Can Windows connect to Windows Update to search for software?	
	 <u>Y</u>es, this time only <u>Yes</u>, now and <u>e</u>very time I connect a device No, not this time No, not this time 	
	Click Next to continue.	
	< <u>Back</u> <u>N</u> ext> Cancel	

Choose "No, not this time" and click the <Next> button.

Found New Hardware Wizard		
Image: Second		
< <u>B</u> ack Next > Cancel		

Select "Install from a list or specific location (advanced)" and press the <Next> button.





Select the option "Search for the best drivers in these locations".

Uncheck "Search removable media".

Check "Include this location in the search".

Click the <Browse> button and browse to the "3rdparty" folder, choose the "USB Drivers" folder on the CD. Choose your operation system: Windows XP or Vista/ Windows 7.

Click <Next> to continue.

The installation is started...

When done, click the <Finish> button to close the "Found new hardware wizard". After a few seconds the following balloon appears:

🄃 Found New Hardware 🗵	
USB Serial Port	
())×()	3:09 PM

The MRS equipment driver installation is done.



2.6 Detect COM-port

Go to the control panel (Start -> Settings -> Control panel)



Double click on "System"

Go to the tab "Hardware" and then to "Device manager"



Double click on "Ports"

Now you can see on which port the "USB Serial port" is connected. In the example it is COM3. The software's auto detect function will automatically search for the connected port.





2.7 Autorun

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

Install Monitored Rehab Systems Software MR Cube Choose installation type: Server/Stand alone Client
Choose installation type: Server/Stand alone O Client
Server/Stand alone O Client
🛞 Close

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 "installMRS.exe".

The following software is required:

- Firebird 2.5 (only on server)
- .NET Framework 4.0
- XNA Framework 4.0

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

In the menu can be chosen between the server and the client. Always start with installing the server. Click therefore check <Server/Stand alone>.

Attention!

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



2.8 Server Installation

After choosing to install the server, this screen appears:

Install Monitored Rehab Systems Softw	vare – 🗆 🗙
Install Monitored Rehab Syst	ems Software
Choose installation type: Server/Stand alone Client	
Server/Stand alone	
Firebird .NET Framework	XNA Framework
Install Firebird 2.5 Install .NET 4.0	Install XNA 4.0
Install server/stand alone	
	S Close

The red crosses indicate that the necessary depending software is not yet installed on the server. Before continuing the installation of the MR Cube, these programms have to be installed. Install from left to right.

2.8.1 Install Firebird

After selecting <Install Firebird 2.5> this screen appears:

	Select Setup Language	×
12	Select the language to use during the installat	ion:
	English	۷
	OK Cancel	

Choose the desired language and press <OK>.





Firebird advises to close all other applications before installing. Close the running applications if you like. press the button <Next>.

В	Setup - Firebird -	×
	License Agreement Please read the following important information before continuing.	۲
	Please read the following License Agreement. You must accept the terms of this agreement before continuing with the installation.	
	INTERBASE PUBLIC LICENSE	^
	1. Definitions.	
	1.0.1. "Commercial Use" means distribution or otherwise making the Covered Code	
	available to a third party.	
	Modifications.	
	1.2. "Contributor Version" means the combination of the Original Code, prior	
	Modifications used by a Contributor, and the Modifications made by that particular Contributor	
	1.3. "Covered Code" means the Original Code or Modifications or the combination of	¥ l
	 I accept the agreement 	
	 I do not accept the agreement 	
Eng	lish	
	< Back Next > (Cancel

Check "I accept the agreement" and choose <Next>.





Choose the path where Firebird will be installed. The default path is C:\Program Files\Firebird\Firebird_2_5. Select <Next>.

B	Setup - Firebird	-		<
Sele W	ct Destination Location here should Firebird be installed?		C	
Į,	Setup will install Firebird into the following folder.			
To	continue, click Next. If you would like to select a different folder, click	Browse.		
	:\Program Files\Firebird\Firebird_2_5	Browse		
At	least 2,3 MB of free disk space is required.			
English —	< Back Next >		Cancel	

If the set-up asks which components should be installed, choose "Super Server binary". Select <Next>.



Select the c install. Click	omponents you want to in Next when you are ready	nstall; clear the components y to continue.	rou do not want to
Full installat	ion of Server and develop	pment tools.	~
Server of	components		11,8 MB
- O Clas	sic Server binary		5,5 MB
🗌 🛄 🕥 Sup	er Server binary		5,6 MB
 Develop 	per and admin tools comp	onents	10,4 MB
Client co	omponents		1,7 MB

Firebird would also like to know if shortcuts are required. This is optional.

ß	Setup - Firebird 🚽 🗖 🗙
3	Select Start Menu Folder Where should Setup place the program's shortcuts?
	Setup will create the program's shortcuts in the following Start Menu folder.
	To continue, click Next. If you would like to select a different folder, click Browse.
	Firebird 2.5 (x64) Browse
Engl	Don't create a Start Menu folder
L'rigi	< Back Next > Cancel

Additional tasks can also be chosen. It is important to set Firebird AS A SERVICE. Also check the settings like in the example:



ß	Setup - Firebird 🛛 🗕 🗖 🗙				
Sel	lect Additional Tasks Which additional tasks should be performed?				
	Select the additional tasks you would like Setup to perform while installing Firebird, then click Next.				
	✓ Use the Guardian to control the server?				
	Run Firebird server as:				
	O Run as an Application?				
	Run as a Service?				
	✓ Start Firebird automatically everytime you boot up?				
	✓ "Install Control Panel Applet?"				
	Copy Firebird client library to <system> directory?</system>				
	✓ Generate client library as GDS32.DLL for legacy app. support?				
English	< Back Next > Cancel				

Now a summary will appear. Choose <Install> to start installing Firebird.

6	Setup - Firebird 🗧	
Re	eady to Install Setup is now ready to begin installing Firebird on your computer.	۲
	Click Install to continue with the installation, or click Back if you want to review or change any settings.	
	Destination location: C:\Program Files\Firebird\Firebird_2_5	^
	Setup type: Full installation of Server and development tools.	
	Selected components: Server components Super Server binary Developer and admin tools components Client components	
	Start Menu folder:	¥
	<	>
English	I	
	< Back Install	Cancel

During the installation a progress bar is shown.



🔂 Setup - Firebird	×
Installing Please wait while Setup installs Firebird on your computer.	
Extracting files C:\Users\Arnold\AppData\Local\Temp\is-EH14U.tmp\vccrt8_Win32.ms	ú
English —	Cancel

When the installation is finished, information about the application is shown. After reading the button <Next> can be pressed.

13	Setup - Firebird 🛛 🗕 🗆 🗙
	Completing the Firebird Setup Wizard To complete the installation of Firebird, Setup must restart your computer. Would you like to restart now? • Yes, restart the computer now • No, I will restart the computer later
	< Back Finish

The installation is now almost ready. With the button <Finish> will the installation be completed and can the installation of the MR Cube be continued.



Install Monitored Rehab Systems Softw	vare – 🗆 🗙
install Monitored Rehab Syst	tems Software
MR Cube	
Choose installation type:	
Server/Stand alone O Client	
Server/Stand alone	
e Monada .net	X
Firebird .NET Framework	XNA Framework
Install .NET 4.0	Install XINA 4.0
Install server/stand alone	
	S Close

2.8.2 Install .NET Framework

When .NET Framework 4 is not yet installed, press <Install .NET 4.0>

Select the checkbox to confirm the legal pack was read and accepted.

setup voor Microsoft .NET Fi	ramework 4	
Setup voor .NET Framework 4 Accepteer de licentievoorwaard	らい door te gaan.	
AANVULLENDE LICENTIEV SOFTWARE	VOORWAARDEN VOOR MICROSOFT-	
🔲 Ik heb de licentievoorwaarde	n gelezen en <u>a</u> ccepteer deze.	
Geschatte downloadgrootte:	0 MB	
Geschatte downloadtijd:	Inbellen: 0 minuten	
	Breedband: 0 minuten	
2a, informatie over mijn erva Corporation. Lees het <u>beleid voor gegevensv</u>	ring met de installatie verzenden naar Microsoft <u>erzameling</u> voor meer informatie.	
	Installeren	Annuleren



When accepted a new checkmark appears. Checking this box is optional.

🕏 Setup voor Microsoft .NET Framework 4				
Setup voor .NET Framework 4 Accepteer de licentievoorwaarden om door te gaan.				
AANYULLENDE LICENTIEVOORWAARDEN VOOR MICROSOFT-				
🔽 ik heb de licentievoorwaarden gelezen en accepteer deze.				
Geschatte downloadgrootte: 0 MB Geschatte downloadtijd: Inbellen: 0 minuten Breedband: 0 minuten				
☐ Ja, informatie over mijn ervaring met de installatie verzenden naar Microsoft Corporation. Lees het <u>beleid voor gegevensverzameling</u> voor meer informatie.				
Installeren Annuleren				

Now the installation will start. A progress bar is shown.

Setup voor Microsoft .NET Framework 4	
Voortgang van installatie .NET Framework wordt geïnstalleerd. Een ogenblik geduld.	Microsoft" .NET
Verificatie van bestandsbeveiliging:	
Alle bestanden zijn geverifieerd	
Voortgang van installatie:	
.NET Framework 4 Client Profile wordt geïnstalleerd	
k	
	Annuleren

If the installation is ready, this screen appears:



Setup voor Microsoft .)	IET Framework 4
	Installatie voltooid
Microsoft*	.NET Framework 4 is geïnstalleerd.
.INE I	
	Controleer op recentere versies op Windows Update.
7/	
	Voltooien

Press <Finish> / <Voltooien> to finish the installation.

If the MR Cube is being installed on a Server 2008 computer, the .NET Framework 3.5 components also have to be enabled. Go to Start - Control Panel - Software/ Programs. Choose "Add/Remove Windows Components"

🐻 Add or Re	move Programs		
5	Currently installed programs: 📃 Show up <u>d</u> ates	Sort by: Nam	e 💌
C <u>h</u> ange or Remove	👸 Intel(R) Graphics Media Accelerator Driver		^
Programs	👘 Java DB 10.6.2.1	Size 2	9.87MB
	🛃 Java(TM) 6 Update 24	Size 9	0.88MB
Add New	🕌 Java(TM) SE Development Kit 6 Update 24	Size 15	1.00MB
Programs	🙀 Microsoft .NET Framework 2.0 Service Pack 2	Size 77	1.00MB 🔜
	🙀 Microsoft .NET Framework 3.0 Service Pack 2	Size 31	0.00MB
Add/Berroue	🙀 Microsoft .NET Framework 3.5 SP1	Size 2	8.31MB
	🌄 Microsoft .NET Framework 4 Client Profile	Size 11	7.00MB
Components	5 Microsoft .NET Framework 4 Extended	Size 3	8.04MB
A state of the	🙀 Microsoft .NET Framework 4 Multi-Targeting Pack	Size 8	3.46MB
Set Program	🙀 Microsoft ASP.NET MVC 2	Size	0.47MB
Access and Defaults	Microsoft ASP.NET MVC 2 - VWD Express 2010 Tools	Size	2.25MB 🔽

Select the .NET Framework 3.5 components ans press <OK>





🔤 Windows-onderdelen – 🗆 🗙		
Windows-onderdelen in- of uitschakelen		
U kunt een onderdeel in- of uitschakelen door het bijbehorende selectievakje respectievelijk in of uit te schakelen. Een gevuld selectievakje betekent dat slechts een gedeelte van het onderdeel is ingeschakeld.		
.NET Framework 4.5 Advanced Services		
🗉 🔳 Afdruk- en documentservices		
API-ondersteuning voor RDC (Remote Differential Compress		
Eenvoudige TCPIP-services (bijvoorbeeld echo, daytime enz.		
✓]] Internet Explorer 10		
⊞ □]] Internet Information Services		
Internet Information Services Hostable Web Core		
🗄 🗹 📙 Mediaonderdelen		
🗄 🔲 Microsoft Message Queue (MSMQ) Server 🗸 🗸		
< >		
OK Annuleren		

After installing everything correctly, this screen may appear:

Install Monitored Rehab Systems Software	re – 🗆 🗙
Install Monitored Rehab Syste	ms Software
Choose installation type: • Server/Stand alone O Client	
Server/Stand alone	
Firebird .NET Framework	XNA Framework Install XNA 4.0
Install server/stand alone	
	Sclose



2.8.3 Install XNA Framework

If the button Install XNA version 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:

	Bestand	l openen - beveiligingswaarschuwing
Wilt u dit bestand uitvoeren?		
-	Naam:	R\Temp\Installation CD\Third party\xnafx40 redist.msi
10°	Uitgever:	Microsoft Corporation
	Type:	Windows Installer-pakket
	Van:	\\VBOXSVR\Temp\Installation CD\Third party\xnafx40
🗸 Altija	waarschuwen	Uitvoeren Annuleren
Hoewel bestanden die u van internet hebt gedownload nuttig kunnen zijn, kan dit bestandstype mogelijk schade aan uw computer toebrengen. Voer alleen software uit van uitgevers die u vertrouwt. <u>Wat</u> <u>is het risico?</u>		

Choose <Run>/ <Uitvoeren>.



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>Back</u> <u>N</u> ext <u>Cancel</u>

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.	
<u>B</u> ack 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 installation screen now should be like this:

🖷 🛛 Install Monitored Rehab Systems Software 🛛 🗖 🗙
Install Monitored Rehab Systems Software
MR Cube
Choose installation type:
Server/Stand alone O Client
Server/Stand alone Firebird NET Framework XNA Framework Install server/stand alone
Close 🛛

Press <Install server/ stand alone>.



2.9 Client Installation

If "Client" is chosen in the menu screen, Firebird is not required, just .NET Framework and XNA Framework.

🍯 🛛 Install Monitored Rehab Systems Software 🚽 🗖 🗙
Install Monitored Rehab Systems Software
Choose installation type:
O Server/Stand alone
Client
.NET Framework XNA Framework Server: [IP-adres server] Database path:
C:\Program Files (x86)\MRS Software\Database\MRS.GDB
Install client
🛞 Close

When the green checkmark shows, the right version is already installed on the computer. If there is a red cross, follow the installation steps from chapter 2.8.2 and 2.8.3.

All green?

Insert the IP address of the server.

Give the path to the database (viewed from the server)

Press <Install client>.

Choose the desired language.

MRS Software 4.5.0.7 Installation	×
Please select a language.	
Dutch (Nederlands)	\checkmark
OK Cancel	



Press <Next> or <Volgende>.

15 ¹ MR	S Software 4.5.0.7 Installation 🛛 – 🗆 🗙
	Welkom bij de MRS Software Installatie Wizard
	Deze wizard helpt u bij de installatie van MRS Software.
	Het is aan te raden om alle overige applicaties te sluiten. Dit maakt het mogelijk om relevante systeembestanden bij te werken zonder dat uw pc opnieuw dient te worden opgestart.
	Klik Volgende om door te gaan.
	Volgende > Annuleren

Choose the destination folder. Default is C:\Program Files (x86)\MRS Software.

19	MRS Software 4.5.0.7 Installation – 🗆 🗙
6	Kies een installatie locatie Kies een map waar MRS Software geïnstalleerd kan worden.
Doel map	Setup zal MRS Software in de volgende map installeren. Om een andere map te selecteren, klik op Opzoeken en selecteer een andere map. Klik Volgende om door te gaan. Er is minstens 433,22 Mb vrije schijfruimte benodigd.
C:\Program	Files (x86) WRS Software Opzoeken
Copyright © 2013	i, Monitored Rehab Systems

The software can have an icon on the desktop. Check the square to create this desktop icon.



B MRS Software 4.5.0.7 Installation - □ ×
Selecteer snelkoppelingen Selecteer overage snelkoppelingen.
Selecteer overage snelkoppelingen voor MRS Software, deze worden gemaakt tijdens de installatie.
☑ Maak een icon op het bureaublad
Copyright © 2013, Monitored Rehab Systems

A summary screen will appear:

19	MRS Software 4.5.0.7 Installation –	×		
õ	Gereed om te installeren Setup is gereed om MRS Software op uw computer te installeren.			
Klik op Installeren om de instellingen te wijzigen.	Klik op Installeren om door te gaan met de installatie, of klik Terug om terug te gaan en instellingen te wijzigen.			
Doel map: C: \Program Files (x86) \MRS Software Overige snelkoppelingen: Maak een icon op het bureaublad				
Copyright © 2013, Monite	ored Rehab Systems	eren		

During the installation a progress bar is shown.



13 N	ARS Software 4.5.0.7 Installation 🛛 – 🗆 🗙		
Bezig met installeren Een ogenblik geduld, MRS Software wordt geïnstalleerd.			
Een ogenblik geduld, MRS Software wordt geïnstalleerd.			
Kopiëer: stax-api-1.0-2.ia	r		
Copyright © 2013, Monitore	d Rehab Systems		
	< Vorige Volgende > Annuleren		

When the installtion is almost finished, our website can be opened by selecting "Visit product website". Press <Finish> / <Einde> to finish the installation.

15 ^J MR	S Software 4.5.0.7 Installation 🛛 – 🗆 🗙		
	Bezig met het afronden van de MRS Software Installatie Wizard		
	MRS Software is geïnstalleerd op uw computer.		
	Klik Einde om dit programma te sluiten.		
	☐ <u>Visit product web site</u>		
	Einde Annuleren		

When totally finished, this screen appears:





2.10 Uninstall

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

Uninstall on the server computer:

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.



Firebird Service Manager			
Startup Enhanced Info			
The Firebird guardian is Stopped The Firebird server is Stopped			
 ✓ Autostart Firebird Server on Windows startup ✓ Run Firebird as service (WinNT/2000/XP) 			
✓ Use Firebird Guardian			
OK <u>C</u> lose Apply			

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

Uninstall on both server/ stand alone and clients:

Open the Control Panel via the <Start> button.



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

👪 Add or Re	move 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
F	intel(R) 845G Chipset Graphics Driver Software			
Add/Demous	🔀 Intel(R) PRO Ethernet Adapter and Software			
Windows	K McAfee VirusScan		Size	19.61MB
Components	1 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 Ch	hange or Remove.	Change	Remove
Access and Defaults	Windows Installer 3.1 (KB893803)			
	鸮 Windows XP Service Pack 2			

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



3. Registration

Double-click the icon on your desktop to start the MRS Software.



The following login screen will appear:

🐺 Login		
Name: Password:	mr **	
	🖌 ОК	Cancel

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

Username:	mradmin
Password:	mradmin

We advise to add your own user(s) with their own competences (we have user, superviser and administrator) User (working Physiotherapist) can not adjust master files and settings.

Supervisor (or site manager, quality manager) can not adjust master files or administrator settings.

Administrator (General Manager, owner) has all rights to all functions in the program and can change the default passwords. Users can be created by the administrator in MRS Software by going to 'Settings' and then 'User Management'.

Before use, the Monitored Rehab 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:

4	MRS Software	X		
	ᇩ Demo version MRS Software			
	License valid to: 3-12-2010 (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	key 🔀			
🔏 Obtain license key				
Institute da	ta:			
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:	fysio@test.com			
	✓ 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 fysio@test.com	
Module:	MRS Software	
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 - 📃	= x		
Message Insert Options Format Text	0		
Paste → Clipboard ¹ 2 Basic Text ¹ 2 Difference Basic Text ¹ 2 Difference Basi	ABC Spelling		
This message has not been sent.			
To Monitored Rehab Systems <info@mrsystems.nl></info@mrsystems.nl>			
Send Cc			
Account Subject: Registration key -Demo Instituut			
Account Subject: Registration key -Demo Instituut Comments> Name: Demo Instituut Address: Claes Tillyweg 2 ZIP/State: 2031CW City: Haarlem Country: The Netherlands Telephone: 023-5255050 Name: T. Test Email: fysio@test.com Module: MRS Software Registration key: 11-21472			
	• •		

Example of an automatically generated email.

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

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

🖋 MRS Software			X		
🔏 Demo version MRS Software					
License valid to: 3-12-20	.0 (30 days left)				
Obtain license key	Enter license kev	Continue			
	Enter Incerise Key	Continue			

The code provided by Monitored Rehab Systems can you copy/paste in the text field under <License Key> (please try not to type, it may give error messages because the difference between I, I, L, I O, 0 o are not clear enough).



J MRS Software	×
Registration key: 11-21472	
License key: 90h59APEONE5U20k3Bc7y1trdvXyWKWg	
Cancel	

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

🖋 MRS Software			
🔏 Valid license key			
License valid to: 31-12-2010 (58 days left)			
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.



4. Settings

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



4.1 Show serial



💙 Serial com	nunication		$\mathbf{\times}$
Communic COM Port: Distance:	ation 1 🛞 0	Connect	
Processing da	ta.0	Disconnect	
		Cancel	Ĩ

COM Port: select the COMport where the electronics of the machine are connected to the computer. The number of your COM Port can be found with the instructions on page 12. 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.


4.2 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.
Contract Settings	

Graphics			
Graphic settings			
Enable synchronization			
Enable anti alias			
Enable blur			
rScreen resolution:	-		
O Full screen			
◯ 1600 × 1200 (Window)			
○ 1280 x 1024 (Window)			
◯ 1280 x 800 (Window)			
◯ 1280 x 768 (Window)			
● 1024 x 768 (Window)			
○800 x 600 (Window)			

4.3 Administrator Settings



Database

🌤 Administrator settings		
Databasel Modules	Language Device	
Server: Database path: Protocol:	localhost C:\Program Files\MRS Software\Database\MRS.gdb OLocal TCP	
Server: Database path:	If you work with a central database on a server, the IP-address be entered in this field. If the computer is used as a server or setting is "localhost". displays the path to the database. (Both local or on a server).	of the server should stand alone, the

TCP or local depending on your network.

Protocol:



Modules

Administrator settings	
Database Modules Language Device	
🐴 Modules	
Select modules:	
□ FysioRoadmap	
Monitored Rehab Systems Software	
□ Kneelax	
Start in module:	
Monitored Rehab Systems Software	
Minimal software requirements:	
VINA Framework 3.1	
✓ .NET Framework 3.5	
Refresh	
en e	Close

Select modules: If the software will be used also for other equipment, select the modules you need.

Start in module: Select the module you want the program to start.

Minimum 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 yet installed)

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.

🍫 Administrator setting	25	
Database Modules	Language Device	
🐴 Language		
General:	English Y Dutch English German Franch Japanese Chinese Spanish	

Device

Select what kind of machine you are using.

Administrator settings	
Database Modules Language Device	
Device	
Device:	
Com port:	
☑ DEMO	
Gebruik "Quick start"	

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 instead of the advanced menu.



4.4 Institute Management



🐫 Institute	Institute				
ा Institute manag	jement				
Name	Address	Town/city	Telephone		
Cube USA Jolanda	Waarderweg 33, Unit 11a	Haarlem	023-7505444		
/ Edit				lose	

Select the line <Type here your istitute name> and choose <Edit>. Fill in your details and save.

Institute			
🏢 Institute	management		
Name: Password: Address: ZIP Code: Telephone:	Demo Instituut ** Claes Tillyweg 2 2031CW 023-5255	City: General Data Manaq Save	Haarlem 1223456
New New	/ Edit	X Delete	Close



4.5 Back-up and restore database

To make a back-up of the database, copy the file MRS.GDB when the software isn't running and put is someplace out of the installation folder.

You can find that file in the installation folder of the MRS Software.Windows XP:C:\Program Files\MRS Software\Database\MRS.GDBWindows Vista/7:C:\Program Files (x86)\MRS Software\Database\MRS.GDB

To restore the back-up, find the original MRS.GDB from the database folder and replace it with the back-up. After restarting the software, the database of the back-up should be visible.



To back-up and restore from Firebird, open the Command Prompt, move into the Firebird folder (C:\Program Files\Firebird\Firebird_2_5\bin\)



<u>A "normal" backup:</u>

gbak -v -t -user SYSDBA -password "masterkey" "C:\Program Files\MRS Software\Database\MRS.GDB" c:\backups\MRS.GBK

A "normal" restore:

gbak -c -v -user SYSDBA -password masterkey c:\backups\MRS.GBK ''C:\Program Files\MRS Software\Database\MRS.GDB''



5. Master files



5.1 Third parties

The tab 'Master files' is used to add/edit the following third parties: General practitioner - Clinician - Referral - Insurer Editing is the same for all third parties and goes as follows:

Search:	⊙ General ○ Referral	practitioner() Chain partner	
Last name 🔺	Middle name	First name –	
Akkermans			
Beekers			
Biemen	van		
Boer	de		
Braken	van den		
Bucher		Dr. G.E.	
Bucher, huisarts		dr. G.E.	
Doctor		Common	
Feenstra		R.M.	
Galisert			
Groezen	van		
Hakema			
Haringa			
Horstmann		W.G.	
Huisarts		Test	1

Select 'General practitioner'. Choose <New> to insert a new general practitioner.

Master file third par	ies third parties
Last name: First name: Street: ZIP Code: Work: Telephone: Email: Gender:	Doctor Middle name: Common Initials: **** No.: **** City: Fax: Fax: Mobile: Specialisme: Specialisme: Outkrown
Salutation: Manner of address: CareMail address: Type:	Dear sir Dear sir
✔ Active	☑ Referral □ Chain partner
	Save 🛞 Close

Ge prac



Fill in the all the fields. A number of fields is required and the screen will not save and close untill this information is completed. To edit someone of the third party, select the button and choose <Edit>. Via <Edit> you can uncheck "Active". The contact person is not deleted but will not appear in the active list.

5.2 Sport/Profession/Employer

All sports are added via button "Sport". Via <Edit> you can uncheck "Active". The sport is not deleted but appears no longer in the active list. The sports which the patient practices can be specified in the indication of the relevant patient. Profession and Employer functions exactly the same.

👌 Ma	aster file sport		
ID	Description	Active	^
4	American Football	Ja	
5	Atletiek	Ja	
6	Badminton	Ja	
7	Ballet	Ja	
8	Basketbal	Ja	
52	Biljart	Ja	
9	Body-building	Ja	
10	Boksen	Ja	
45	Bowling	Ja	
11	Cricket	Ja	
12	Dansen Ja		
13	Fitness Ja		
14	Gevechtsport	Ja	
53	Gewichtheffen	Ja	
44	Golf Ja		
47	Golfsurfen Ja		
15	Gymnastiek Ja		
16	Handbal Ja		
41	Usedlanan	15	~

5.3 Quickstart presets

Choose this option to change preset levels of the quickstart. Select an exercise and level. Change settings into the preferred ones. Choose <Save>.

Quickstart presets		
📕 Quickstart p	resets	
Kind of exercise:	andom reactive	<u>v</u>
Level		
Level 1	Weight:	20 🗸
Level 2	weight.	3
Level 3	Number of sets:	
Level 4	Duration of set:	60 💙
Level 5	Duration of rest:	30 🗸
	Side:	Both sides 💌
	Speed:	Normal
	Difficulty:	Normal
		Save X Cancel
		🛞 Close



6. 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.

2 Patient			X
🧖 Patient			
Last name:		Middle name:	
First name:		Initials:	
Street:		No.:	
ZIP Code:		City:	
Telephone:		Mobile:	
Work:		Email:	
Birth date:	1-1-1980 💌	Age:	
Length:		Weight:	
Gender:	C Male C Female	ID:	
Particulars:			
I Show in mainscreen			
		Save	🛛 🛞 Close

6.1 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.

Diagnosis:	ACL	~			
Q. Clinician: Q. General practitioner: Q. Insurer: Q. Profession: Q. Sport:	Heuperman, Joost Beekers, I.H. ABNAMRO Accountant Badminton	> > >	Q Referral: Insurance no.: Q Employer:	Akkermans, J.C. 123456 Monitored Rehab Systems	×
Machine settings: These are footplate set X 50 Y 50	tings:				<





6.2 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	Extended history					
🏭 Extende	ed history					
Date	Time	Test	Device	<u>^</u>		
23-3-2010	12:04:42	Power test	DEMO			
22-3-2010	16:18:32	Power test	DEMO			
22-3-2010	14:13:54	Holton test	DEMO			
22-3-2010	13:24:08	Holton test	DEMO			
22-3-2010	13:23:16	Holton test	DEMO			
22-3-2010	13:22:18	Holton test	DEMO			
16-3-2010	12:42:54	Response time test	DEMO			
6-2-2008	0:00:00	ResponseTime	DEMO			
6-2-2008	0:00:00	Proprioceptive	DEMO			
6-2-2008	0:00:00	Proprioceptive	DEMO			
21-1-2008	0:00:00	Coordination	DEMO			
21-1-2008	0:00:00	FunctionalEndurance	DEMO			
21-1-2008	0:00:00	FunctionalEndurance	DEMO			
10-12-2007	0:00:00	FunctionalEndurance	DEMO			
3-12-2007	0:00:00	Coordination	DEMO			
L			i.			
😫 Print		🗸 ок		Cancel		

To print to paper use the <Print> button.

Extended history						
Name: Tes Birthdate: Print date Diagnosis:	:t AaMonitore 29-5-1976 : 18-6-2010 asdfasdf	d	Clinician: A.P. Ergotherapeut (e) Referral: Lindenhovius Involved side: Both			
Date	Time	Test	Device			
10-6-2010	11:41:09	IsometricGate	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			



7. Quick Start menu

When the Quickstart in the Settings (tab Settings - Administrator settings - Device) is checked, the following screen will appear in the tab of the MRS software.





I) 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.



8. Rehab F5

In the main menu of the MRS Software, the first option for training is Rehab (F5).



8.1 Rehab

😌 Start Rehab		×
뒎 Rehab settings	• •	
Type of equipment:	Rehab	
· · · · · · · · · · · · · · · · · · ·	Rehab type:	Repetitions 👻
Type of exercise:	Weight:	
	Number of sets:	1
Side	Duration of sets:	30
One side left	Number of repetitions:	
Both sides	Rest time between sets:	30
	Start position:	Bottom 🖌
	Concentric speed:	20 💉 cm/s
	Eccentric speed:	20 <u> </u>
	ROM acceptance: 50	90% '
Mixed rehabs		
	~	OK X Cancel

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

- I) 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 counts 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 I 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 speed of the 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	-X
ң Remark about thi	s training.
🖌 ОК	Cancel



8.2 Mixed Rehab

💙 Mixed rehab	k −	×
🔊 Mixed rehab	·	
Type of equipment	Exercises Rehab Weight Vcon Vecc Rest time	
	✓ 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:



Mixed rehab				×
詞 Mixed i	rehab			
Type of equipmer	Exercises			
	Rehab type:	Repetitions	Side One side left	time 🔹
Type of exercise	Weight:	10 💙	One side right	
	Number of sets:	1 🗸	O No side	×
	Duration of sets:	30 🖌		
	Number of repetitions:	5 🖌		
	Rest time between sets:	30 💌	N	
	Start position:	Bottom 🖌	~	
	Concentric speed:	20 💌 cm/s		
	Eccentric speed:	20 💌 cm/s		
	ROM acceptance: 5	0% 90%		
		🖌 OK 🛛 🗙 Can	cel	
		🗸 ОК		X Cancel

Bij pressing the pencil, the exercises can be changed.

Bij pressing <Ok> the exercises will start.

Everything else works the same as the Rehab exercises.

8.3 Rehab History



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



💙 R	ehab history		R				X
	🐼 Rehab history						
	5						
6	Date	Time	Rehah		Device	Device	
	4-7-2012	10:19:52	Rehab (4 x 5 Repetitions)		Both sides	DEMO	
	4-7-2012	10:19:51	Rehab (1 x 5 Repetitions)		Both sides	DEMO	
					1		
			Rehab:	4 x 5 repetitions			
			Weight:	13			
			Number of sets:	4			
			Number of repetitions:	5 repetitions			
			Side:	Both sides			
			Concentric speed:	20 cm/s			
			Eccentric speed:	20 cm/s			
	😑 Print			🖌 ОК			Cancel

To print to paper use the <Print> button.

Rehab history						
Name: Joost de KoningscobraClinician: Joost HeupermanBirthdate: 21-3-1974Referral: AkkermansPrint date: 30-6-2010Involved side: Left						
Date	Time	Rehab	Device	Device		
30-6-2010	15:01:16 15:46:02	Rehab (1 × 10 Repetitions) Rehab (1 × 2 Repetitions)	Both sides Both sides	DEMO		
17-6-2010	15:25:41	Rehab $(1 \times 2 \text{ Repetitions})$	Both sides	DEMO		



9. Exercises



9.1 Functional exercises

S Functional Exercises	Þ		
🔊 Functional Exerc	ises		
Type of equipment:	Exercises		
×	Weight:	10 🔽	
Type of exercise:	Number of sets:	1	
	Duration of set:	30 💌	
[Speed	Rest time between sets:	30 💌	
OSlow			
 Normal 			
OFast			
One side right	Random reactive	Isometric gate	Controlled route
Both sides			
E	Random explosive	Controlled position	Random decelaration
Mixed exercises			
			Cancel

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

- I) Select "type of equipment" where the equipment is connected to (optional)
- 2) Descripe 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) After starting, the range of motion has to be set by doing one 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 symbolizes a catcher cube. Making concentric or eccentric movements will shift the red catcher to the right (concentric) or to the left (eccentric). The goal is to avoid the yellow balls.



Isometric Gate

This exercise is a dynamic test form with a so-called isometric "hold" (= freeze moment). The coordinate abilities are stimulated by accelerating the power ability (hold). The 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 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 ball to the right (concentric) or to the left (eccentric).



SCORE: 98	ser]/]	™≋ 0:25

Controlled Route

In this exercise the red circle / disk 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 catcher bar to the left and to the right.



SCORE: 98	338:]/]	TIME: 0:11

Controlled position

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



9.2 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.

9.3 Mixed Excercises

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



pe of equipment:	Exercises			
Leg Press	Exercise	Sets	Set duration	Rest time
	Random reactive	1	30	30
pe of exercise:	Isometric gate	1	30	30
	Controlled route	1	30	30
de)One side left)One side right)Both sides	Weight: Number of sets:			
) Both sides) No side Reversed	Duration of set: Rest time between sets: Rest time between exercises:	30 • 30 • 30 •		
rt min/max	Random reactive	Isometric gate	Controlle	d route

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

- I) 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:



Ex	ercise complete!
Next Exe	ercise starts in 24 seconds
	Isometric gate

After pressing any key, a concise list of all test and training programs with belonging scores will be shown.





9.4 Isometric Training



Choose Isometric Training or press F8.

Start isometric training		X
Start isometric training Side One side left One side right Both sides No side Presets Level 5 Level 4 Level 3	Settings Level 3 Length (s) Force (%) 3 30 2 80 50 Evel 1 2 90 Level 1 Level 2 4 40 Level 3 2 80 Level 4 2 40 Level 5	
Level 2	Number of repetitions: 3 Pepetitions	
Level 1	Pause duration: 30 💌 seconds	
	Force threshold: 5 Newton	
	Cancel	

How to set up an Isometric Training step by step:

- 1) fixate the weight stack, if your machine does not have this technical feature select the maximal weight
- 2) Select training level (preset 1 to 5)
- 3) Select if you want to train with one or two sides
- 4) Select the graphics for feedback
- 5) Press <start>

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



After pressing <Enter> the exercise will start.

The screen will display the following:



Isometric 1	iraining		
400 360 320 280 9 240 120 120 40 0			
	Repetitions Score	11.5f 3 12	

The task for the patient is to follow the orange blocks by giving more or less isometric power. The number of repetitions and the score of the exercise will be displayed.

How to change the preset levels or create the default level:

Clear the preset level with the <Delete> button. By using <Add> or <Insert> (with information of length and force) and add rest time (with information of rest time), you can create your own protocol. Select the right mouse button and the protocol you made will be stored under the preset level you just cleared.

9.5 Exercise history

When a patient is selected, a concise list of all exercise programs with belonging scores will be shown.

0	Rehab history						
F	🚮 Rehab hi	story					
	2				R.		
	Date	There	Debeb		Daulas	Deuler	
	6 7 2012	14:07:51	Rehab (1 v E Depatitions)		Device Dette sides	Device	
	6-7-2012	14:27:51	Renab (1 x 5 Repetitions)		Both sides	DEMO	
	6-7-2012	13:25:57	Renab (4 x 5 Repetitions)	1	Both sides	DEMO	
	6-7-2012	13:25:56	Renab (1 x 5 Repetitions))	Both sides	DEMO	
	4-7-2012	10:19:52	Rehab (4 x 5 Repetitions))	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 sneed:	20 cm/s			
			Eccentric sneed:	20 cm/s			
C	🖹 Print			🖌 ОК			Cancel

10. Challenging Programs



10.1 Dual Tasks



10.1.1 Mathematics

💙 Start Math	k		X
2x4 Start Math	·		
Type of equipment:	Exercises		
✓	Weight:	20	
Type of exercise:	Number of sets:	з 💙	
	Duration of set:	60 🗸	
Speed	Rest time between sets:	30 💙	
Slow			
 Normal 		Mantha w	
OFast	Kind of exercise:	Maur	
Side			
One side left	Difficulty:	Normal 🖌	
One side right One sides			
O No side			
	🖌 🗸 ОК	Cance	1

How to set up a Math exercise step by step:

- I) 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 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.



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 show





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

Exer	cise history Exercise	history	1			k,	
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	
•	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 game 212 5 kg 4 sets 20 secor Both side Normal	nds es		

10.1.2 Recognition

Start Recognition	L.	
Start Recognition	n	
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:	Recognition 💌
Side		
One side right	Difficulty:	Normal
Both sides No side	Recognition mode:	SingleImage 💙
	🖌 🗸 ОК	Cancel



How to set up a Recogition exercise step by step:

- I) 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 duration of set
- 8) Select the rest time between sets
- 9) Select your exercise: Recognition
- 10) Select difficulty
- II) After starting, the range of motion has to be set by doing one repetition:



After pressing <Enter> the exercise will start.

Accognition Test				
TEST: Recognition	on		TIME LEFT:	0:10
	SPZ			
		¢		

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:

🛠 Recognition Test						
	EXE	SE C		E		
	<u>SET 1</u>	0:20	A	A	า	
		0.20	A	A	ש ר	
			~		J	

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

Exe	rcise history							Þ
~	Exercise	history	1			45		
		DEMO						
Sele	ect 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		
•	6-7-2012	14:42:57	Recognition game		9	DEMO		
•	6-7-2012	14:38:46	Math game		12	DEMO		
٠	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 sid Normal	e nds les			
							Close	



10.1.2 Memory

🕏 Start Memory		
Start Memory		-
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 Fast	Kind of exercise:	Memory
Side		
○ One side left ○ One side right ● Both sides	Difficulty:	Normal
O No side		
	🖌 🗸 ок	Cancel

How to set up a Memory exercise step by step:

- I) 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 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	I
Number of questions per set	4	3	3

Time of selection is depending on speed:

Slow 2 sec. Normal I 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.

🕈 Nemory		약 Memory	
TEST: Memory	0:18	test: Memory	0:38
4			

After finishing the exercise the results will be shown:



	EXERCISE COMPLETE! PRESS ANY KEY TO CONTINUE								
[SET 1 @ 0:20 🔂 4 🗹 4								
					4		4		

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

Exercise history							
Exercise history							
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							
Evercice : Bace came							
Exercise: Race game							
Stule. 233							
Weight: 5 kg							
Number of sets: 4 sets							
Duration of sets: 20 seconds							
Side: Both sides							
Speed: Normal							
	Close						



10.2 Sports

2x4 Dual tasks *	Spo) rts		Show tests	Test	,
Challenging	🕘 Ra			e game		
	🕅 Ski game					
	Football game					

10.2.1 Race Game

😌 Start race		
🕼 Start race		,0
Type of equipment:	Exercises	
	Weight:	20 💙
Type of exercise:	Number of sets:	3 🗸
	Duration of set:	60 🗸
Speed	Rest time between sets:	30 🗸
Normal	Kind of game:	Race game 🖌
OFast	Traffic:	Average 💌
One side left		
One side right One sides		
O No side		
	🔷 ОК	

How to set up a race game step by step:

- I) 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:

0	ixer	cise history							×
		Exercise	history			43			
Select device: DEMO						~			
		Date	Time	Exercise		Score	Device	Type of exercise	
	•	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 game Score: 235 Weight: 5 kg Number of sets: 4 sets Duration of sets: 20 seconds Side: Both sides Speed: Normal								
								Close	



10.2.2 Ski game

💙 Start Ski game			
📷 Start Ski game		h2	
Type of equipment:	Exercises		
	Weight:	20 💌	
Type of exercise:	Number of sets:	3 🗸	
Speed	Rest time between sets:	30 🖌	
OSlow	Kind of game:	Ski game 🗸	
Normal			
Side			
One side left			
One side right			
Both sides No side			
		·	
	V OK	X Ca	ncel

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:



J	Exercise	history	/		4	
ele	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	
•	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: S Score: 2 Weight: 5	iki game 212 5 kg		
			Exercise: S Score: 2 Weight: 5 Number of sets: 4	Ski game 212 5 kg 4 sets		
			Exercise: S Score: 2 Weight: 5 Number of sets: 4 Duration of sets: 2	Ski game 212 5 kg 4 sets 20 seconds		
			Exercise: S Score: 2 Weight: 5 Number of sets: 4 Duration of sets: 2 Side: B	iki game 212 5 kg 4 sets 20 seconds 30th sides		
			Exercise: S Score: 2 Weight: 5 Number of sets: 4 Duration of sets: 2 Side: 8 Speed: N	iki game 212 5 kg 4 sets 20 seconds 3oth sides Normal		
			Exercise: S Score: 2 Weight: 5 Number of sets: 4 Duration of sets: 2 Side: B Speed: N	iki game 212 5 kg 4 sets 20 seconds 30th sides Kormal		



10.2.3 American Football game

😌 Start football	N	
💽 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 🗸
◯ Slow		Pod Atthits Atthits
○ Fast	Player outfit:	
Side One side left One side right Both sides No side	Opponent outfit:	Black/Blue/Yellow
	🖌 🗸 ОК	Cancel

How to set up a football game step by step:

- I) 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.





resultion of the second second

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:





II. Tests Monitored Rehab Systems



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



II.I 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		k	×
🔊 Coordination test			
Type of equipment:	Settings		
×	Weight:	10 🗸	
Type of exercise:			
	Mode:	Vertical 🗸	
Side			
One side right			
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:



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	

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	



II.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 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.



II.3 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	N	
🔊 Start propriocept	ive test	
Type of equipment:	Settings	
	Weight:	10 🗸
Type of exercise:	Duration of rest:	4
	Duration of position:	5 🗸
	Percent of ROM:	80 🗸
O One side left		
Both sides		
ONo side		
		V OK

- 1) Select Side: One side left/right, Both sides leg or No side (no use of legs) training.
- 2) 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.



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 their 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	lnician: eferral:- volved side: - de: Both sides
Visible	Involved	Non Involved
Correct position (mm):	174.40	
Avg. 1st movement (mm):	174.10	174.10
Dev. 1st movement (mm):	0.11	0.06
Avg. 2nd movement (mm):	143.40	173.60
Dev. 2nd movement (mm):	-30.65	-0.42
Non visible	Involved	Non Involved
Correct position (mm):	174.40	
Avg. 1st movement (mm):	174.80	174.00
Dev. 1st movement (mm):	0.81	0.00
Avg. 2nd movement (mm):	104.10	174.00
Dev. 2nd movement (mm):	-69.92	0.00
Involved		Non Involved
0 165 167.5 170 172.5 175 177.5	180 182.5	0 165 187.5 170 172.5 175 177.5 180 182:



II.4 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.

II.5 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		R	×
Start response time test Start response time test Type of equipment: Type of exercise: Side One side left One side left One side right Both sides No side	St Settings Weight: Number of repetitions: Mode:	L0 Vertical Vertical	
	~	ж [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 $\langle OK \rangle$ 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.





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>.



ngscobra 4) me (s) 00	Response tim	Clinicia Referra Involve Side: B	an: al:- ed side:- oth sides
me (s)	Response tim	ne (s)	
me (s)	Response tim	ne (s)	4
00	0.500		<u>17</u> 3-
33 00	0.566 1.300 0.600		Repetition
			Non Involved
me (s)	Response tin	ne (s)	4-
67 34 34	0.467 0.400 0.434		B 2- 1 2 3 Repution
			hvolved Average values Non hvolved
me (s)	Response tin	ne (s)	4
244 278 %	0.822 0.434 -89 %		
	00 me (s) 67 34 34 34 me (s) 244 278 %	00 0.600 me (s) Response tin 67 0.467 34 0.400 34 0.434 me (s) Response tin 244 0.822 278 0.434 % -89 %	00 0.600 me (s) Response time (s) 67 0.467 34 0.400 34 0.434 me (s) Response time (s) 244 0.822 278 0.434 % -89 %

II.6 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

	lnv		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.



II.7 Power Test



Start power test			×
Type of equipment: Type of exercise: Type of exercise: Side One side left One side right @Both sides No side	-Settings Rehab type: Weight: Number of repetitions: Duration of sets: Start position: ROM acceptance: 50%	Repetitions	L.
	🖌 🗸 ОК		🔀 Cancel

I) 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.



TEST: Rehab	388:]//]	REPS:]/5
	R R	

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.



wer tes	st results					
Range of m	otion Range of mo	otion with speed Acce	leration/Deceleration			
				1		· · · · · · · · · · · · · · · · · · ·
				==		
	_			—	_	
	2	3 4	5 6	7	8	9 10
1 Repetition	2 Direction	3 4 Range of motion	5 6 Average speed	7	8	9 10
Repetition	2 Direction Concentric	3 4 Range of motion 19.70 cm	5 6 Average speed 28.80 cm/s	7	8	9 10
Repetition	2 Direction Concentric Eccentric	3 4 Range of motion 19.70 cm 16.10 cm	5 6 Average speed 28.80 cm/s 26.88 cm/s	7	8	9 10
Repetition	2 Direction Concentric Eccentric Concentric	3 4 Range of motion 19.70 cm 16.10 cm 15.80 cm	5 6 Average speed 28.80 cm/s 26.88 cm/s 38.07 cm/s	7	8	Change legend speed:
Repetition	Direction Concentric Eccentric Concentric Eccentric Eccentric	3 4 Range of motion 19.70 cm 16.10 cm 15.80 cm 18.10 cm 18.10 cm	Average speed 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s	7	8	9 10
Repetition	2 Direction Concentric Eccentric Concentric Eccentric Concentric	3 4 Range of motion 19.70 cm 19.70 cm 16.10 cm 15.80 cm 18.10 cm 19.20 cm 19.20 cm	Average speed 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s	7	8	9 10 Change legend speed:
Repetition	2 Direction Concentric Eccentric Concentric Eccentric Concentric Eccentric	3 4 Range of motion 19.70 cm 19.70 cm 15.80 cm 15.80 cm 18.10 cm 19.20 cm 17.60 cm	Average speed 28.80 cm/s 26.88 cm/s 38.07 cm/s 40.31 cm/s 39.75 cm/s 34.11 cm/s	· · · · · · · · · · · · · · · · · · ·	8	9 10 Change legend speed:
Repetition 1 Repetition 2 3 4	2 Direction Concentric Eccentric Concentric Eccentric Concentric Eccentric	3 4 Range of motion 9.70 cm 19.70 cm 16.10 cm 15.80 cm 19.20 cm 19.20 cm 17.60 cm 17.90 cm 17.90 cm	Average speed 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	· · · · · · · · · · · · · · · · · · ·	8	Speed < 30 cm/s
Repetition	2 Direction Concentric Eccentric Concentric Eccentric Eccentric Concentric Eccentric Eccentric	3 4 Range of motion 19.70 cm 16.10 cm 15.80 cm 18.10 cm 19.20 cm 17.60 cm 17.90 cm 16.60 cm	Average speed 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	· · · · · · · · · · · · · · · · · · ·	8	9 10 Change legend speed: Speed < 30 cm/s Speed > 43 cm/s Speed > 45 cm/s Speed > 60 cm/s
Repetition	Direction Concentric Eccentric Concentric Eccentric	3 4 Range of motion 19.70 cm 19.70 cm 15.80 cm 15.80 cm 19.20 cm 17.60 cm 17.60 cm 16.60 cm 20.00 cm 16.00 cm 36.60 cm	Average speed 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	· · · · · · · · · · · · · · · · · · ·	8	9 10 Change legend speed: Speed < 30 cm/s Speed > 43 cm/s Speed > 45 cm/s Speed > 60 cm/s Gradienten

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.



ange of mo	tion Range of m	notion with speed	Acceleration/Dec	eleration
Repetition	Acceleration	Deceleration	Total time	Repetition: 1
2 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	
26	0.12 s	0.15 s	1.62 s	
7	0.15 s	0.13 s	1.52 s	
28	0.15 s	0.12 s	1.47 s	
2 9	0.13 s	0.12 s	1.52 s	Ecceptuic
10	0.13 s	0.13 s	1.52 s	
				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>.





Po	Wer test results	
Name: Joost de Koningscobra Birthdate: 21-3-1974 Test date: 26-5-2010 Weight: 10 kg. Diagnosis: ACL	Clinician: Joost Heupern Referral: Akkermans Involved side: Left Side: Both sides	nan
Concentric	Involved	
Total work: Total power: Average speed: Average acceleration time:	177.77 J 361.64 W 36.90 cm/s 0.13 s	
Eccentric	Involved	
Total work: Total power: Average speed: Average deceleration time:	172.48 J 333.55 W 36.90 cm/s 0.13 s	
		9 10
■ Speed < 30 cm/s S ■ Speed > 45 cm/s ■ S	eed > 30 cm/s eed > 60 cm/s	



11.8 Maximal Force Test



It is important, before the maximal Force test is started, to do a good warming up. The test person should be familiar with the piece of equipment.

The test should be done high speed concentric, and slow speed eccentric.

The test person should go up (concentric) high speed to get information about maximal speed combined with maximal weight. If the speed is too high (e.g. on squat : not able to keep heel and toe attached to the footplate) the test should be redone with a higher weight.

The test person should go down (eccentric) controlled because typically the test person is stronger in eccentric activity and gravity is helping the patient going down

The Maximal force test, the first screen you get:

😌 Start maximal force test		<u>k</u>	X
Start maximal force test Start maximal force test Type of equipment: Type of equipment: Type of exercise: Side One side left One side left One side left No side No side	Settings Weight: Trial repetitions: Rest duration:	10 v kg. 3 v seconds	
		√ ок	Cancel

In this screen you can select the amount of trial repetitions. The weight to do the IRM test should be selected within a maximum of 5 trial repetitions .

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 the trial repetitions the weight for the IRM test can be selected.



Press <OK> to perform the I RM test.

During the test, you see the curves.

The clinician should observe the quality of movement and ask the test person if this repetition felt like his maximum performance. If not the test should be redone by using the <Retry> button.

When you finish the one repetition the software asks if the test is OK or if you want to retry. If you retry you get some rest. If you have to retry several times (maximum of 2) in a maximal force test (if the weight is still too easy) the test is not reproducible and should be done again another day.



If you press <Yes> the software automatically switches to the involved side. If you press <No> you have to do the test again. If you press <Previous> the test before this last one is saved. Testing should always start with the non-involved side. Only with the Back Extension and Abdominal Crunch machines there is "one side only".

After finishing the involved side (press <OK> after the test) you will get the first information on the screen.





Patient: Date:	Test AaMonit 26-7-2010	ored 9:10:35	Birthd Side:	ate:	29-5-1976 Both sides	Clir	nician: Griethuizo	en, H. van 🔽
			Devic	e:	DEMO			
a con [Cond	:entric		0.500	·	Eccent	ric	
3.500				3.500				
3.000				3.000				
2.500				2.500				
Ê 2.000				Ê 2.000				
8								
5 4 500				5 4 500				
ພື້ 1.500				ي 1.500				
1.000				ی س 1.500 1.000				
ີ້ 1.500 1.000 500				2 				
1.000 500				2 				
1.000 500 0	20 4	0 60 Vistance (cm)	80	2 41.500 1.000 500 0	8	0 60 Dista	40 nce (cm)	20 0
1.500 1.000 500 0	20 4 L	0 60 Vistance (cm)	80 Concentric	1.500 1.000 500	8	0 60 Dista	40 nce (cn) Eccentric	20 0
	20 4	0 60 Vistance (cm)	80 Concentric Non involves	2 1.500 1.000 500 0 UDeficit	8	0 60 Dista Involved	40 nce (cm) Eccentric Non involved	20 0 Deficit [%]
2 1.500 1.000 500 0 0	20 4	0 60 Xetance (cm) Involved 30	80 Concentric Non involver 20	2 1.500 1.000 500 0 0	8	0 60 Dista Involved 30	40 nce (cm) Eccentric Non involved 20	20 0 Deficit [%]
2 1.500 1.000 500 0 0 0 0 0 0 0 0 0 0 0 0	20 4 C	0 60 ktance (cm) Involved 30 2143.00	80 Concentric Non involves 20 3319.00	2 1.500 1.000 500 0 1 Deficit	[%] %	0 60 Dista Involved 30 3095.00	40 Eccentric Non involved 20 3628.00	20 0 Deficit [%]
/eight [kg] eak force [N] soithon peak for	20 4 C	0 60 Nixtance (cm) Involved 2143.00 98.30 1950.10	80 Concentric Non involver 20 3319.00 80.00 2116 20	2 1.500 1.000 500 0 1 Deficit -35 23 -52	[%] [%] %	0 60 Dista Involved 30 3095.00 3.30 2571.50	40 nce (cm) Eccentric Non involved 20 3628.00 3.30 2201 50	20 0 Deficit [%] -15 % 0 %
Zeight [kg] eak force [N] sotial work [D] ower [W]	20 4 C	0 60 Nixtance (cm) 2143.00 98.30 1500.10 1526.03	80 Concentric Non involver 20 3319.00 80.00 3146.30 3200.70	2 1.500 1.000 500 0 1 Deficit -35 23 -52 -52 -52	[%] [%] % % %	0 60 Dista 30 3095.00 3.30 2571.50 2706.81	40 Eccentric Non involved 20 3628.00 3.30 3291.50 3464.70	20 0 Deficit [%] -15 % 0 % -22 %

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





11.9 Interpretation Maximal Force Test

Doing the Maximal Force test you get the following information:

Concentric versus Eccentric:

The concentric movement is important, it shows you how much weight the test person could move with what speed. The eccentric movement is not important. Gravity is helping the weight coming down and the eccentric muscle force is always higher than concentric so gives no extra information.

Non-involved=Green versus Involved=Red.

The numbers of the involved side compared to the non-involved side and the deficit between them.

In our example:	
Weight:	The (maximal) weight you used in step 5 to do the one repetition max force test
Peak Force:	The combination of the weight and speed makes the curve; the highest point in the curve is the Peak Force.
Position Peak Force:	Location where the Peak Force is reached.
Total Work: Power:	The amount of Work delivered. The total volume under the torque curve This is the Total Work divided by the time it takes to perform the work.





Maximal Speed: The maximal speed performed during the one repetition.

Deficit:

The value of the Non-Involved side is the number we work with, i.e. 100

	Inv -	Non involved
If there is no deficit the value is 0%	100 -	100
If the Involved is weaker it say's -10%	90 -	100
If the involved is stronger (not expected) is say's 10%	110 -	100

Normally you expect to see a -x% if the involved side is weak.

How to look at the numbers:

The weight: because only the weight is less than the combination of weight and speed you get more information in the peak force. Especially when the weight during the test is the same at the involved and non-involved side.

Peak force: this will tell you the combination of weight and speed. A higher speed with the same weight makes the peak force higher. The weight at involved and non-involved can be the same but because of a different speed you still can find a deficit.

Total Work: this has to do with the weight, the speed, the range of motion. It shows you the total capacity within the range of motion.

Average power: because the speed is related to the time, you already see this in total work.

Maximal speed: you always see a higher peak force if there is a higher maximal speed (if the same weight is used).

In healthy persons left - right deficit should be within about 10%.

In high level athletics the left-right deficit should be within about 3%, though we recognize there may be greater deficits due to the asymmetries created by the demands of muscular activity required in a specific sport.



11.10 Functional Endurance Test



The Functional Endurance Test is performed to get information about the endurance strength of muscle groups.

Type of equipment:	Settings			
~	Weight:	10 🛩	kg	
Type of exercise:	Number of repetitions:	3 🗸		
	Movement acceptance:	50 🛩	percent	
One side left One side right Both sides No Side Set min/max				
Set min/max				

IMPORTANT: The endurance test should be done at high speed.

Instructions to the test person before the test should be: perform the total number of repetitions with the highest speed possible.

The weight and amount of repetitions should create maximal fatigue of the muscle groups causing a reduction of speed. Since the weight during all the repetitions is constant, the reduction of speed is the most important sign 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.

The repetitions with the non-involved side are done first. After the rest period perform the same repetitions on the involved side.

During the test you see the software counting the repetitions. A repetition is counted if more than 50% of the range of motion is realized.





When all repetitions are done you get the following screen :



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>.



II.II Interpretation Functional Endurance Test

Doing the Functional Endurance Test you get the following information. As a general rule the eccentric data is not pertinent. So we focus on the concentric data.



Initial review of the curves shows that fatigue on the non-involved side is negligible (the blue and green curves are almost superimposed), and that fatigue on the involved side is significant (about 12%). However, it is important to look closer at the individual curves for comparison. In the above dialog you can select which curves you want to see. By clicking on the box you can either select or de-select the curve you want.

In the picture above we selected only the Involved rep. 2 and Non Involved rep. 2

In this example we see that a deficit between the blue Non-Involved curve and the Purple Involved curve already exists. Therefore we should focus our rehabilitation more on developing the absolute strength for this patient to overcome the existing deficit.

If the mentioned curves are the same in the beginning (what we expect) we should look how they are at the end, we select the Involved Last rep. and the Non-Involved Last rep.

In the above example we see that the Green (Non Involved) repetition has the typical shape of a well-performed test, ie a test performed at maximal speed. The shape of the graph for the last repetition of the involved side (red) is indicative of a repetition performed with a much lower speed.

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>.


Name: Joost de Koningscobra Birthdate: 21-3-1974 Test date: 26-5-2010 Weight: 20 kg. Diagnosis:		Clinician: Referral:- Involved side:- Side: Both sides	
Concentric	Involved	Non Involved	Deficit
Max. peak force (N)	501.00	502.00	0%
Work (J)	1161.20	1217.60	-5 %
Eccentric	Involved	Non Involved	Deficit
Max. peak force (N)	411.00	423.00	-3 %
Work (J)	1027.30	917.57	12 %
	entric 0 15 20 tance (cm)		ntric 10 5 3ance (cm)

The Numbers we get:				
Weight:	The weight you selected to do the test.			
Repetitions:	The number of repetitions asked in this test			
Peak Force:	The combination of the weight and speed makes the curve; the			
	highest point in the curve is the Peak Force. In	this case we		
	only see the curve of the second repetition, the	e Peak Force		
	could also possibly be made in one of the othe	r repetitions.	We	
	do not see this in our curve.			
Position Peak Force:	This is the position in the range of motion where the peak force is made			
Total Work:	The total amount of Work delivered. The total	volume unde	r the	
	force curve of all repetitions together			
Average Power:	This is the Total Work divided by the time it tal	kes to perform	n the work	
Maximal Speed:	The maximal speed performed during the one	repetition		
Deficit:	I he value of the Non-Involved side is the num	ber we work v	with, i.e. 100	
		Inv	-	Non involved
If there is no deficit the val	ue is 0%	100	-	100
If the Involved side is weak	er it say's -10%	90	-	100
If the involved side is stron	ger (not expected) it say's 10%	110	-	100

Normally you expect to see a $\ \ \, - x\%$ if the involved side is weak.



How to look at the numbers:

The weight: because only the weight is less than the combination of weight and speed you get more information in the peak torque.

Peak force: this will tell you the combination of weight and maximal speed.

Position of peak force: In healthy situation you expect the position of the peak force at the same position in both concentric curves. This tells you, in numbers, if the shape of the curve is similar.

Total Work: this has to do with the weight, the speed, the range of motion. It shows you the total capacity within the range of motion of all repetitions together.

Average power: because the speed is related to the time, you already see this in total work

Maximal speed: you always see a higher peak force if there is a higher maximal speed (if the same weight is used)

In healthy persons left - right deficit is typically within about 10%

The importance of this test is to look at the deficit between the second curve and the last curve. This deficit (not in a separate number) should be the same at both sides.

II.I2 Holten



Holtens Test is a maximum force test using a predictive formula as published by Holten (reference). It is primarily used for patients who because of joint problems cannot complete a maximal force test, and the accompanying I time max repetition that is required of the max force test.

Select "Test", then "Holten" from resulting menu. The following dialog appears:



Start Holten test	N	X
💌 Holten test	μζ	
Type of equipment:	Settings	
Type of exercise:		
One side left One side right		
Both sides No side		
	🖌 🖌 ОК	Cancel

Type in the weight at which the test will be performed. Weight should be light enough so that the test person can perform at least 10 reps, but heavy enough so that they cannot complete the entire 20 reps. Clinical experience will help in the weight selection process.

Choose <OK> to begin the test.

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

RESET (R)

Press <Enter> to start the data collection process.





Each successful rep is counted. If the test person cannot complete a rep, click "Esc" to end the test.



The results are shown. 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>.





II.I3 Isometric Test



The Isometric Test is designed to quantify the maximum force the test person can generate at a specific joint angle. The isometric test can be a safer alternative than the Max force test for certain patient populations. This may allow testing of strength and/or pain threshold earlier in the rehab process. This can serve as a baseline to judge future strength gains and pain reduction.

Note: With the Functional Squat, all Isometric tests are performed single legged. If the test person exceeds 4000N the test should be stopped to prevent patient and machine overload.

Select "Show tests", then "Isometric" from resulting menu. The following dialog appears:



-Side C One side left C One side right Both sides C No Side	Settings Time:	v seconds	
---	-------------------	-----------	--

- 1) Select One side left/right, Both sides leg or No side (no use of legs) training.
- 2) Select time in seconds.
- 3) Select force threshold in Newton.

Click <OK>. Click the <Start Test> button to initiate the test. The software begins recording data and graphing the force once the threshold of 100 N is exceeded. The threshold is designed to protect the overstress of the joint against overzealous test persons who may rapidly apply the force in an effort to maximize their performance.



The green bar displays the relative load relative to the threshold. When the load approaches 75 N (3/4 of the bar) the bar turns yellow.

The Non-involved side is tested first, followed by the Involved Side. A single rep is performed for each test since the test is intended to be a maximum exertion, thereby depleting the energy stores of the involved muscle groups.







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>.





11.14 Interpretation Isometric test

Several pieces of information that we need to look at when evaluating the isometric strength curves:

Max Force: The maximum force registered during the test. This is an indication of the test person's ability to stabilize the joint under certain load conditions.

Time to Max Force: The specific time during the test in which the max force was reached. The quicker the test person is able to generate the max force, the more likely the joint is prepared to stabilize and can react to provide that stabilization.

Average Force: The average of all force values recorded over the entire duration of the test. This parameter gives indication of the test person's ability to maintain the force, relative to the peak. If the average is low despite a high max force, we can say that the test person's endurance is not high.

Deficit:

The value of the Non-Involved side is the number we work with, i.e. 100 N

	Inv	-	Non involved
If there is no deficit the value is 0%	100	-	100
If the Involved is weaker it say's -10%	90	-	100
If the involved is stronger (not expected) is say's 10%	110	-	100

Normally you expect to see a -x% if the involved side is weak.



While it is beyond the scope of this document, the shape of the force curve can yield valuable information to the trained clinician.



12. Test history

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



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

Test history				
🚦 Test hi	istory			
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	
1-7-2010	12:30:15	Coordination	DEMO	

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 FI2 (overlay) to select the other test.

🐺 Pick a test for	overlay			×
n Overla	v tests:			
	,			
		1	1	
Date	Time	Test	Device	
		Current		
1-7-2010	12:39:15	Coordination test	DEMO	
				Class
		VK		

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





13. Shortcuts

- F2 New Patient
- F3 Edit Patient
- F4 Select Patient
- F5 Rehab
- F6 Functional exercises
- F7 Coordination test
- F8 Isometric training
- FI0 Administrator settings
- FII Test history
- Ctrl H Extended history



Other Products:



Kneelax



Functional Squat



MR Cube



Easy Slide



MR Wiggle

American customers only:

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