

zebris FDM 3.0.x



Software instructions for use zebris FDM

describes included functions up to and including version 3.0.x
Illustrations in these operating instructions may differ.

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Please always specify the serial number of the product when making inquiries!



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User instructions

1 User instructions

Dear customers,

these operating instructions provide you with basic knowledge on how to operate the zebris FDM software . It explains the installation and gives advice on preparing measurement and data acquisition.

The zebris FDM can be used with all **zebris** measuring systems to analyze the pressure distribution. Therefore, all available measurement modules are presented in this manual. Please note that depending on the measuring system used, certain measuring modules cannot be used. In addition, please observe the safety-relevant information contained in the associated Software instructions for use and keep all operating instructions in the immediate vicinity of the measuring system. The operating instructions are an essential part of the product and will help you to operate the measuring system as intended.

The zebris Medical GmbH accepts no liability for injury to personnel or patients or damage to the system resulting from failure to observe information contained in the operating instructions or misuse of the system .

Should you notice any errors while working with the instructions for use or should you have any suggestions, we would be grateful for a message at any time.

The software and hardware operating instructions can be displayed in the zebris FDM software as online help (F1 key).

In addition, the documents are available on the enclosed installation disk, as well as online at www.zebris.de.



Read these instructions before using the product for the first time to avoid operating errors and damage.

Exact compliance with the instructions in all parts of the operating manual is a prerequisite for proper use.

User instructions

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1.1 User target group

This document is intended for physicians, physical therapists, office staff and service personnel.

User instructions

1.2 Conventions and symbolism used



Warnings designate a **potential hazard to the health and safety of** users and/or patients. The warnings explain the nature of the hazard and how it can be avoided.



Hints designate a potential danger that can lead to **damage or destruction of the device**. The hints explain the type of hazard and how it can be avoided.



Notes that are **relevant to the measurement procedure** are marked in this way.

The instructions for use must be kept in such a way that the information contained therein is available to the user at all times.



Please note that a new version of these operating instructions is not published for every software release, as technical changes that are not visible to the user are often made in releases. The latest version of the operating instructions is available from your dealer.

2 Software installation and activation

2.1 System requirements

From version 3.0.x the system requirements for the measurement PC will change.

The current system requirements can be found on the zebris website in the Service / PC specifications / zebris FDM 3.0.x .



If you have any questions about the system requirements, please contact your supplier's customer service.

2.2 Install user software



If a message is displayed during the installation, that your graphics hardware does not support OpenGL 4.6, you cannot run the software with this computer. If your graphics hardware is a dual graphics chip solution, please switch to the high-performance chip in the associated software. If your graphics hardware supports OpenGL 4.6 according to the specification, try updating the graphics driver.

Software installation and activation

2.2.1 Step by step installation

Welcome to the zebris FDM Setup Wizard

This will install zebris FDM RC 1.108 on your computer.
It is recommended that you close all other applications before continuing.
Click Next to continue, or Cancel to exit Setup.



Open the "Software" folder on the installation disk and start the installation file with the name zebris FDM. After that, please click **Next** to start the installation.

Ready to Install

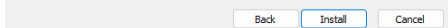
Setup is now ready to begin installing zebris FDM RC on your computer.

Click Install to continue with the installation, or click Back if you want to review or change any settings.

Setup type:
I want to choose what will be installed

Selected components:
zebris FDM RC
Visual C++ runtimes
Driver for zebris USB
Driver for SYNLightCam HS before 2021
Balance Board Game

Additional tasks:
Create a desktop icon
Associate zebris FDM RC with the .zebdb file extension

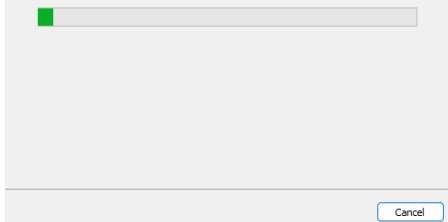


Confirm that you have made a backup of your database before starting the installation and click **Install**.

Installing

Please wait while Setup installs zebris FDM RC on your computer.

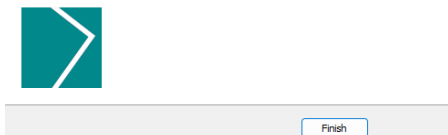
Extracting files...



The installation will now be performed.

Completing the zebris FDM Setup Wizard

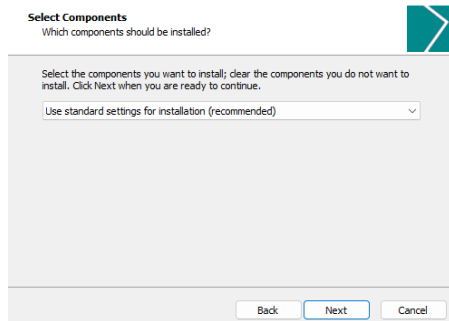
Setup has finished installing zebris FDM RC on your computer.
The application may be launched by selecting the installed icons.
Click Finish to exit Setup.



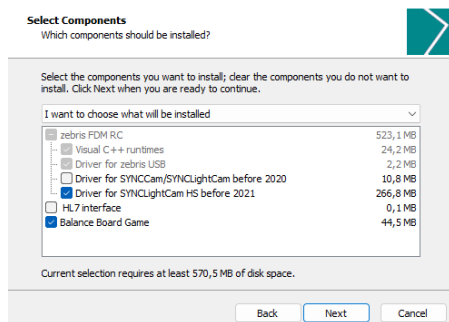
After the installation is complete, the following window will appear. Click **Finish** to complete the installation .

Software installation and activation

2.2.2 Customized installation



In the **Select Components** step of the installation wizard, you can also select the "I choose what to install" option by clicking on the selection list.



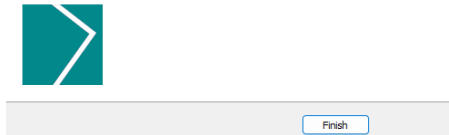
Here you have the option to exclude individual components from the installation by removing the check mark in front of them, or to select components for installation that are not installed by default if you place the check mark in front of them.

The core components of the software cannot be deselected.

Completing the zebris FDM Setup Wizard

Setup has finished installing zebris FDM RC on your computer. The application may be launched by selecting the installed icons.

Click Finish to exit Setup.



After the installation is completed, the shown window appears. Click **Finish** to complete the installation .

2.3 Data backup by the user

Data backup is essential in modern IT systems to prevent data loss (e.g. caused by power failure, program crashes, wear and tear of the storage media used).

The manufacturer therefore recommends that a professional system is used to make periodic, automated backups of the database. Please note in particular that the system allows data to be restored at any point in time ("incremental backup"), as data loss may not be noticed until late.



Users of this software are responsible for regularly backing up patient data.

Software installation and activation

The zebris FDM database is located in the user data directory:

(Windows 10)

C:\ProgramData\zebris\zebris FDM



ProgramData is a hidden folder and must be made visible beforehand.

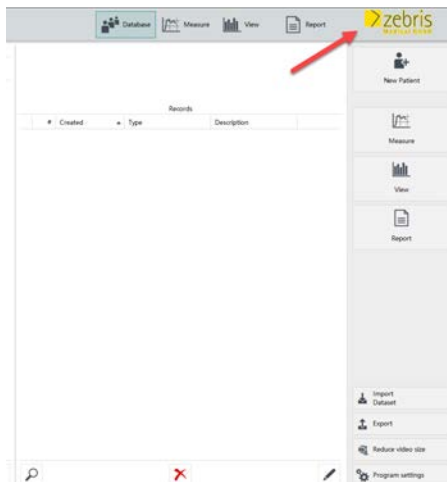
Please note that this path may differ if the additional option "external database" is purchased, as here the database can also be stored on network drives. The setup and also the definition of the storage location of an external database is done by the user.

2.4 Update Installation

zebris provides regular updates of the zebris FDM software. Within these updates, improvements are implemented and bugs are fixed.

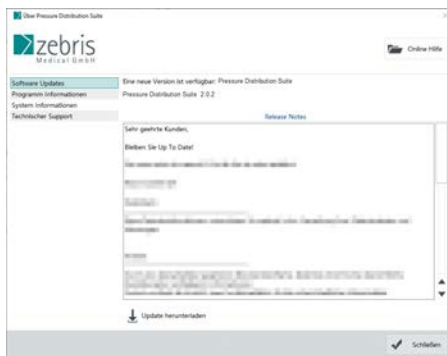


A software update is available when the zebris - logo is highlighted in yellow.



Clicking on the zebris - logo opens the About dialog of the zebris FDM software.

Software installation and activation



In the about dialog, the release notes or changes of the update version are displayed.

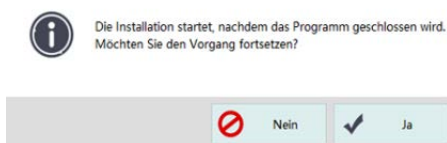
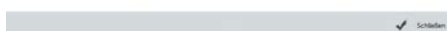
Click on **Download update** to obtain the update.



After requesting the download directory, the download will start automatically. In the meantime you can continue to use the software as usual. You also have the option to cancel the download at any time and continue at a later time.



After a successful download, you can install the update directly or at a later time. Click **Install Update** to start the installation.

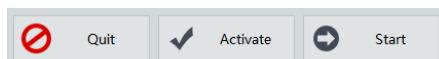


The prompt again ensures that you want to run the installation now. Click **Yes** to start the installation .

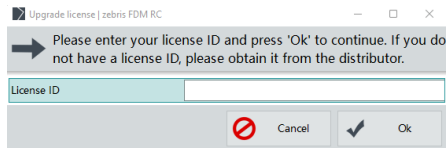
2.5 Activate software

The software can be started 30 times.

The installation file contains a selection of modules for unrestricted use for 30 starts, after which the software must be activated.

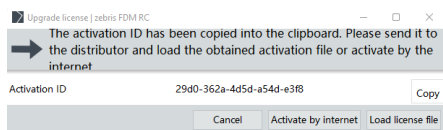


Software installation and activation



To do this, enter the license code (8-digit, e.g. 1234-5678) that you purchased when you bought the software. You will find this license code on your USB data carrier of the software and in your order documents of the zebris system. If you purchased the device through a dealer, you will receive the license code directly from your dealer.

Then you have two options for activation, as described below.



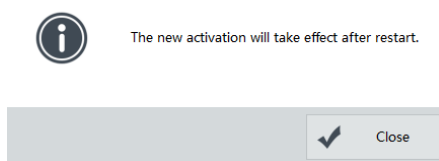
Via Internet

Click **Activation via Internet**. Activation is fully automatic after checking the activation code provided by the software and comparing it with the registered licenses. If the check is negative, a corresponding message appears.

Offline

Activation is performed by sending the activation code displayed by the software by phone/fax/email/mail.

1. You will receive a 20-digit activation code. Please send this code to your dealer.
2. You will then receive a license file, which you can make available on the computer to be activated, e.g. via USB stick.



Then click on **Open license file** in the dialog window shown, select the license file received and confirm. After an automatic restart of the software, the activation is completed.



Please note that activation is per computer (workstation) and the number of activations is limited to 3 workstations by default. Additional activations can be purchased upon request through your reseller.

About zebris FDM

3 About zebris FDM



Clicking on this icon opens the About dialog. Here you can find information about the technical support, the software license, the update status and the PC system.



Program Information

The functionality and the application of the software are briefly described. Furthermore, the software version, the active license and manufacturer information can be viewed here.

System information

Information about the operating system and graphics hardware used is displayed here.

Technical Support

Contact details and further information about technical support are listed here.

4 Instructions for use



The zebris FDM software and hardware usage instructions can be viewed via the question mark.

Alternatively, you can press the F1 key to open the manual center.



All manuals including software release notes and quick start guides are available here as PDFs. These files are copied to your computer during installation, so no Internet is necessary.

Operating concept

5 Operating concept

The operation of zebris FDM is intended to be as intuitive as possible, so that it is easy to get started, but there are still more functions available for advanced users.

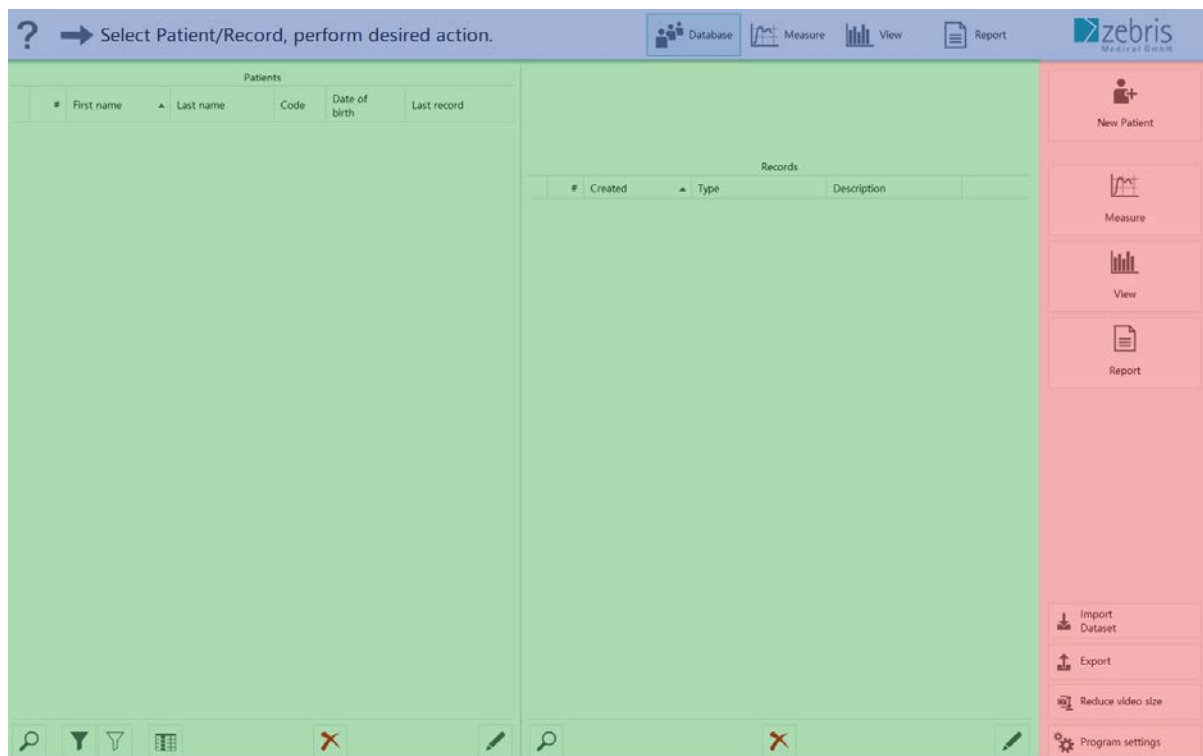
To achieve this, the user interface is divided into three functional areas and standard elements such as selection lists are used throughout.

The three areas are colored correspondingly in the following image.

The area highlighted in **blue** contains instructions for the current screen and offers a quick overview of which work step is active at the moment by means of the colored navigation buttons.

The area with the **red** background contains the main functions in the current screen, as well as extended functions at the lower edge.

The **green** area shows the actual content for the current work step. Special functions are explained in this manual for each module.



Operating concept

Database



The database contains possibilities to create, edit and remove patients. Likewise, recordings, comments and descriptions can be added, adjusted and removed.

An **export/ import function** allows large amounts of data to be archived and reused at another time.

Measure



After creating or selecting an existing patient, this button takes you to the module selection. Here you can see all modules that you can use with your license.

You can make device and exposure settings. You can navigate through the application using two control elements.

View



The currently selected recording is opened for viewing and editing.

Here you can export image and/or video data of the measurement.

Report



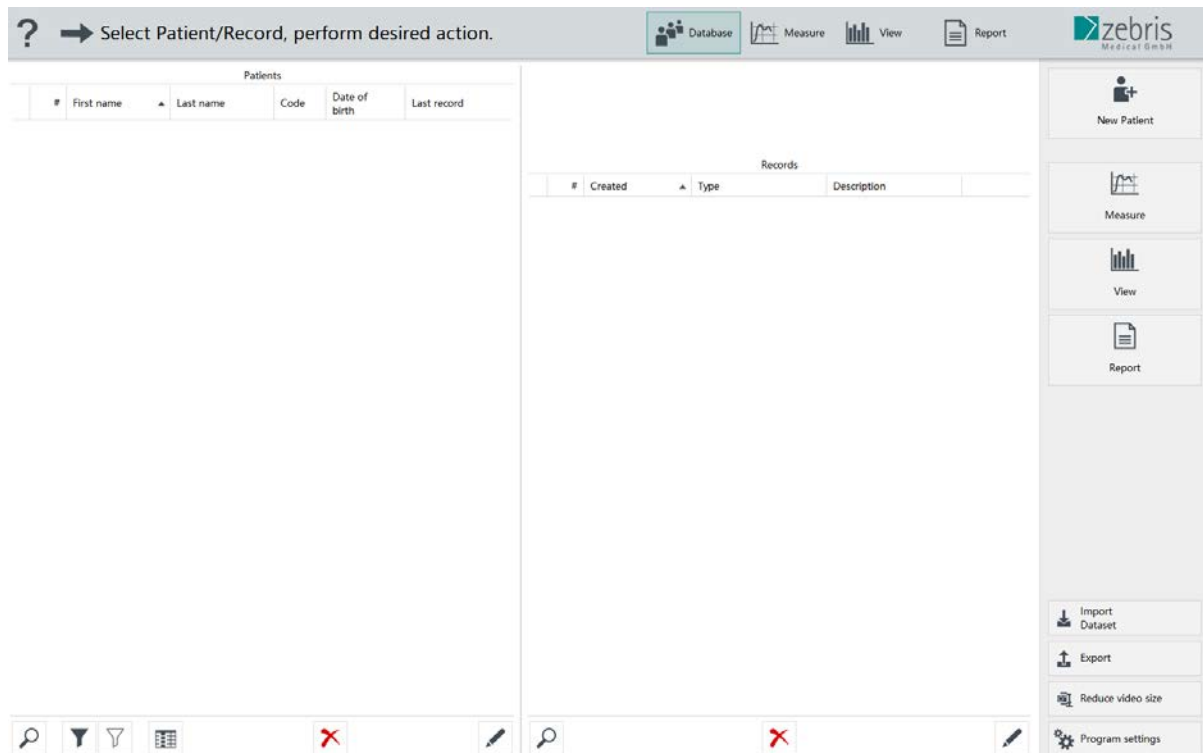
The results of the currently selected exposure are clearly displayed. The report offers a print function and a PDF export.

Here the data can be exported as CSV.

Database

6 Database

After starting the program, you will find yourself in the patient database.

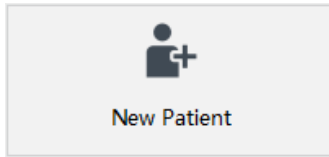


Here you can manage patients as well as existing records and have access to import and export functions. Below you will find a detailed description of the user interface.

Database

6.1 Patient file / New patient

This section explains how to create a new patient or edit an existing patient record.



Click on **New patient** to create a new patient file.



Click **Edit patient information** to make changes to the patient file.

The following dialog box appears:

A screenshot of a "New Patient" dialog box. The title bar reads "New Patient" and includes standard window controls. Below the title bar is a gray header with a right-pointing arrow and the text "Enter properties of a new patient here." The main area is divided into several sections: "Properties" on the left, "Patient picture" on the top right, "Comments" on the bottom left, and "Text clips" on the bottom right. The "Properties" section contains text input fields for "First name*", "Last name*", "Code", "Shoulder height, cm", "Body weight, Kg", "Leg length left, cm", "Leg length right, cm", and "Shoe size". It also has radio buttons for "Gender*" (Male, Female, Other) and a date picker for "Date of birth*" with the format "dd/mm/yyyy". A note at the bottom left of this section says "* - mandatory field". The "Patient picture" section has icons for taking a photo, opening a folder, and deleting, along with a "Labels" checkbox. The "Text clips" section has an "Add" button and a "Rename" button. At the bottom of the dialog are "Cancel" and "Ok" buttons, each with a corresponding icon (a red circle with a slash and a checkmark).

Database

6.1.1 Properties

Properties	
First name*	<input type="text"/>
Last name*	<input type="text"/>
Gender*	<input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Other
Date of birth*	<input type="text"/> dd/mm/yyyy <input type="calendar"/>
Code	<input type="text"/>
Shoulder height, cm	<input type="text"/>
Body weight, Kg	<input type="text"/>
Leg length left, cm	<input type="text"/>
Leg length right, cm	<input type="text"/>
Shoe size	<input type="text"/>
Shoe size left	<input type="text"/>
Shoe size right	<input type="text"/>
Foot size left	<input type="text"/>
Foot size right	<input type="text"/>
Email	<input type="text"/>

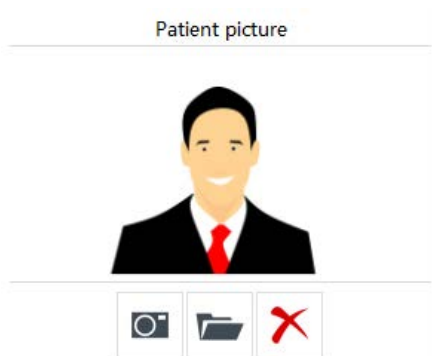
Patient properties

Please enter the patient data here.
Mandatory fields are marked with an *.

The "Code" field allows you to assign a unique identifier to the patient entry.

6.1.2 Patient picture

You can use this field to assign a picture to the patient files.



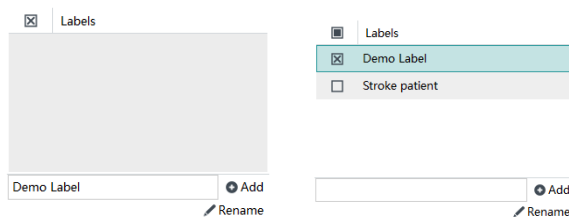
Take/ open/ remove new photo

You can use the buttons either to open a connected camera and take a photo of the patient, or to open an image that is already loaded on your workstation. You can also delete the existing image.

6.1.3 Labels

You can use this field to assign the patient to labels.

In the database, you then have the option of displaying only patients of a specific label.

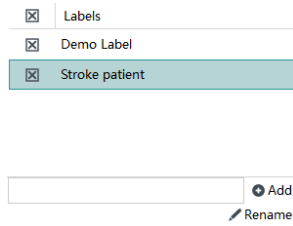


Create new label

Enter the name for the new label to be created here and click **Add**.

The newly created label appears in the list. The cross in front of it indicates that the patient is assigned to this label.

Database



Assign patient to several labels

Click on the checkbox to make or cancel the assignment.

Labels that are no longer assigned to a patient automatically disappear after you exit the dialog.

If the patients are assigned to a specific label, you can display patients according to label membership in the [filter settings](#) ²⁶.

6.1.4 Comments & text clips

Comments

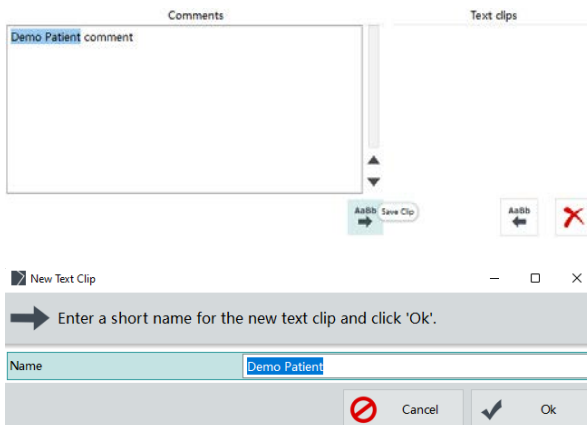
Write any free text here as a comment to this patient.

Text clips

This list contains all the text clips you have defined.



Add text clips



1. Mark text

In the "Comments" field, select the text section that you want to create as a text clip.

2. Save

Click **Save clip** button.

3. Enter name

In this dialog, you can specify a name for the text clip; your selection is automatically accepted as a suggestion.

Click **OK** to create the text clip and it will appear in the list with the specified name.

Database

Insert text clip

1. Set cursor position

Set the cursor to the position where you want to insert your text clip by left-clicking.

2. Insert text clip

Left-click to select a text clip from the list, then click **Insert** to move it to the current position in the comment field.



6.2 Patients

Patient list

The patients are listed here. The currently selected patient is highlighted.

#	First name	Last name	Code	Date of birth	Last record
1	Max	Mustermann		07/02/2022	29/03/2022 14:33
2	Erika	Mustermann		07/03/1972	

The patient list can be sorted according to each column by clicking on the column header.

#	First name	Last name	Code	Date of birth	Last record
1	Erika	Mustermann		07/03/1972	
2	Max	Mustermann		07/02/2022	29/03/2022 14:33

Database



Search patient

With Search, the patient database can be filtered via an input line and thus searched for a specific patient. The search window can be hidden by pressing "Esc" or clicking "Search" again.



Add/remove filter

The left button adds an individually configurable filter, the right button removes all applied filters from the database.



The filter function is a possibility to search very large databases in a targeted way.



Columns

You can select which patient data you want to display in the software.



Edit patient record

Clicking on "Edit patient record" opens the patient record. In it you can make changes to the stored patient data.



Delete patient

After a separate confirmation, the patient is **irretrievably** deleted together with the records assigned to him .

6.2.1 Filter

Add parameters at this point to filter all entries in your database and display only the relevant patients/ records.

Name contains

Insert the entire name or parts you know of it here.

Gender

Choose between the options "Female", "Male" and "Other" or "All".

Date of birth after/ before

Narrow down the age of the patient you are looking for by date of birth.

Code includes

If you use the code field to uniquely assign patients, you can use these codes or parts of them to filter the complete database.

Last record after/ before

Database

Limit the recording period of the recordings you are searching for.

Groups includes

If you have assigned the patients in your database into groups, you can use this information to filter the complete database.

6.3 Records

#	Created	Type	Description
1	12/04/2016 10:13	Stance Analysis	shoes, no video
2	12/04/2016 10:22	Stance Analysis	barefoot, no video
3	12/04/2016 13:35	Gait Analysis FDM-T	barefoot, 2 cams, 1.5km/h
4	12/04/2016 13:39	Gait Analysis FDM-T	shoes, 2 cams, 1.5km/h

List of records

All records of the currently selected patient are listed here. The currently selected record is highlighted.

#	Created	Type	Description	Indicator
1	13.04.2016 14:49	Gait Analysis FDM-T	EMG + Video	
2	13.06.2022 11:40	Gait Analysis FDM-T		

Indicator

Records that include video, marker tracking or EMG information in addition to pressure measurements are marked accordingly.



Delete record

After a separate confirmation, the selected record is irretrievably deleted.



Properties

Edit the description and comments for the record here (see Record details [27](#)).

6.3.1 Record details

You can open this dialog by clicking on **Edit record information** on the right below the list of recordings.

Record Properties

→ Edit properties of the record here.

Properties	
Type	Stance Analysis
Created	12/04/2016 10:13
Description	shoes, no video

Comments

Text clips

Cancel Ok

Type

The record type automatically results from which module you have used for measuring. The recording type cannot be changed

Created

The creation date and time is specified here. This value is obtained automatically and cannot be changed manually.

Description

After each measurement, you will be asked how the record should be described. The value entered there can be adjusted at any time.

Comments/ text clips

Database

Comments to the measurements can be entered here. Furthermore, text clips can be configured here or predefined text clips can be used. For more information, see [Comments & text clips](#) ^[24]

6.4 Import / Export data set



The zebris Medical GmbH expressly points out that the user is responsible for backing up data. zebris also recommends creating a regular backup of the patient database.

The zebris FDM database is located in the user data directory .

Windows 10:

```
C:\ProgramData\zebris\zebris FDM.
```

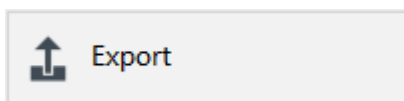
ATTENTION! ProgramData is a hidden folder and must be made visible beforehand.

6.4.1 Export data set

You can export patient and measurement data from the patient database to zebris's own "zebdb" format.

This gives you the option of exchanging individual data records, for example, with colleagues who also work with the zebris FDM software.

You can re-import exported data using the Restore function (see [Importing data \(Restore\)](#) ^[28]). Furthermore, backup copies of the database can be created in this way.

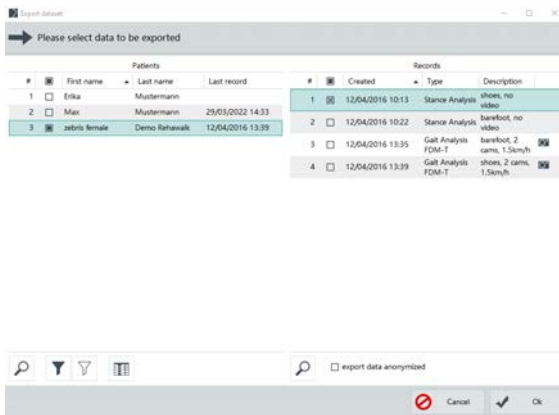


Click the **Export** button at the bottom right of the toolbar.



Select **Dataset (zebdb)** to export the desired data from your database.

Database

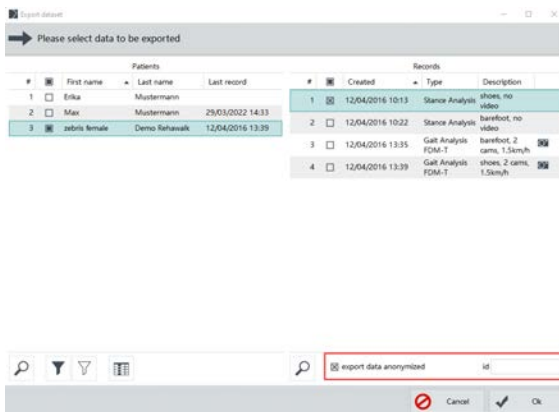


Select records

Place check marks in front of all data sets you want to export or save.

If you want to export or save all measurements of a patient, simply click the checkbox in front of the patient name.

If you click in a line with a patient name, all measurements of the patient are displayed on the right side. You can then also select these individually.

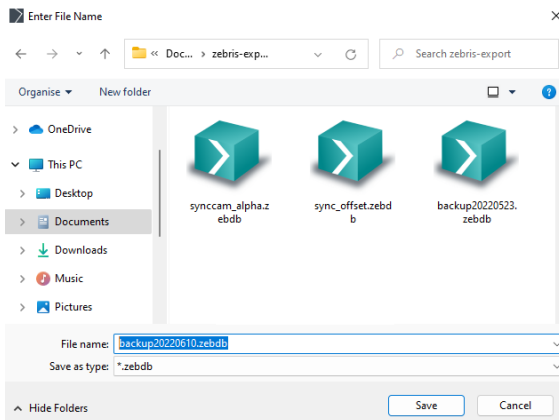


Anonymized data export

If the checkbox **Export data anonymously** is activated, you can pass on measurement data or recordings anonymously to third parties. The first letters of the first and last name are retained.

First name and surname thus consist of the first letter of the original name + the individual ID that you can define.

All other patient information is deleted. The admission description will be replaced by the defined ID.



Select destination folder

Navigate to the location on your hard disk where the exported file or the backup of the database is to be stored.

Assign a name and then click OK to go to the data selection.



In order to export a dataset, sufficient free memory must be available on the PC used. This should correspond to at least twice the data volume of the data set to be exported. Before exporting, make sure that this is free in the C:\ directory of your PC.

Database

6.4.2 Import data set

zebris-Own formats (.zebdb/.data)

If you want to import data from old or new software packages, simply select the corresponding file with the extension .zebdb or .data.

Old data (WinFDM/ WinFDM-T/ zebris FDM 1.18.x)

You can find the old database in your WinFDM/ WinFDM-T/ zebris FDM installation folder. Specifically, look for the database.db file .

The default paths to the database are

...for WinFDM-T "C:\Program Files\zebris\WinFDM-T\Data\Database.db"

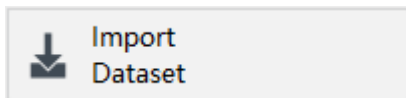
...for WinFDM "C:\Program Files\zebris\WinFDM\Data\Database.db"

...for zebris FDM 1.18.x "C:\ProgramData\zebris\zebris.fdm.data".

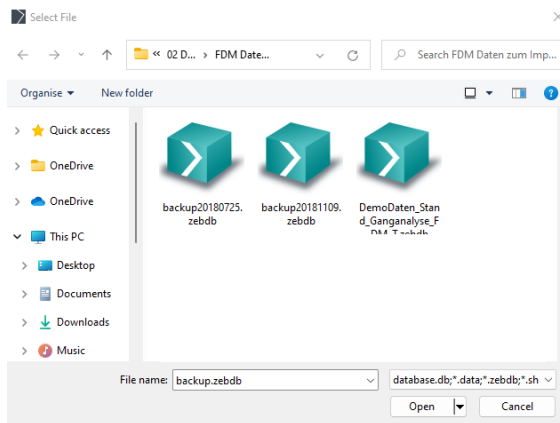
Alternatively, you can also copy the entire "Data" folder from the legacy software to a memory stick, for example, and import the data accordingly from this stick.

You can import existing patient and measurement data of different formats into the database.

The exact procedure for doing this is explained below:



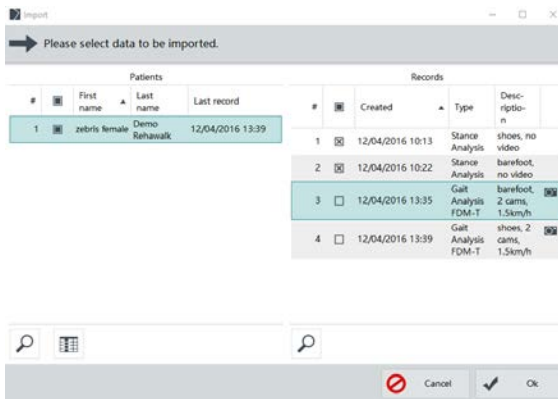
Click the **Import... Dataset(zebdb)** button at the bottom right of the toolbar.



Search & select data

On your hard drive or other storage media connected to your computer, locate the records you want to import. Which files you need to select depends on the format. For details (see Data Formats ³⁰).

Database



Selecting data sets

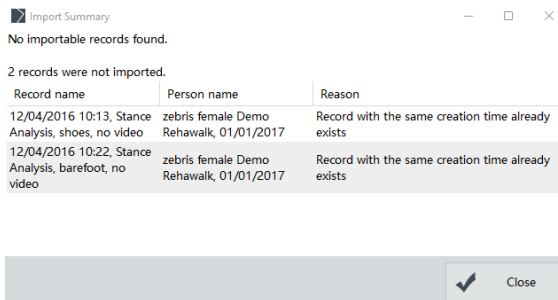
Place a check mark in front of all the datasets you want to restore.

To import all patients of a group or project, click the checkbox in the top column. If you want to import all measurements of a patient, just click the checkbox in front of the patient name. If you click in a row with a patient name, all records of the patient will be displayed on the right side. You can then select them individually.



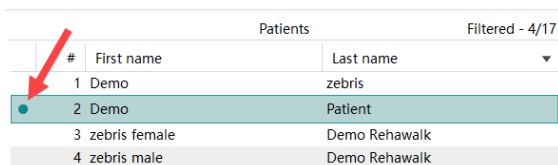
Results

After successful data import, the dialog shows you a summary of how many patients and records have been imported. The list shows incorrect datasets as well as patients and measurements that have already been created and therefore have not been restored. Project names from the old software are assigned to the patients as a group with the prefix "Project".



Errors/ duplicates

If errors occur during the import or if you want to import data records that already exist in your database, you will be shown a summary with corresponding notes.



Indicator before imported datasets

Newly imported datasets are marked with a dot in the patient or record list until the software is restarted.

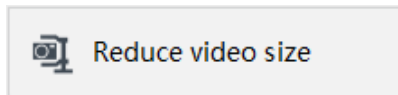


In order to import a dataset, sufficient free memory must be available on the PC used. This should correspond to at least twice the data volume of the data set to be imported. Before importing, make sure that this is free in the C:\ directory of your PC.

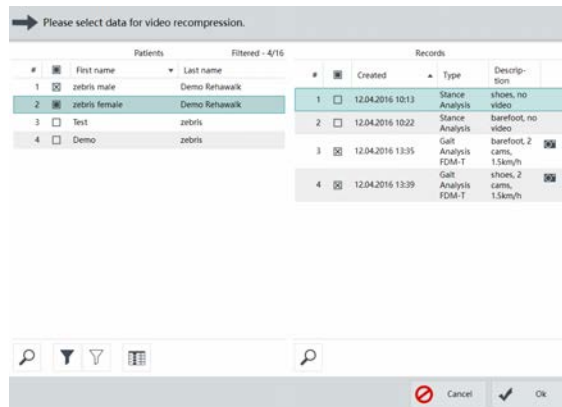
Database

6.5 Reduce video size

Video records can take up a lot of memory. Therefore, there is an option in zebris FDM to reduce the video file size without noticeable loss of image quality.



Click the **Reduce Video Size** button at the bottom right of the toolbar.



Select records

Select the records whose videos you want to compress. Several records can be selected at the same time.



10 file(s) recompressed. 101.8 MB freed.

After the compression process is finished, you will be informed about the size of the freed space.



Reducing the video file size can be performed only once per record. If you select it again, no additional storage space will be released.

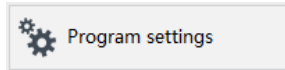


Attention: The compression process may take longer depending on the file size and cannot be aborted!

Database

6.6 Program settings

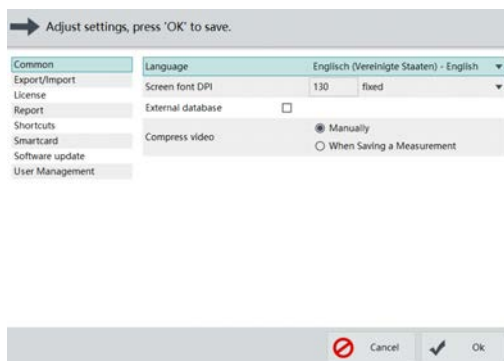
Under program settings, user-defined settings can be made, such as the selection of the language, definition of export paths, report individualizations, definitions of shortcuts, and much more.



Click **Program Settings**.

The available options are explained below.

6.6.1 Common



Common settings

Click **Common** on the left side.

Language

Select the desired translation of the program interface from the list.

Magnification factor

This factor determines the size of all display elements in the software. Select **Fixed** to enter your own value in the input field in the unit dpi.

Ratio **from screen size** can be used as an alternative to the dpi setting. **From system** resets the value to the Windows default.

External database

If you have purchased this feature with your license, you can create a database in another location here. The storage location must be available in Windows with a drive letter (e.g. external hard disk or network drive).

Check this box and then click the three dots to the right of the line to open the destination path selection. You can specify any name for the database and also create multiple databases. The extension .shared will be appended automatically.

Only one database can be used at a time.

If you remove the check mark again and confirm with Ok, the software is restarted and the local database created during installation is loaded.

Compress videos

You can reduce the data volume of your records with zebris SYNCCams by automatically compressing recorded videos after each recording.

Database

To do this, select **When saving each measurement** here. This has the effect that the videos of a record are compressed directly during the saving process.

Alternatively, you can manually compress individual recordings as described in [Reduce Video Size](#).

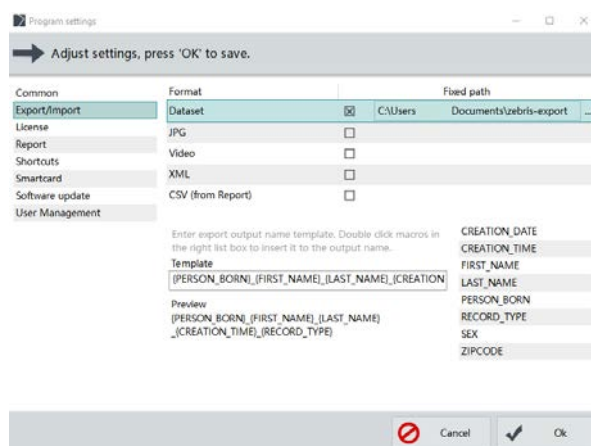


Automatic compression of video recordings after each measurement may increase the duration of the storage process.

6.6.2 Export with default paths

You can specify a destination folder for each available export function.

If this setting is active, the Save dialog ("Enter file name") is no longer displayed and the files are stored directly in the specified folder.



Fixed paths

Activate the checkbox and select the desired directory for the backup of the corresponding format.

Confirm the entry with **OK**.

Template for file names

In the text field you can define a template for naming the automatically saved exports.

Use the text modules from the right list. These can be complemented with manually entered characters and numbers.

If you have not set a fixed folder, a dialog appears where you can specify the location and name of the export file.

Enter a different file name or simply click **Save** to accept the displayed suggestion.

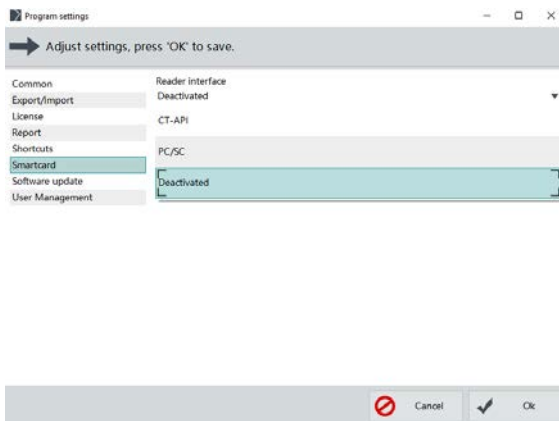
6.6.3 Smartcard

Here you can set up your smartcard reader for the use of KVK or eGK. The prerequisite for this is a Smartcard reader for the eGK or special readers for the KVK, such as chip card keyboards from the German manufacturer Cherry. The type of interface can be found in the manufacturer's specifications for the reader.

The electronic health card (eGK) works with the card reader built into the zebris HP notebooks (right side) without further installation (default setting).

The old insurance card (KVK) only works with the CT-API driver installed.

Database



Select the **Smartcard** entry on the left side.

Select interface

On the right-hand side, select the interface or the device with which you are reading in the KVK or eGK:

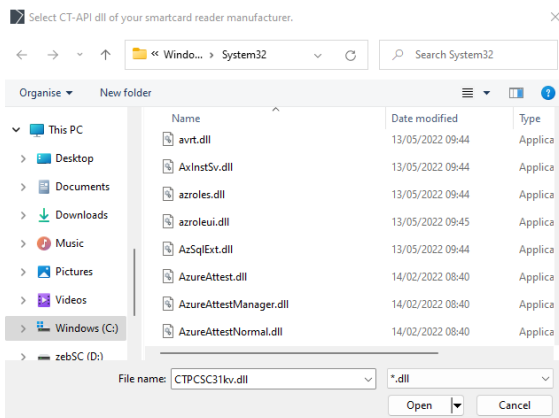
- PC/SC for eGK
- CT-API for KVK and eGK

If you have selected PC/SC, confirm by clicking Close.

CT-API

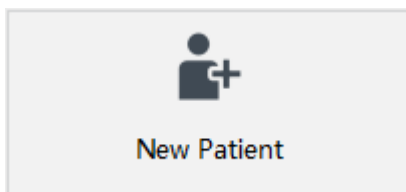
CT-API can read both KVK and eGK. The default suggestion is the driver of the EHEALTH-BCS keyboard G87-1504 from the manufacturer Cherry.

Click **Browse** to select the corresponding dll file of your CT-API driver.



1. Select driver dll

Select the appropriate CT-API driver on your hard disk. Please refer to the card reader manufacturer's manual for details.



2. Insert card

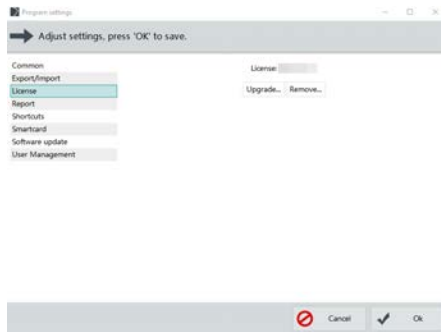
Insert a card into the reader.

3. Create new patient

Click New Patient and the card data will be inserted automatically.

Database

6.6.4 License



This shows you the currently activated license, or how many times the software can still be started before you need to activate.

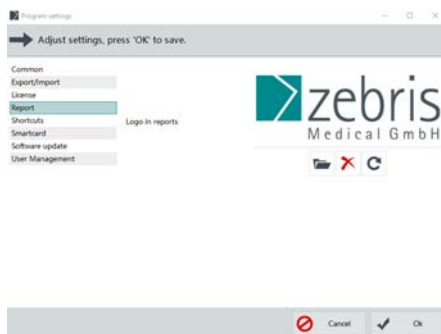
Upgrade license

In the right window the current user license is displayed. To upgrade/ renew the license, please click on the "Upgrade..." button.

Remove license

If you want to remove the used license from this device, please select the "Remove..." button.

6.6.5 Report



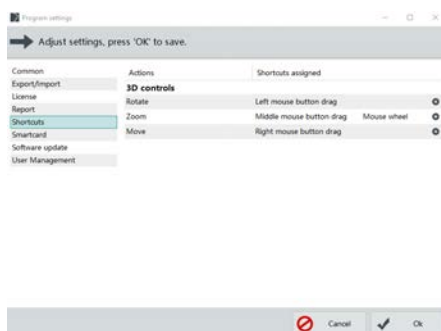
Logo in reports

Click on **Report** on the left side.

Here you can click on the folder icon to select the logo graphic that will appear in the header of all reports.

Click on "**Clear**" to display no logo graphic, or on "Default image" to restore the original graphic.

6.6.6 Shortcuts



Select shortcuts

Define here which keys you use to move 3D graphics (display of pressure distributions) in space.

Database

6.6.7 Software Updates



Software Update

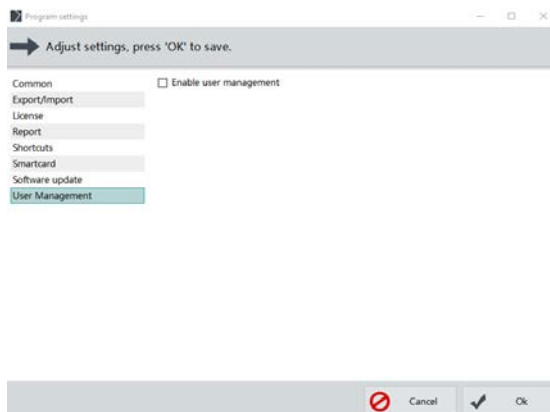
When software updates are available, you have the following options:

- Notification when an update is available
- Automatically download with notification at program start
- Never check for updates

We recommend the setting **Notify me**. This way you will always be kept up to date and still have the option to skip the update/installation.

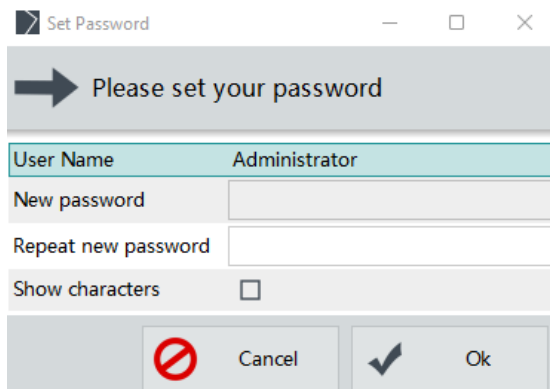
6.6.8 User management

When user management is active, the software can only be used with a password-protected user login. How to set this up is explained below.



Activate user administration

Activate the **Enable user management** checkbox.

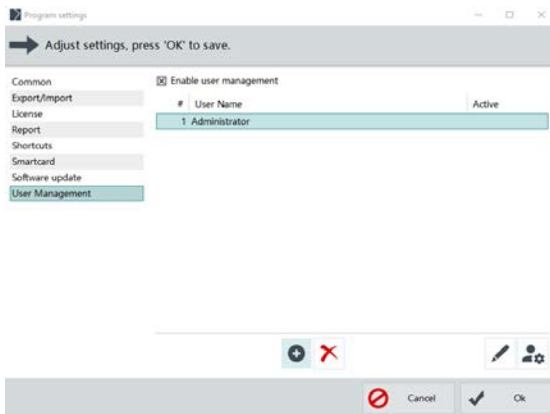


Set password

Enter your desired password and repeat it.

To check your input you can activate **Show characters**.

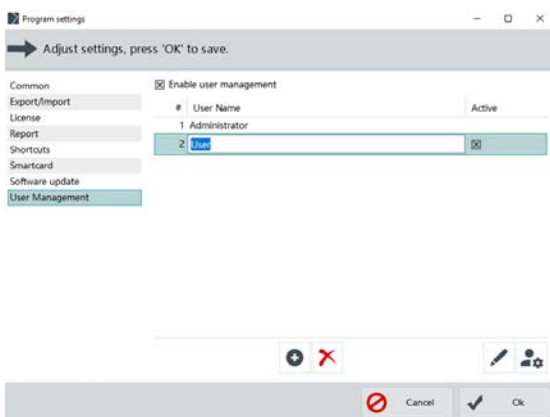
Database



Add user

The first created user is always administrator of the user management.

By clicking on **Create new item** more users can be added.

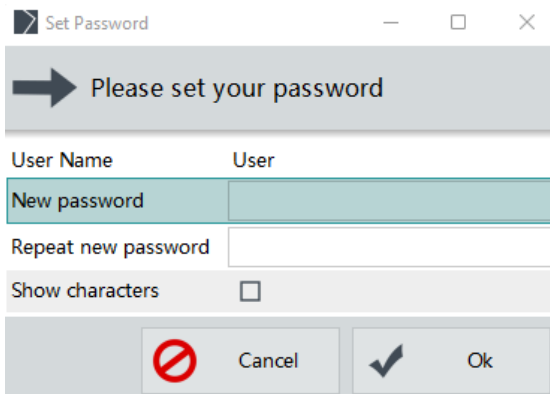


Customize the user information

Users can be renamed and deactivated.

Deactivated users cannot be selected in the login dialog.

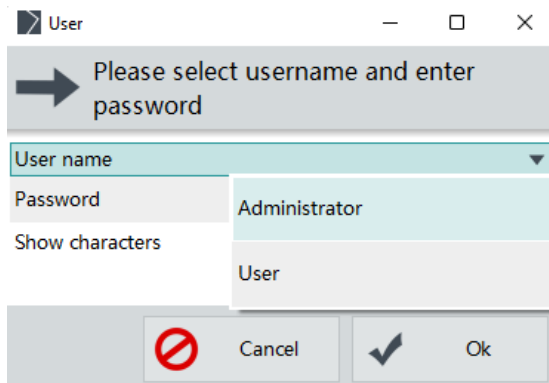
Users that are no longer needed can be deleted.



Set password

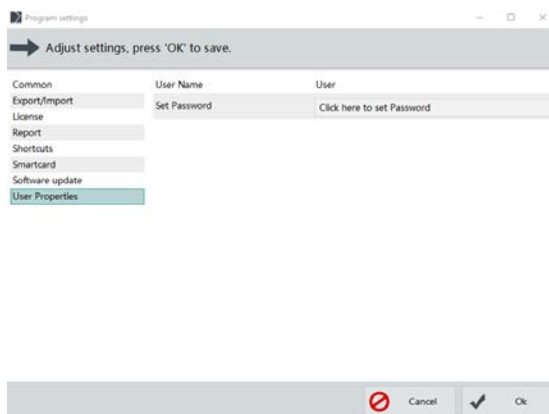
Via **Edit properties of the selected element** the password of the selected user can be added or changed.

Database



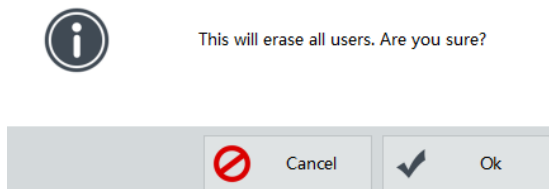
Login

Every time the program is restarted, the user login appears before the database is opened. Active users can be selected here.



User properties

Users who do not have administrator rights can change their password via **user properties** in the program settings.



Deactivate user administration

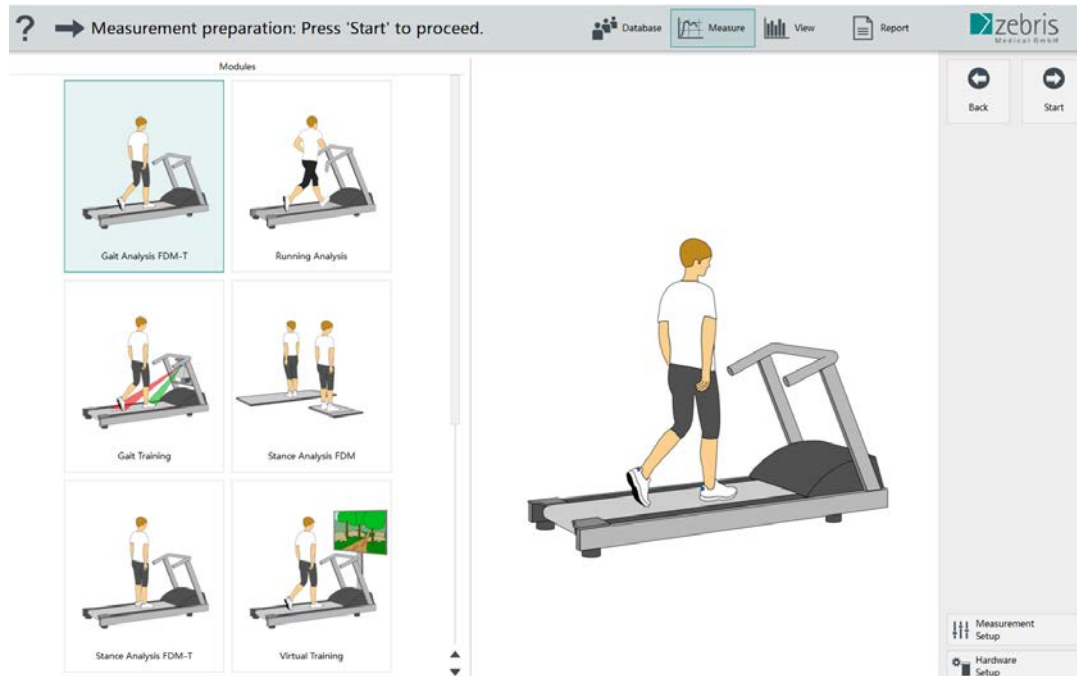
By deactivating the **Enable user management** checkbox, the **administrator** can remove the user management.

This will delete all created users and passwords. This cannot be undone.

7 Measure

7.1 General

Click on Measure to go from the database to the module selection. All modules are displayed, which were purchased with the system. The system is software and hardware expandable.



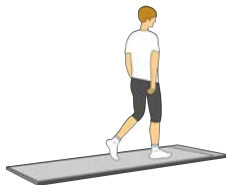
An overview of the currently available software modules can be found below:



Roll-off Analysis

Analysis of the pressure and force distribution of single roll-offs.

Included in the basic package.

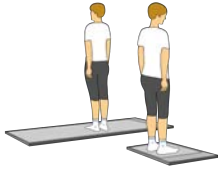


Gait Analysis FDM

Analysis of pressure and force distribution during walking and calculation of gait parameters.

Included in the basic package.

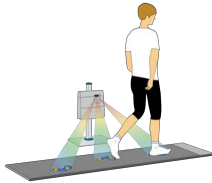
Measure



Stance Analysis FDM

For analysis of load distribution during standing.

Extension module.



Projector Gait Analysis

Analysis of pressure and force distribution during walking and calculation of gait parameters with simultaneous projection of pressure distribution patterns onto the measurement platform.

Extension module.



Gait Analysis FDM-T

Analysis of pressure and force distribution during walking and calculation of gait parameters.

Included in the basic package.



Stance Analysis FDM-T

For analysis of load distribution during standing.

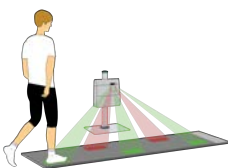
Extension module.



Running Analysis

Analysis of pressure and force distribution during running and calculation of specific running parameters.

Extension module.



Gait Training FDM

Gait training by projecting a step pattern onto the running surface. Setting of stride length, stride width and foot rotation.

Extension module.

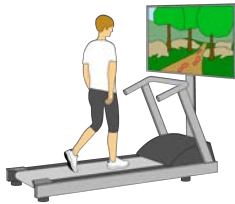
Measure



Gait Training FDM-T

Gait training by projection of a step pattern on the treadmill. Adaptive adjustment of stride length, stride width and foot rotation.

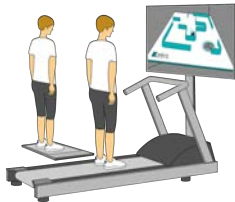
Extension module.



Virtual Training

Interactive treadmill training on a virtual forest path.

Extension module.



Balance Board

Playful training of coordination and balance skills.

Extension module.

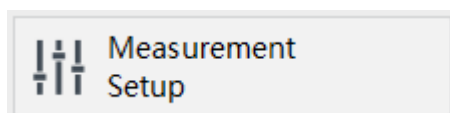
In addition to the listed software applications, zebris also offers further extensions within the purchased software module. Ask your supplier about additional application possibilities.

Before starting the measurement, measurement- and device-specific settings can be made depending on the module.

7.2 Measurement settings

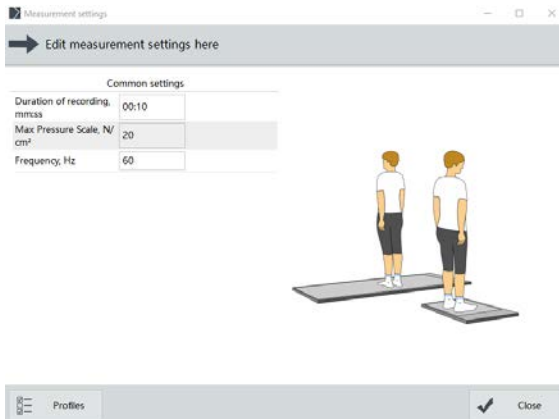
Depending on the selected measuring module, different measuring settings are possible.

Select the desired measurement module and click on "**Measurement setup**" at the bottom right to access the settings.



Corresponding settings are made for each module individually. The most common parameters are explained here, details on module-specific settings can be found in the corresponding chapter for the module.

Measure



Duration of recording

After this time, the measurement is automatically terminated.

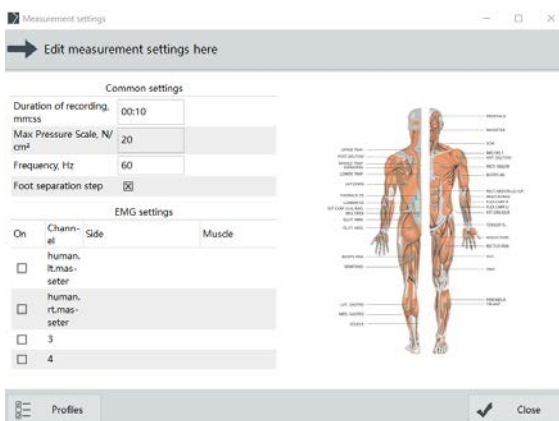
Maximum pressure scale

Determines the upper limit of the pressure scale during a measurement. The scale can be changed during the measurement by dragging the pressure scale.

Frequency

Determines the measuring frequency of the pressure distribution.

Click on "**Close**" to save the settings and return to the module selection.



Measurement of analog data

If the analysis is used in combination with the zebris DAB, further adjustment options are available in the measurement settings.

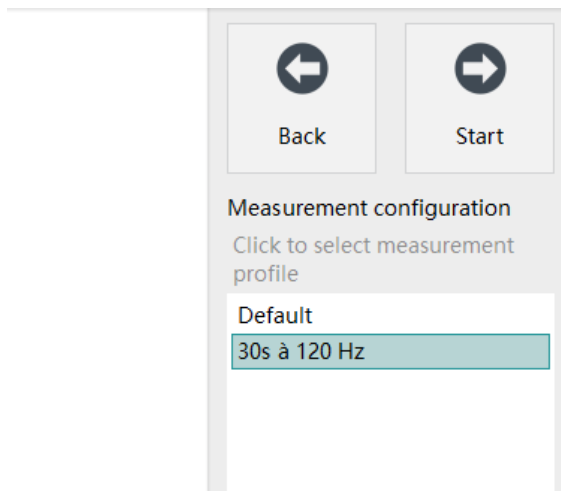
The prerequisite for this is that the WIDAB device (also DAB) is added in the device settings.

Set a check mark per channel you want to use. There are always as many channels displayed as are available in the device.

For each channel, select which side of the body it is and which muscle you are recording the EMG signal of.

The graphic shows the anatomical assignment of the abbreviations used.

Measure



Profile management

It is also possible to create measuring profiles here, as described under [Device settings](#)⁴⁴.

As soon as more than one measuring profile is available, a quick selection list with the available measuring profiles is displayed in the module selection. The colored profile is used for the next measurement.

7.3 Hardware Setup

7.3.1 Automatic device detection

Connect all devices to be used according to the operating instructions and switch them on.

As soon as you start the measurement, the system is automatically searched for the system intended for the selected measuring module.

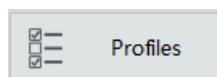
7.3.2 Add devices manually



1. Open the **hardware setup**.
2. The detected devices are listed on the right side. If a device is not visible after approx. 30 seconds, try switching the device off and on again.
3. To set up a device for measurement, select it on the right side with a click and then click the plus sign below. Alternatively, you can add the device by double-clicking on it.

Profiles

If you often switch between different settings, it makes sense to create device profiles.



To do this, click **Profiles** at the bottom left. This will display a list on the left side.

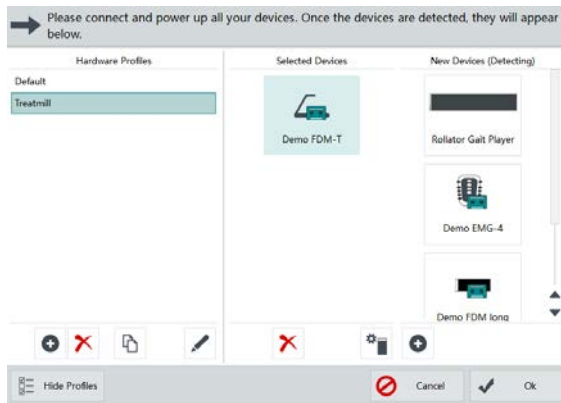


1. Create device profile

Measure

Click on **Plus** to create a new device profile. Select a suitable name for the created profile and confirm by clicking **Enter**.

Use the **Copy** function to duplicate the currently selected profile. Use the **Edit** function to subsequently adjust the naming .



2. Add devices

Now add devices to your new profile as described above.

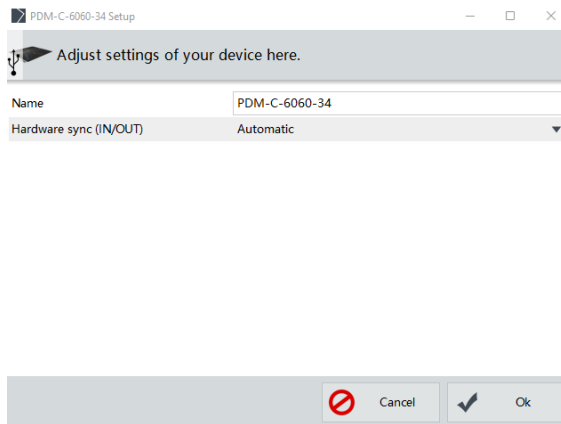
By selecting another profile in the list, you call up the device settings stored here and can thus quickly switch between different settings.

Confirm with **Ok** to save your settings.

Measure

7.3.3 Pressure measurement plates, instrumented treadmills

From the hardware setup, click on **Edit properties** to access the settings dialog for the currently selected device.



Name

Change the name of your device here if required. Multiple devices with the same name are not allowed.

Synchronization mode

If you want to synchronize your device with cameras, select the mechanism used here according to your camera system. This must also be set in the camera settings for correct function (see section 5.2^[48]), the default setting is "**Automatic**".



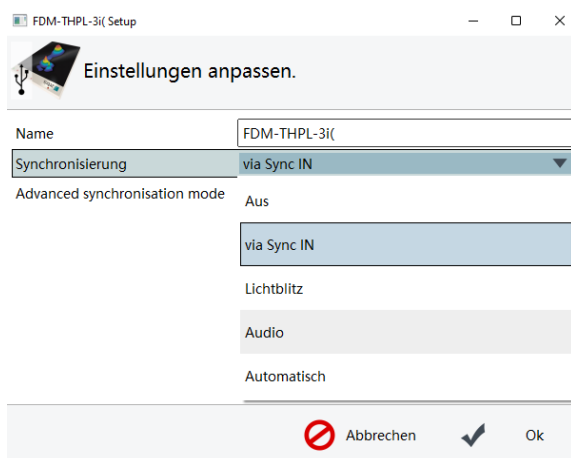
Please note that only the cable supplied with the cameras may be used for synchronization with camera systems.

7.3.4 Synchronisation via Sync IN

In zebris FDM it is possible to define the synchronization time using a single pulse from an external signal source.

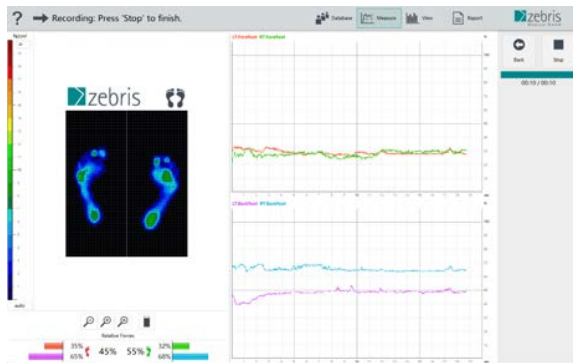
Events before this signal are shown with a negative sign in the time base, events after are shown with a positive sign.

To use this synchronization method in zebris FDM proceed as follows:



In the **device settings** of the zebris-device used, select the setting **via Sync IN** under **Synchronization** .

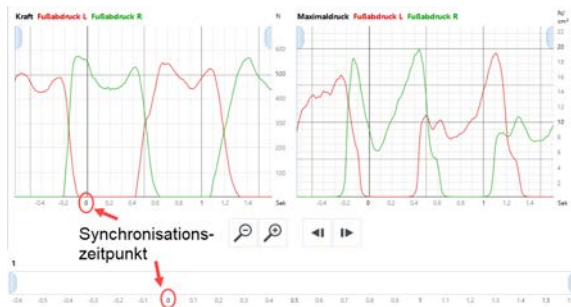
Measure



Start the recording in zebbris FDM as usual.

All data is recorded from the start of the measurement. As soon as the described signal is sent, the time base is set to 0 (zero).

The measurement continues until the set measurement duration has elapsed or can be ended manually via **Stop**.

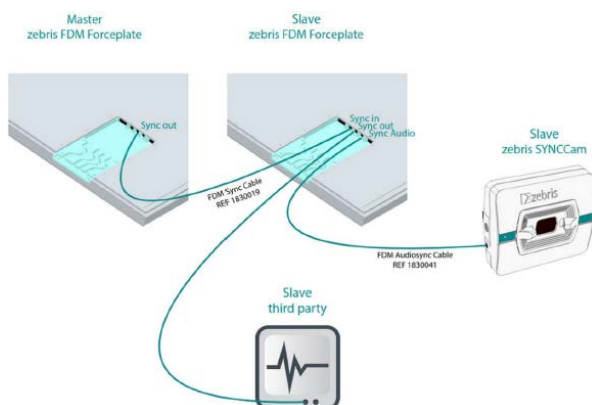


In the **view**, zero corresponds to the time at which the pulse signal was sent.



Weitere Informationen zur Verwendung der Sync-IN-Funktion entnehmen Sie bitte der Hardware-Gebrauchsanweisung ihres verwendeten zebbris-Geräts.

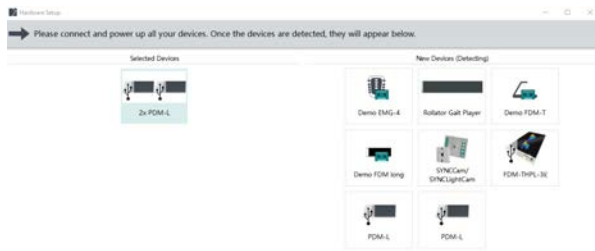
7.3.5 Multiple synchronized pressure measurement plates



Connect the plates as shown in the shown image. Then connect both devices to the power supply and both USB cables to the measuring computer.

Attention special case: Floor plates of the PDM-L series are not connected with a cable for synchronization, but only with the short edge (front side) flush against each other. In the center of the short edge there is a notch in which an optical synchronization is integrated. The following steps are identical with other plates.

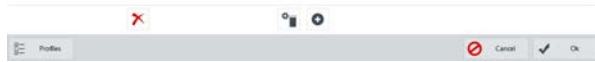
Measure



Switch to the **device settings**.

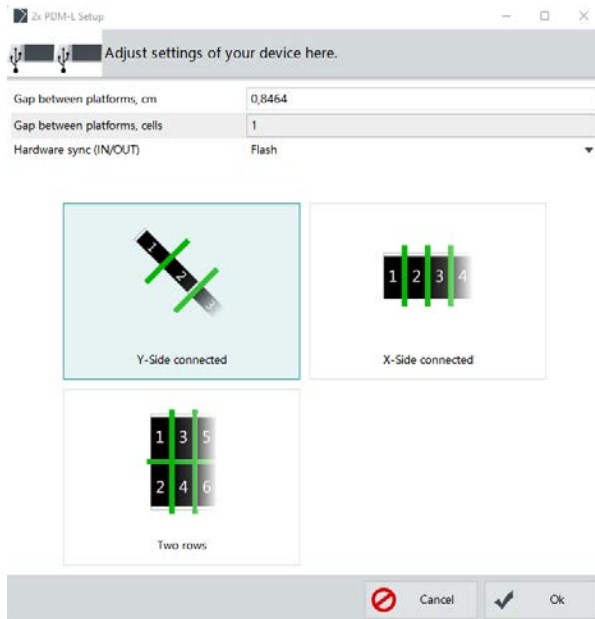
The measuring plates will first appear as single devices and after a short time another icon with two plates will be displayed.

Add this one to your selection like any other device.



Click on **Edit properties** to enter the **setup dialog**.

You can select the orientation of the plates to each other and set the distance between them. No measurement takes place in the gap between the plates (measure from outer edge to outer edge). This gap appears as a black sensor area in the measurement.



Please also note that the sensor area does not extend to the edge of a plate, but there is approx. 3cm frame to the long outer edge and approx. half a sensor width at the short edge (at the side without logo plate).

A special case are two plates, which are placed together at the front side (called long side in the picture). Here, only one sensor line is missing, which is automatically interpolated with the appropriate setting.

7.3.6 Cameras

The default settings are sufficient for using the cameras, but you can make additional settings according to your requirements, which, among other things, influence the image sharpness, quality and the usable image section.

You have to make the settings once for each added camera. The settings dialog box opens automatically when you add a camera. On the right side of the window you can see a preview image of the camera to check your settings directly. With "Ok" your settings will be saved.

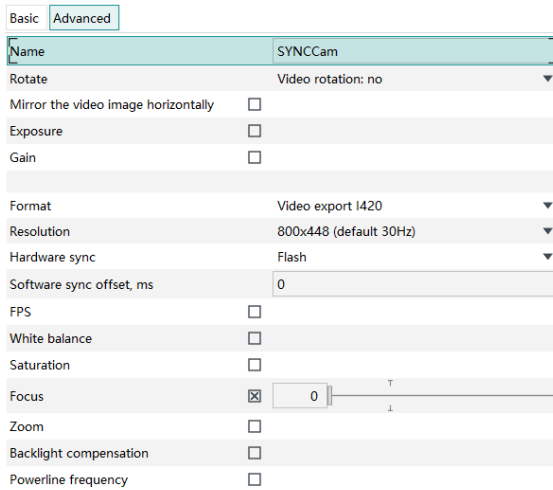
You can also open the settings at any time by double-clicking on the camera or the button **Edit properties** of the device.



Please note that the simultaneous use of two different modes for synchronization is not possible (e.g. audio and flash).

The synchronization settings must be made in the same way both in the camera settings and in the configuration of the pressure plate.

7.3.6.1 SYNCCam/ SYNCLightCam (USB)



Basic		Advanced	
Name		SYNCCam	
Rotate		Video rotation: no	
Mirror the video image horizontally	<input type="checkbox"/>		
Exposure	<input type="checkbox"/>		
Gain	<input type="checkbox"/>		
Format		Video export I420	
Resolution		800x448 (default 30Hz)	
Hardware sync		Flash	
Software sync offset, ms		0	
FPS	<input type="checkbox"/>		
White balance	<input type="checkbox"/>		
Saturation	<input type="checkbox"/>		
Focus	<input checked="" type="checkbox"/>	0	
Zoom	<input type="checkbox"/>		
Backlight compensation	<input type="checkbox"/>		
Powerline frequency	<input type="checkbox"/>		

Name

Enter a unique name for your camera here, e.g. the position of the camera. This name will be displayed later in the analysis and in the report.

Rotate

Here you can rotate the image in 90° steps.

Mirror horizontally

If this checkbox is active the video image is mirrored horizontally.

Gain

Brightens the image additionally. Image noise increases at higher values.

Exposure

Here you can set the exposure time. Longer exposure means a brighter image, but also blurrier movements. Ideally, you should set this value in measuring conditions and work with a setting that is as dark as possible, which you can lighten slightly with the Gain slider.

Format

Select the "MJPEG" setting for smooth recordings. Other values may result in image loss during transfer, as the amount of data transferred becomes larger.

Resolution

Image size of the captured video in pixels. In addition, some settings change the visible section of the image.

FPS (=Frames Per Second)

Set the desired number of frames per second here. If you press Enter after entering or if you leave the field, your setting will be checked by the camera and, if necessary, reset to the next available value.

Video synchronization

To use the synchronization via built-in LED, set "Flash" here. Please note that you must also make this setting in the device settings of the zebris FDM system used.

Software sync Offset

For synchronizing the camera images with a constant offset.

White balance

Makes the image appear rather cold (bluish) to warm (yellowish).

Measure

Saturation

Determines the intensity of the colors in the image, the smallest setting makes the image appear in grayscale.

Backlight compensation

Uses the camera's function to compensate backlight.

This can only be used with original camera settings.

Focus

Set the focus here. A setting here overrides the automatic system.

Powerline frequency

Filters flickering caused by artificial lighting, for example.

This can only be used with original camera settings.



The camera has automatic focusing (close-up to infinity) and white balance (for natural colors).

However, as soon as a check mark is placed in front of the corresponding function, control is manual via the slider.



For recording fast movements using a separate light source, set the "Exposure" to the smallest possible value.

The "Gain" slider can then be used to optically brighten the image again.

7.3.6.2 SYNCCam HS

Name	SYNCCam HS
Rotate	Video rotation: clockwise
Formats	640x480 @ 120 Hz
Exposure	<input type="checkbox"/> 640x480 @ 120 Hz
Gain	<input type="checkbox"/> 1280x720 @ 90 Hz
Software sync offset, ms	1920x1080 @ 60 Hz
Video sync	
Audio device	[None]
White balance	<input type="checkbox"/>
Saturation	<input type="checkbox"/>
Focus	<input checked="" type="checkbox"/> 0
Zoom	<input type="checkbox"/>
Backlight compensation	<input type="checkbox"/>
Powerline frequency	<input type="checkbox"/>

Basic	Advanced
Name	SYNCCam HS
Rotate	Video rotation: clockwise
Formats	640x480 @ 120 Hz
Exposure	<input type="checkbox"/>
Gain	<input type="checkbox"/>

Your selection cannot be applied (fps). Please check your USB connection/port.

For the SYNCCam HS, resolution and FPS are limited to the following combinations:

1920x1080 Pixel (Full HD) @ 60 Hz

1280x720 Pixel (HD) @ 90 Hz

640x480 Pixel (VGA) @ 120 Hz

This message indicates that the selected frame rate cannot be achieved. Make sure that you are using the supplied USB cable and that it is plugged into a USB 3.0 slot on your PC.

Measure

7.3.6.3 SYNCLightCam HS

Name	SYNCLightCam HS
Rotate	Video rotation: no
Video sync	<input checked="" type="checkbox"/>
Lens	<input checked="" type="radio"/> Other <input type="radio"/> Lens 1
Configure	<input checked="" type="checkbox"/>
FPS	120
Resolution	640x480
Shutter time limit, s	1 / 500
Gamma	1,2
Gain	<input checked="" type="checkbox"/> 8,35

Configure

Here you can show or hide the advanced configuration.

Resolution

Select the image size (resolution) of the recorded video here.

Gamma

Brightens the image additionally, higher values decrease the contrasts (light-dark differences) in the image.

Name

Enter a unique name for your camera here, e.g. the position of the camera. This name will be displayed later in the analysis and in the report.

Rotate

Here you can rotate the image in 90° steps.

Video sync

Check this box to use the integrated synchronization. Please note that you must set the "Flash" setting in the device settings of the zebrius FDM system used.

FPS (=Frames Per Second)

Set the desired number of frames per second here.

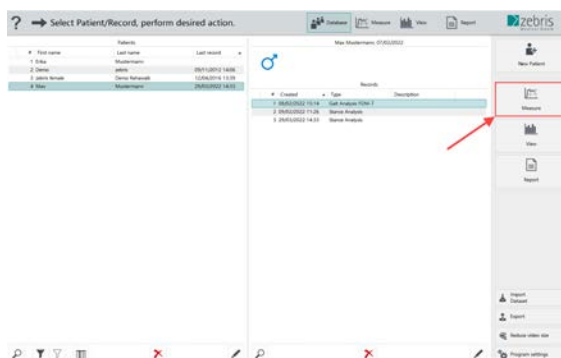
Shutter time limit, s

The number entered here limits the maximum time the image sensor is exposed per frame. Higher values result in sharper but darker images (because less light hits the sensor in a shorter time). Lower values result in blurred or blurred motion, but the image appears brighter.

Gain

Brightens the image additionally, the image noise increases with higher values.

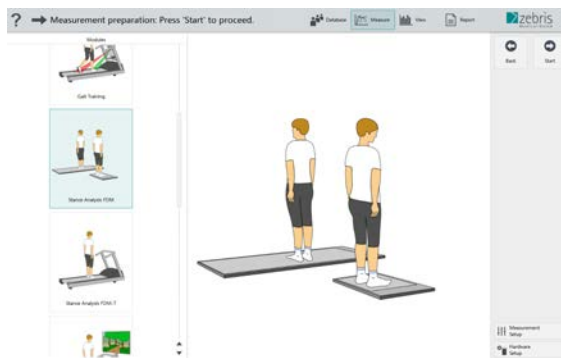
7.4 Performing a measurement



1. Database

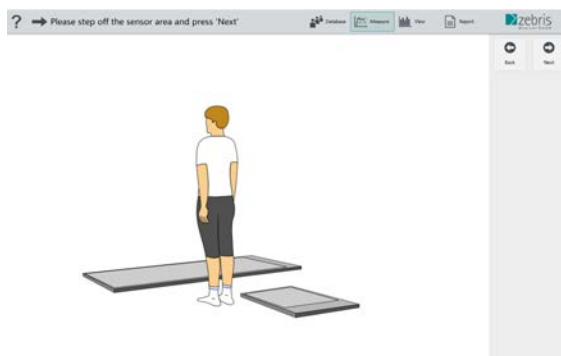
Select the desired patient in the patient list and click **Measure** in the right-hand function bar.

Measure



2. Module selection

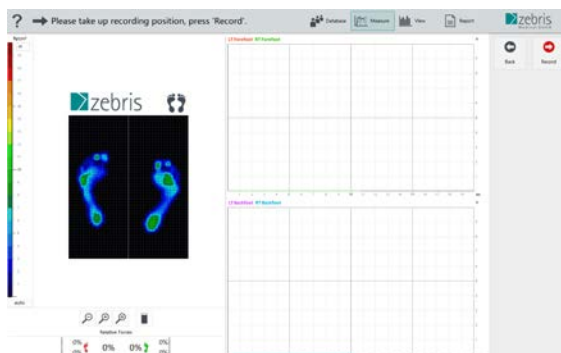
Select the desired module with one click on the corresponding tile and then click the **Start** button.



3. Preparation

Instruct your patient to stand next to the pressure surface in order to perform a calibration in an unloaded state.

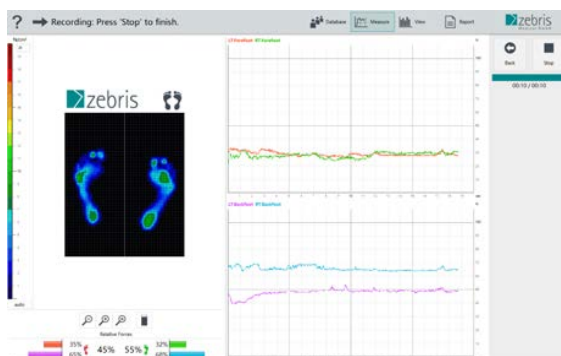
Click on **Next** to switch to the next work step.



4. Preview mode

In the preview mode you can use the connected systems without recording. Start the measurement by clicking on **Record**.

Please note the instruction text behind the arrow in the upper left corner. Some modules require an intermediate step here, which will be pointed out to you in the instructions.

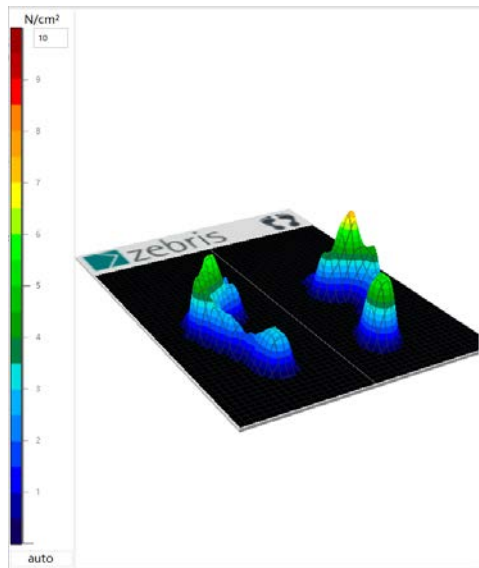


5. Recording

After starting the **Record**, the measurement data of all active devices are recorded over the preset measurement duration. For direct control, the data is displayed "live".

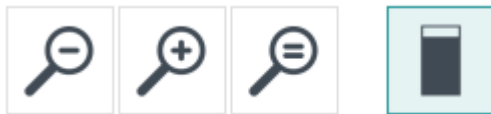
The green progress bar shows the elapsed measurement duration. The record can be stopped at any time by clicking the **Stop** button.

Measure



The **color scale** on the left of the measurement window allows the color assignment of the force effect on the individual sensors to the unit N/cm². The maximum value can be specified in the input field at the top left. By keeping the left mouse button pressed and simultaneously dragging the scale, the scaling can be changed.

In the left measurement window, the pressure distribution under the feet is displayed during the measurement, either two- or three-dimensionally color-coded. In **3D mode**, the view can be rotated to the desired position by holding down the left mouse button. By holding down the middle mouse button (wheel), the platform can be moved in 3D space.

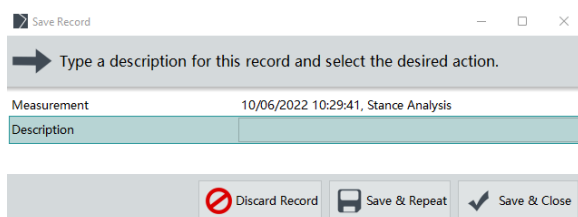


The magnifying glasses are used to zoom **in (+)** or **out (-)** of the platform view. The mouse wheel can also be used to zoom. The third magnifier (=) centers the platform representation in the view and automatically sets the zoom factor to overview.

View from top switches between two- or three-dimensional representation of the pressure distribution. The **2D representation** is activated if the button is highlighted.

7.5 Save record

At the end of each measurement you will be asked to decide how you want to continue your work. After clicking the **Stop** button, or after the measurement duration has elapsed, a dialog box appears for saving, continuing or discarding the measurement.



Discard record

The last record is discarded and you return to the preview mode to perform a new measurement.

Save & Continue

The record is saved and you return to preview mode to perform a new measurement.

Save & Close

The record is saved and you return to the database.

View (Edit measurement)

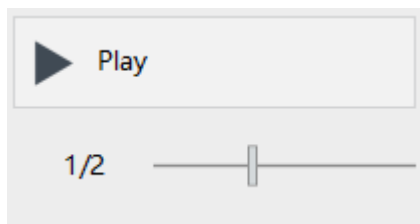
8 View (Edit measurement)

In the **View** mode, you can view and play back the records, limit the analysis interval for the report and, when using a camera system, mark individual images for the report and draw in angles.

The individual functions of the view mode are explained in detail below.

8.1 Functions

Here you will find basic functions explained that are available in most modules. Module-specific functions can be found in the chapter for the corresponding module.



Play

Automatic playback of the record by clicking the play button. The record is played and repeated until the Pause button is pressed.

Playback speed

Clicking this button opens a list for selecting the playback speed.



Step forward/backward

The arrows with the preceding dash jump one frame of the measuring system with the highest measuring rate forward or backward. Example: You measure with a pressure measuring plate at 100Hz and a camera at 30Hz, then the jump will be approx. 10ms ($100\text{Hz} = 100 \text{ images}/1\text{s} = 100 \text{ images}/1000\text{ms} = 1 \text{ image}/10\text{ms}$).



Zoom

Zoom in or out of e.g. 3D display or signal curves in the force-time diagram.

The magnifying glass with minus sign reduces the display by 20%.

The magnifying glass with plus sign enlarges the display by 20%.

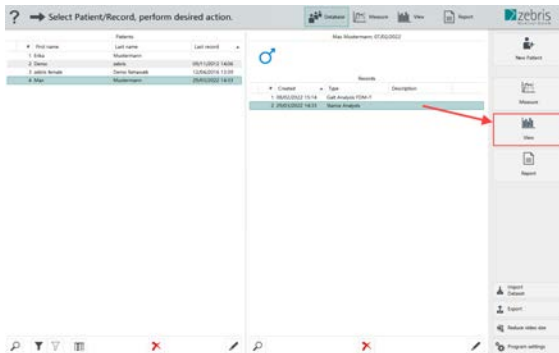


Fit

The 3D display is centered in the view and the zoom factor is automatically determined so that the model is fully visible.

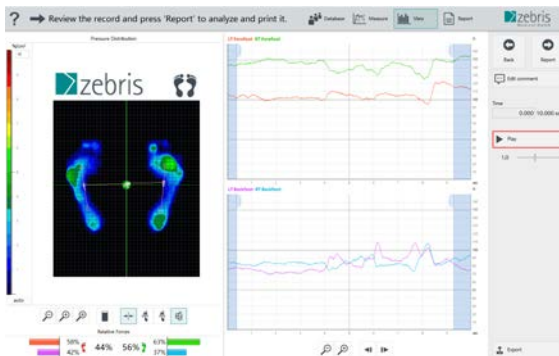
View (Edit measurement)

8.2 Open and playback record



Open record

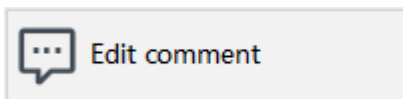
Select a record in the database and click **View** in the right-hand toolbar.



Play record

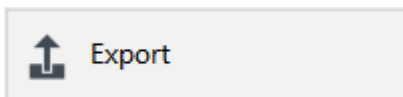
Click on **Play** on the right-hand toolbar.

The time display above the Play button shows the currently displayed time of the record in seconds. Click in the field to enter a value.



Edit comment

Edit comment can be used to add comments to the measurement directly from the view (cf. [Comments & Text Modules](#))²⁴.



Export...

Here you have access to various export formats, see also zebbris-own formats¹¹².

Additional functions

Depending on the license and module, additional functions are displayed, each of which is described in the chapter on the module.

Click **Back** to return to the database.

View (Edit measurement)

8.3 Pressure plots 2D/3D

These functions are available for all measurement modules.



MPP
Display of the maximum pressure plot.



Gait line
Display of the roll off line in the stance phase.



Stride line
Display of the Center of Pressure for the whole gait cycle.



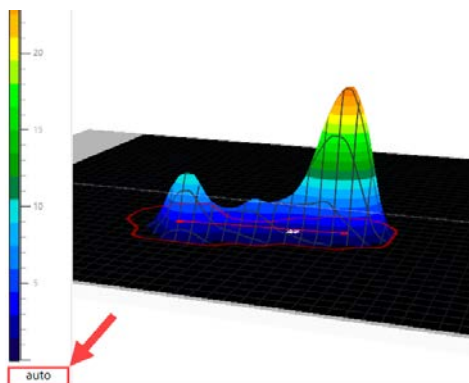
Remove current step
Removes a single detected step at the current cursor position. This action can NOT be undone. However, you have the option to run the automatic or manual step detection again.



Swap left/right page
Here you can swap the page assignment of the footprints.



2D/3D display
Switches the pressure distribution between the 2D and 3D representation. The 2D representation is activated if the button is highlighted in color.



Pressure scale

The pressure scale can be automatically adjusted to the maximum pressure within the analysis interval by pressing the **auto** button.

Changing the pressure scale additionally causes a proportional change of the displayed pressure height in the 3D image.

View (Edit measurement)



Numerical display of the pressure values

In the 2D view, the pressure values of the roll off process can be displayed numerically. To do this, deactivate the 3D mode by clicking on View from top (if the button is not highlighted, the **3D display** is active). By zooming in with the middle mouse button or the **magnifying glass tool**, the **pressure values** of the individual sensors and the limiting grid are displayed.



Please note that the display of the pressure distribution is smoothed, which can cause inaccuracies in the marginal area of the displayed print image due to rounding errors.

View (Edit measurement)

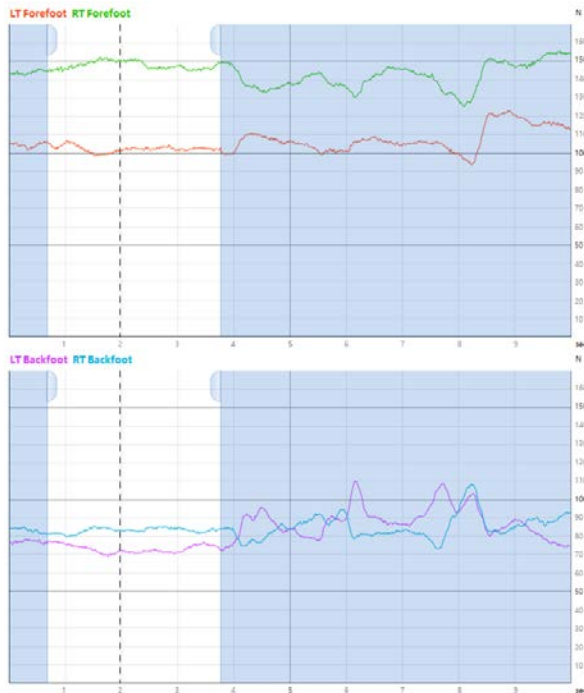
8.4 Select data for the report

In the zebris FDM software, it is possible to analyze the entire recorded data volume or only a specific **interval**. For this purpose, recordings are divided into **cycles**; from two cycles onwards, a consecutive number is displayed in the timeline and in the curve diagrams for easier assignment.



Data in areas highlighted in blue are not evaluated in the report.

Select measurement data



If you can freely select the interval, semi-transparent blue handles are displayed on the left and right edges of a measurement.

After each measurement, the entire measurement duration is automatically preselected.

Two **blue boundary lines** in the force-time diagram mark the analysis area. For the report, the blue highlighted area is discarded and **only the data in the white area** is analyzed.

Adjusting the analysis area

Move the mouse pointer over a boundary line from blue to white. The mouse pointer changes to a double arrow. With the **left mouse button held down**, you can restrict the analysis area by dragging the boundary line.

Some modules (e.g. roll-off analysis) generate recordings that are divided into cycles. Here you can only switch entire cycles on or off for the report.

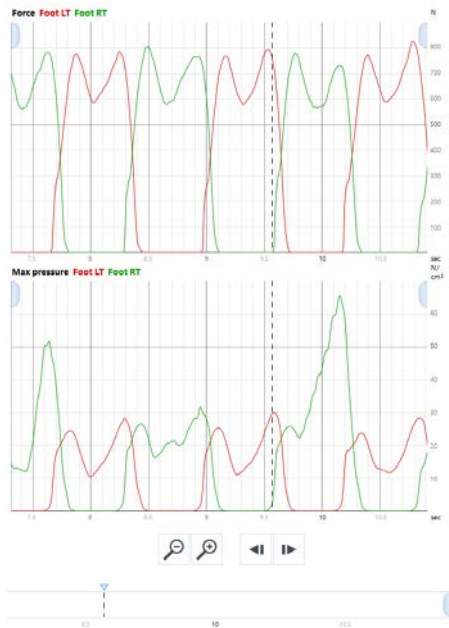
Each cycle is marked with a consecutive **number** in the timeline. By **double-clicking** on the cycle in the timeline, it can be switched on or off for the report .

Areas that are switched off (**highlighted in blue**) **are not evaluated in the report.**

View (Edit measurement)

8.5 Select video sequences

Please note that the use of video cameras is not available in all modules.



1. Set position

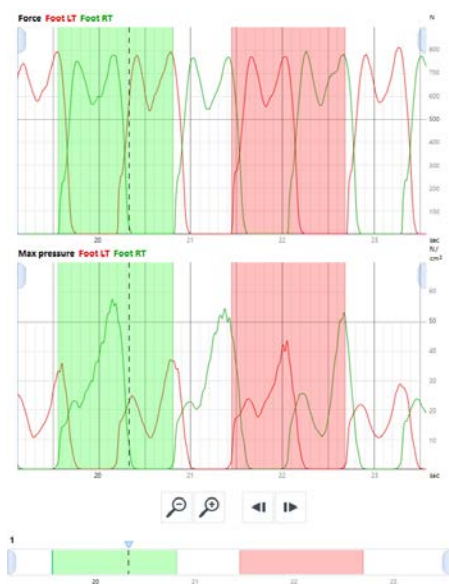
To transfer video images to the **report**, click on the desired position in the **force-time diagram**. The dashed line (cursor) is placed at the clicked position.

You can move the cursor to any position with the **left** mouse button or the image forward/back button .



2. Select video sequence of a step cycle

By clicking on the **movie symbol** the gait cycle around the marked position will be selected automatically .



3. Adjust video interval

To select a larger area, move the mouse pointer to a boundary line of the **green or red area** until it becomes a double arrow. Keeping the left mouse button pressed, you can change the length of the video sequence by dragging the boundary line.

Delete the marker by dragging the boundaries together until the marker disappears completely.

View (Edit measurement)

8.6 Mark pictures

In recorded videos, you can mark individual frames for display in the report. It is also possible to draw an angle in an image and use two straight lines to determine the percentage length ratio between them.



Mark single frames

Click at the desired position in the force-time diagram. The dashed line (cursor) is placed at the clicked position.

Then click on the **camera symbol** below the video image. The marker appears as a blue line in the timeline.



Delete mark or video sequence

Place the cursors with the left mouse button on the blue line on the timeline or in a video sequence and then click this button to delete it.

You can set the image or video sequence again at any time.



Right-click on the video image to open the context menu with the functions "**Save video as**" (the video is exported in raw format, you can specify where) and "**Copy current image to clipboard**" (copies the current video image as seen, i.e. including drawn-in elements, to the clipboard so that you can paste it into other programs, e.g. with the key combination Ctrl + V).

8.7 Drawing tools

Markers can be drawn in the video recordings using drawing functions.



Click on the drawing tools button below the video image to open the drawing tools menu with all available actions in the right-hand navigation bar

To add a drawing, click the button for the desired drawing tool in the actions. The following drawing tools are available:



Lines

Clicking in the video image inserts the start and end point of a line.

View (Edit measurement)



Circles

Click in the video image to insert a circle and click a second time to define the radius.



3-point angle

Three contiguous points are inserted in the video image, with the middle point being the center and the first and last points being the end points of two axes.

The angle between the two axes is specified in degrees.



4-point angle

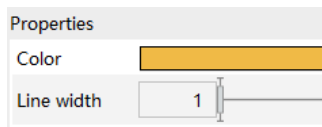
Two independent lines are drawn with one click each for the start and end point.

The angle between the lines is shown in degrees and the length ratio in %.



Text

The inserted text can be edited via the text field in the properties. By holding down the mouse button on the text, it can be moved to the desired position.



Properties

The properties of the selected drawing element can be adjusted here.

Elements that have already been inserted can be selected with a click and subsequently changed.

Elements can be moved in the image by holding down the left mouse button. .



Delete

This deletes the currently selected element.



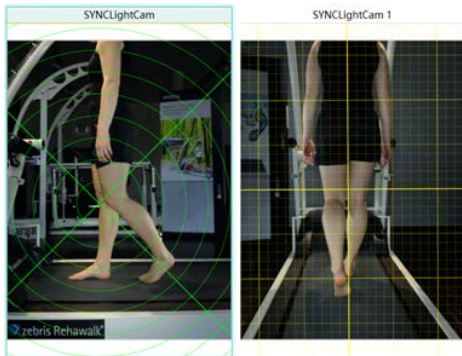
This deletes all elements displayed in the image.



Für Videobilder, die Zeichnungen enthalten, wird automatisch eine Markierung in der Zeitleiste gesetzt. Wird diese Markierung gelöscht, werden auch die dort eingefügten Zeichnungen entfernt. Dazu muss beim Löschen eine entsprechende Abfrage bestätigt werden.

View (Edit measurement)

8.8 Video grid

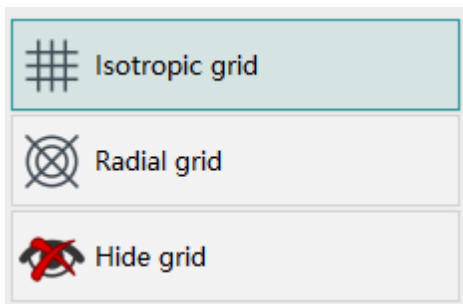


Auxiliary grids can be displayed in recorded videos, which can be helpful, for example, in the assessment of flexion/extension deficits and misalignments.

The grids are displayed using the corresponding buttons below the video. Two forms are available:



Click on this button to display a submenu in the **right-hand navigation bar**.



Isotropic grid

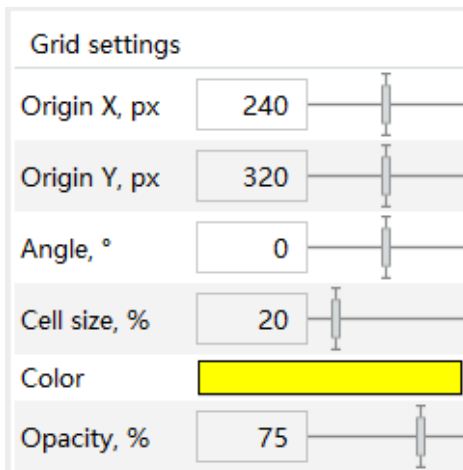
Grid of vertical and horizontal lines.

Concentric circles

Grid of concentric circles.

Hide grid

To hide the auxiliary grid again



Grid properties

The grid properties are displayed in the right-hand navigation bar and can be customized here.

The angle and size of the grid can also be adjusted directly in the image by clicking and moving the corresponding icons:



Rotate

Adjust the angle by rotating this icon while holding down the mouse button.

View (Edit measurement)



Zoom in/out

Adjust the grid size or spacing by dragging this icon while holding down the mouse button.



Move

Adjust the placement of the auxiliary grid by dragging this icon with the mouse button pressed.

The grid can be centered again via the **Move to center** button under the grid settings.



Hiding the grid

By deselecting the **Shown** checkbox in the grid settings, the grid is hidden again.

The settings of a grid can also be transferred to grids in videos of other cameras and also other measurements:



To do that, first select the appropriate grid and click the **Copy** button below the grid properties.

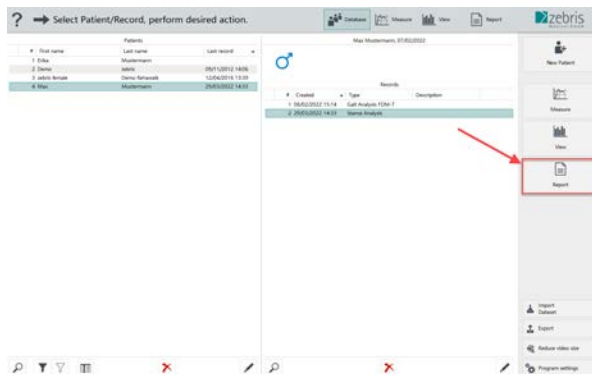


Then activate the grid in the desired video and press the **Paste** button. This will apply the copied settings to the corresponding grid.

Report (evaluate measurement)

9 Report (evaluate measurement)

In the **Report** mode, the gait parameters for the measuring section defined in the **View** mode are evaluated and displayed.



Select record

First select a record and then click **Report**.

9.1 Functions

View

With these buttons you can define how many report pages are displayed at the same time. Alternatively, the magnifying glasses can be used to reduce/ enlarge or the input field can be used to directly enter a magnification factor.



1:1

Adjusts the display to show a full page height.



Page width

Zooms the current page to the full available width.



Full Page

Displays the pages in their original size. The size may differ from the **printer paper size** due to different screen resolutions.



Thumbnail

Shows all pages as small pictograms for overview.

Report (evaluate measurement)

Right function bar



Print

Print the report using the printer selected in Printer settings.



PDF export

Export of the displayed report as PDF (Portable Document Format) to any directory or e.g. to external data carriers like USB sticks. The path for this export can be fixed (see [Export \(Always export to the same folder\)](#)^[34]).



Customize

Show and hide individual report parameters (see [Customize](#)^[65] Report).



Printer settings

Select printer and change settings for printing (e.g. portrait/landscape format, page size, etc.). The settings made here are only applied to the current printout. To make the settings permanent, you must set the print settings for your default printer under Windows accordingly.

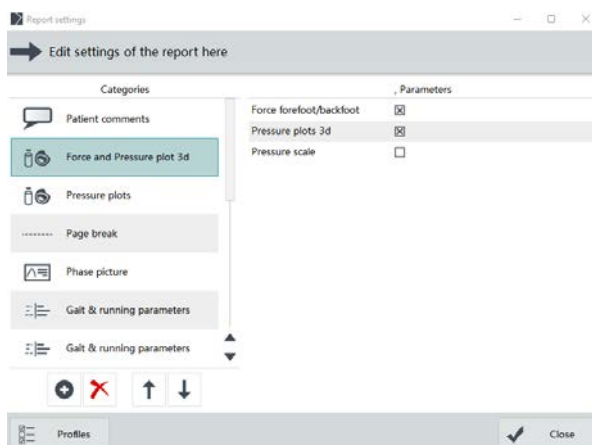


CSV export

Export the parameters of the report in CSV format (Comma-separated values), see also [CSV](#)^[112].

9.2 Customize report

To show or hide individual parameters of the report, click **Customize**.



Categories and parameters

On the left side categories are displayed by headings in the report. On the right side the individual parameters (elements subordinated to a heading) of the category selected on the left are displayed.

Show/ hide parameters

By activating the check box on the right side, the parameter will be displayed in the report. If the check mark is removed, the corresponding parameter will not appear in the report.

By clicking the **Ok** button, your changes will be applied.

Report (evaluate measurement)

The following controls are available to customize the report content:



Add profiles or a category



Delete profiles or a category



Change order, move up



Change order, move down



Element is visible in the report

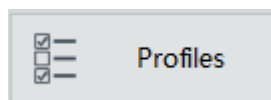


Element is not visible in the report



Setting or removing a check mark in the **Customize** menu neither changes nor deletes the recorded data.

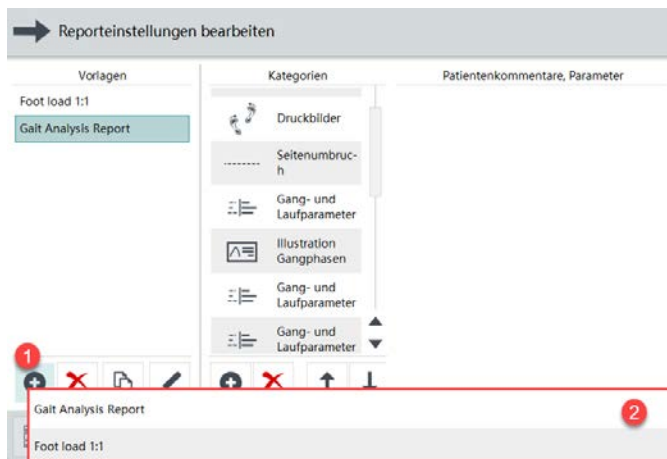
9.2.1 Create profiles



Profile

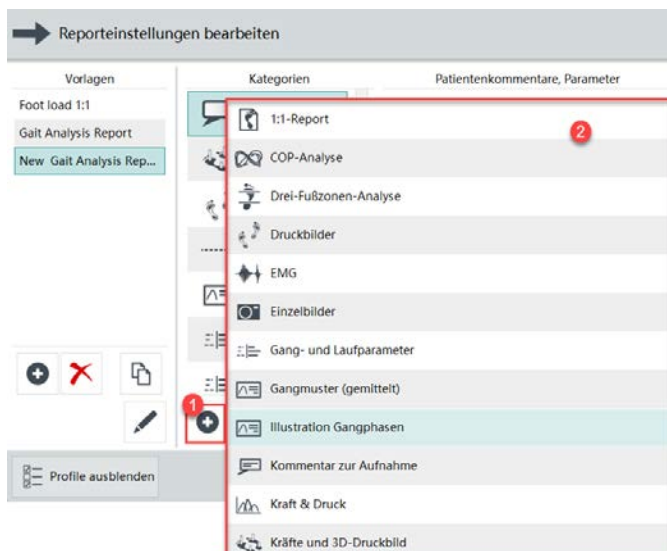
Hier können Sie individuelle Reportkonfigurationen zur Verwendung bei allen Aufnahmen gleicher Art abspeichern.

Report (evaluate measurement)



Neues Profil anlegen:

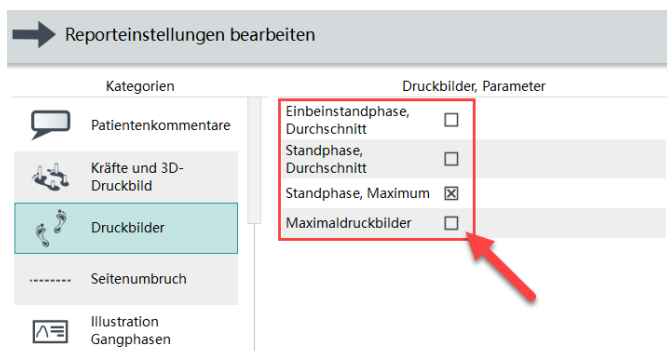
+ - Button unter **Vorlagen** drücken und, falls im ausgewählten Modul verfügbar, die gewünschte Vorlage auswählen.



Kategorien auswählen / löschen

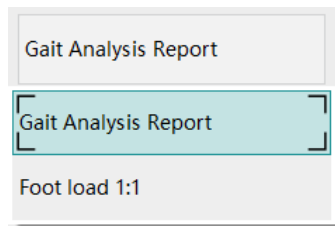
+ - Button unter **Kategorien** drücken, um eine neue Kategorie hinzuzufügen.

X - Button betätigen, um die markierte Kategorie zu entfernen.



Einzelne Elemente ein-/ausblenden
Anzuzeigende Elemente durch Aktivieren/ Deaktivieren der Checkbox auswählen.

Report (evaluate measurement)



Profil wechseln

Sobald für die gewählte Messung mehr als ein Reportprofil verfügbar ist, steht in der rechten Seitennavigation ein Drop-Down-Menü zur Verfügung.

Wenn Sie auf die Schaltfläche klicken, wird die Dropdown-Liste geöffnet.

Sobald ein anderes Profil ausgewählt wurde, ändert sich der Inhalt des Berichts entsprechend

Report (evaluate measurement)

9.3 Report contents

Components independent of the used module are described below. Module-specific report contents are described in the corresponding chapter for the module.

Gait Analysis Report

Person: zebris female Demo Rehawalk, 01/01/2017
Record: 12/04/2016 13:39, Gait Analysis FDM-T, shoes, 2 cams, 1.5km/h



Header

Title, project name, patient name, date, type of measurement and company logo are in the header.

Patient comments

Patient comments

Displays the patient comment stored in the database.

For instructions on how to create a patient comment, see [\[24\] Comments & text clips \[27\]](#).

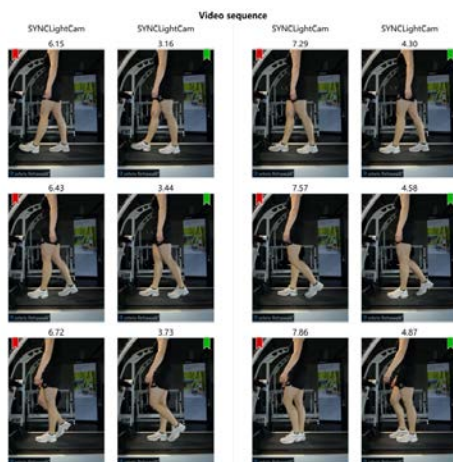
Record comments

Record comments/ recommendations

Displays the record comment stored in the database.

For instructions on creating an admission comment, see [Record details \[27\]](#).

Only with camera systems:



Video sequence

Here the gait cycle defined in the **View** mode is displayed as a video sequence with eight images at the same time interval.

Left and right sequence - if defined - are displayed next to each other (marking of the side with red or green, respectively), in order to be able to make a direct side comparison.



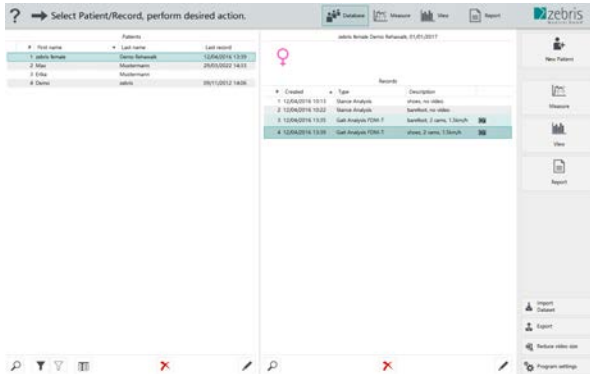
Marked pictures

Shows the pictures marked in the **View** module, including the angles and length ratios drawn there, if applicable.

The record time is displayed under the picture.

Report (evaluate measurement)

9.4 Comparison of two measurements



Select data sets

In order to compare two measurements with each other, they are both first marked in the database using the **Ctrl key + left mouse** button. Then the report can be called up as usual by clicking on the **Report** button.



Representation in the report

Measurement A is displayed in white, measurement B in gray. The assignment to the respective measurement can also be seen in the header.

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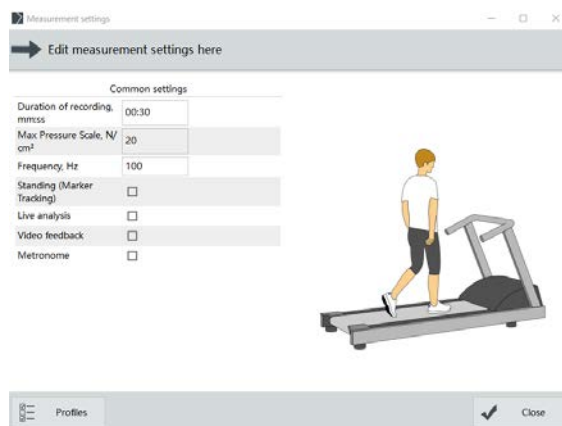
With this module, you perform gait analysis with a zebris FDM system. The individual steps of a gait analysis are described here as an example for gait analysis on the treadmill (FDM-T), but also function similarly for use on the floor plate.

10.1 Measure

The measurement procedure corresponds to the procedure in chapter [Performing a measurement](#)^[51].

10.1.1 Measurement setup

For default parameters, see [Measurement setup](#)^[42].



Standing (Marker Tracking)

Activates an additional step at the beginning of the measurement. Here the test person must stand quietly on the treadmill or floor plate while the user triggers a measurement. Only then can the actual measurement be started.

The measurement data from the standing position is used to improve the pressure reproduction of a measurement. This additional step is a prerequisite when recording a measurement with marker tracking, since this position is used as a reference for the determined measurement values.

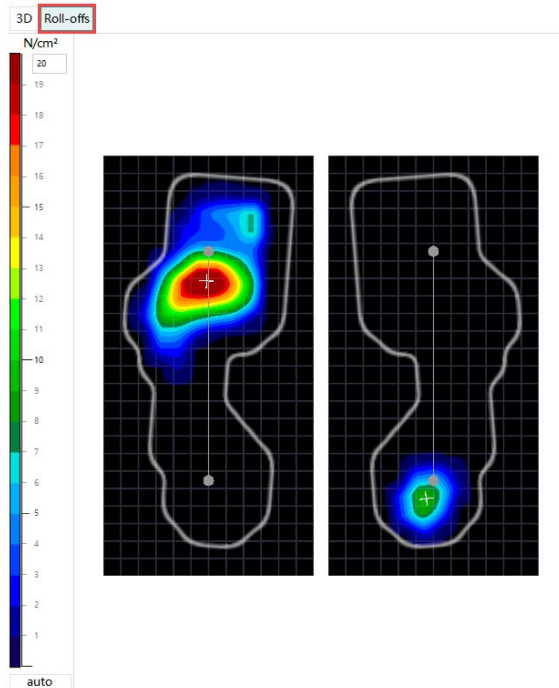
Metronome

This is used to output a constant acoustic signal during preview and measurement. The speed can be adjusted manually in the measurement interface.

10.2 View (edit measurement)

The basic functions of the **View** can be found in the chapter [View \(Edit measurement\)](#)^[71].

10.2.1 Roll-offs



In the **Roll-offs** tab, the course of each individual roll off is displayed, separated by left/ right. In addition, it is possible to display the maximum pressure plots and the gait line of the roll offs.

A display of the sensor values is not possible in this view, since the display is interpolated from the original measured values.

10.2.2 Step definition



Automatic step definition

Clicking this button opens the following dialog window (see below).



All steps will be deleted and new steps are defined automatically. This cannot be undone. Do you want to continue?



No



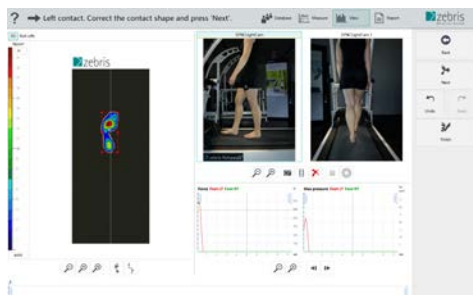
Yes

If you press **Ok**, all previously defined steps will be deleted and the automatic step definition will be performed again .



Manual step definition

Clicking this button opens the following dialog window (see below).

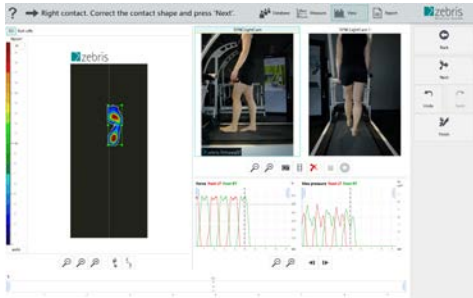


The software alternately prompts to select a left or a right contact.

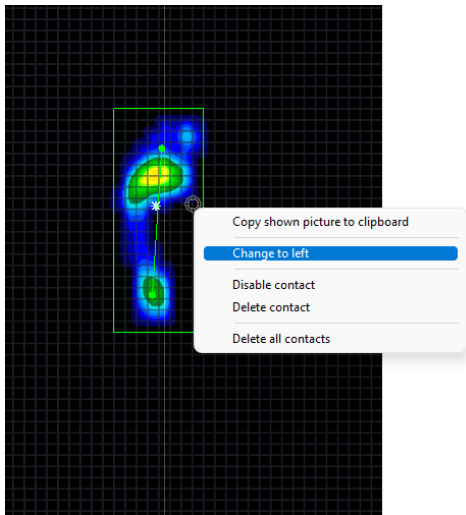
By clicking on the corresponding contact, the step can be assigned to the respective side.

To proceed to the next step, click **Next** on the right .

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You must **define at least five contacts**, as this number is required for an evaluation in the report. If you have defined fewer contacts, a corresponding note will follow the click on **Finish**.

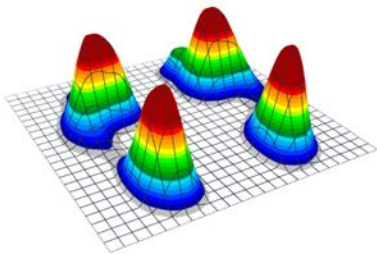


Correction of individual contacts

If you only want to define individual steps manually, you can also do this in the view by right-clicking on the desired contact.

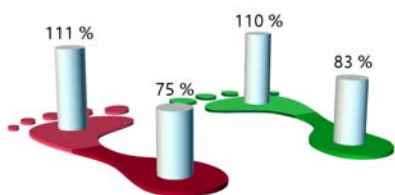
10.3 Report

The report includes the elements described below:



3D pressure plot

This 3D representation visualizes the average pressure distribution of the stance phase of all detected contacts in the analysis interval.



Average maximum load (% of body weight).

Each column represents one half of the contact (forefoot L/R, backfoot L/R).

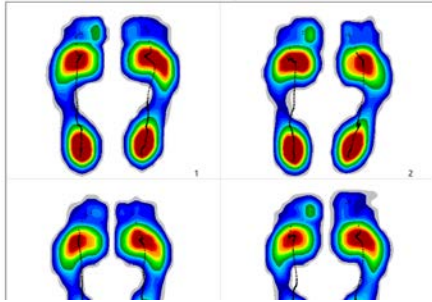
All detected left and right contacts in the analysis interval (see [selection of an interval for analysis in the report](#)^[55]) are included in the calculation of this graph.

Each contact is geometrically separated into front and rear halves. The maximum load is calculated for each roll-off assigned to the contact over all sensors within the

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separated surface parts. From all results of the same surface part the average is calculated.

The display is as a percentage of the body weight (determined from all detected contacts in the analysis interval).



Maximum pressure plots per contact

This figure shows the maximum pressure plots. Each maximum pressure plot (MPP) contains the highest pressure values of the complete roll off process of a contact.

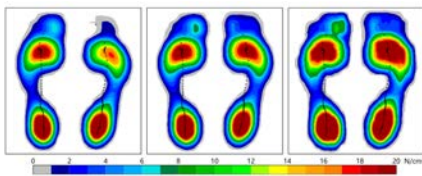
Maximum pressure plots

The images under this heading each represent the maximum pressure plot of all contacts in the analysis interval of the designated phase.

The color scale allows quantification of the pressure distribution.

Single-leg stand phase, average

This graph shows the average maximum pressure plot of all acquired maximum pressure plots of the single-leg stance phase.



Stance phase average

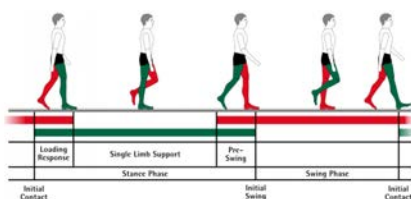
This figure shows the average maximum pressure plot of all acquired maximum pressure plots of the stance phase.

Stance phase maximum

This figure shows the absolute maximum pressure plot of all acquired maximum pressure plots of the stance phase.

Gait line

The line of force application points is displayed separately for each foot in the pressure plots.

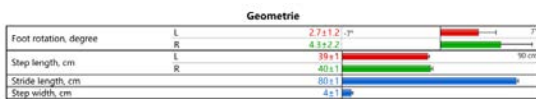


Gait phases

Here you can see the individual gait phases.

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Parameter



Foot rotation

Describes the angle between the longitudinal axis of the foot and the direction of walking. Negative value = internal rotation, positive value = external rotation.

Step length

Includes the distance from the heel strike of the contralateral side to the heel strike of the observed side of the body.

Stride length

Includes the distance between two heel strikes of the same side of the body.

Step width

Describes the distance between the right and left foot.

The areas highlighted in light green represent reference values, depending on the determined speed.



Stance phase

Period within a gait cycle when the foot is in contact with the ground.

Load response

Period between initial ground contact and lifting of the contralateral leg.

Mid stance

Phase in which the contralateral leg swings in the air and the body's center of gravity is transported over the loaded foot.

Pre-swing

Includes the period within a gait cycle whose beginning is defined by heel strike of the contralateral side of the body and whose end is defined by toe-off of the side of the body under consideration.

Swing phase

Period within a gait cycle during which the foot is not in contact with the ground.

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Double stance phase

Sum of the load response and the pre-swing phase.

The areas highlighted in light green represent reference values, depending on the determined speed.

Step time

Is the time period within a gait cycle between the heel strike of one side of the body and the heel strike of the contralateral side.

Stride time

Time span of a gait cycle.

Cadence

Step frequency in steps per time unit.

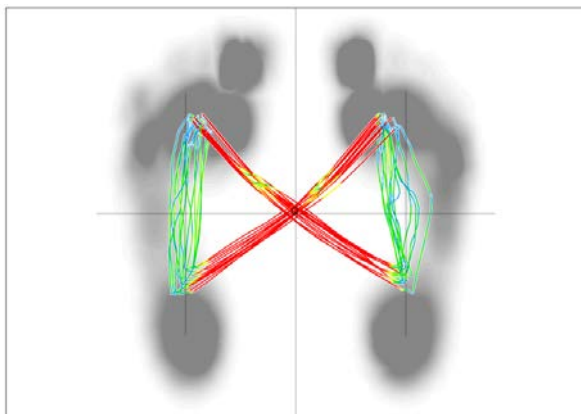
Velocity

Measured average gait speed in the analyzed measurement interval.

Timing	
Step time, s	L 0.95±0.01
	R 0.97±0.00
Stride time, s	1.92±0.01
Cadence, steps/min	63±0
Velocity, km/h	1.5±0.0

COP analysis

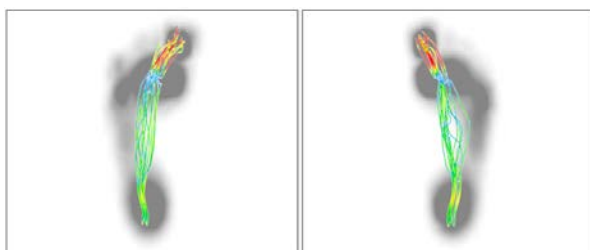
The Center Of Pressure (COP for short) describes the load center or force application point of a contact.



Butterfly diagram

This block analyzes the trajectories of the COP during the selected gait cycles. The transition between the sides of the body is connected from the forefoot of one side to the backfoot of the contralateral side (cyclogram representation).

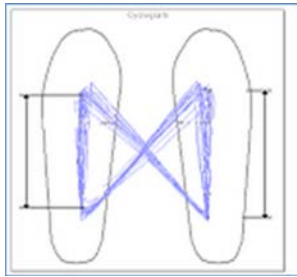
Here, the colored COP traces correspond to different velocity levels (red: fast, green: medium, blue: slow). Taking into account the double stance phase and the load transfer results in the typical butterfly diagram of the force application points.



Gait line left and right

Here the trajectories of the COPs are displayed separately for each foot, the color coding corresponds to that of the butterfly diagram.

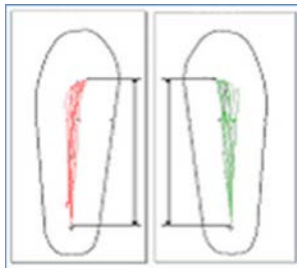
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Length of the gait line

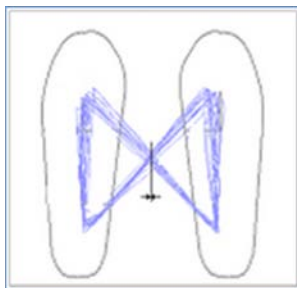
The parameter "length of gait line" is calculated from the projection of the gait line onto the vertical.

Only the ground contacts of one side of the body are taken into account.



Single support line

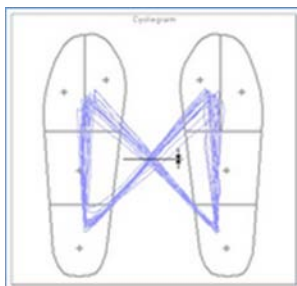
This parameter corresponds to the track length of the COP during the single-leg stand phase.



Anterior/Posterior position

This parameter describes the forward-backward displacement of the COP intersection point over time in the cyclogram diagram, taking all steps into account.

The starting or zero position is described by the rearmost heel point.

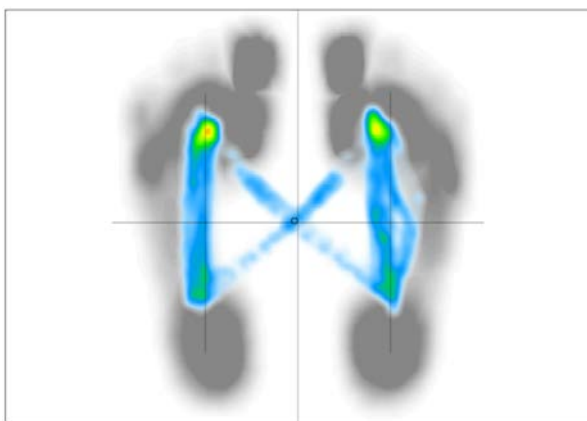


Lateral symmetry

This parameter describes the left-right displacement of the COP intersection point over time in the cyclogram diagram, taking all steps into account.

A negative value indicates a shift to the left side, a positive value indicates a shift to the right side.

The starting or zero position is marked by the center point.



COP density

The diagram shows the frequency distribution of the COP in the selected measurement interval.

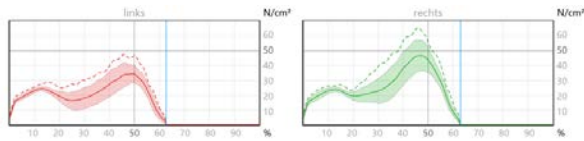
The color scale represents the percentage frequency of points during the stance phase, relative to the area of one square centimeter.

A red coloring means a high density and thus a slow movement course of the calculated COPs.

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Pressure curves

Display of the averaged and normalized pressure curves over all contacts in the analysis interval.

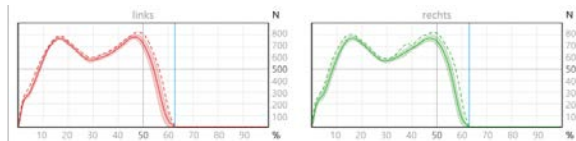


The standard deviation is shown as a shaded area, the dashed line represents the absolute maximum values.

Stance and swing phases are separated by a vertical line.

Force curves

Plot of the average vertical ground reaction force of all contacts in the analysis interval.



The standard deviation is shown as a shaded area, the dashed line represents the absolute maximum values.

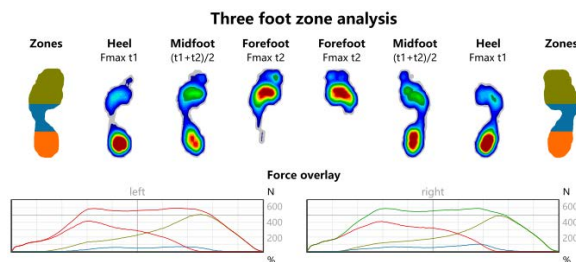
The stance and swing phases are separated by a vertical line.

Force parameters			
Maximum force1, N	L	587.5	700 N
	R	592.0	700 N
Time maximum force1, %	L	23	100%
	R	22	100%
Maximum force2, N	L	593.0	700 N
	R	591.6	700 N
Time maximum force2, %	L	49	100%
	R	49	100%

The table presents the amount of maximum force as well as its timing from all contacts in the analysis interval related to the gait cycle.

Three foot zone analysis

Here, the maximum pressure plot of all contacts in the analysis interval of the left and right sides of the body are each divided geometrically into the zones forefoot (40%), midfoot (30%) and heel (30%).



The maximum pressure plots of the entire load area of the left and right sides of the body are displayed at three fixed points in time, which are indicated under the designation of the zone.

The color coding of the zones is used to display the force curves in the diagram below.

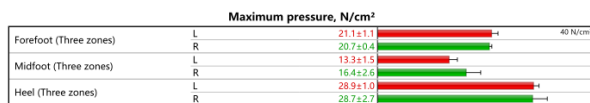
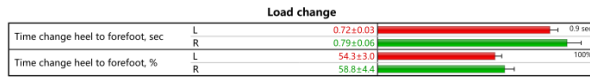
The force curves show the force progression in a zone. I.e. as long as load occurs in the corresponding zone, the force curve is drawn.

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The parameters shown as bars are briefly described here, the indicator gives the standard deviation in each case.

Load change

The absolute load change from heel to forefoot during the stance phase as a percentage.



Maximum force

The average maximum values achieved in Newton for the three zones toe, midfoot and heel.

Maximum pressure

The average maximum values achieved in N/cm² for the three zones toe, midfoot and heel.

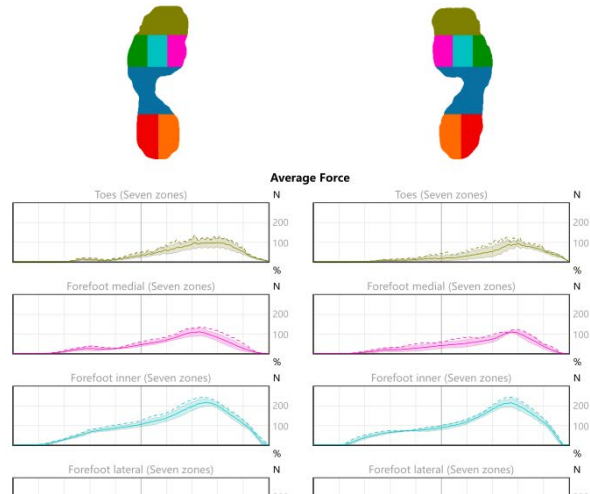
Time maximum force

The average time in the gait cycle at which the maximum values in Newton were recorded for the three zones toe, midfoot and heel.

Contact time

The average contact time of the three zones toe, midfoot and heel in percent.

Seven foot zone analysis



Seven foot zone analysis

This advanced foot zone analysis can be optionally purchased.

Here, the forefoot is divided into toes (20%) and forefoot (20%), with the forefoot again divided vertically into three thirds. Furthermore, the heel is also divided vertically into two zones.

The parameters force, pressure, contact time, maximum force and time of maximum force are calculated and listed separately for each zone.

10.4 Help for the interpretation of determined data

In dynamic measurement, the load distribution under the foot during walking/running is recorded on a force/pressure measuring plate.

In an inconspicuous foot with normal weight-bearing capacity, the "ideal" load distribution under the foot during gait is characterized by a hemispherical load distribution under the heel, support of the entire foot with the exception of the area of the medial longitudinal arch, and an even load distribution under the forefoot (in this case, the maximum load may be under both the ball of the big toe and the center of the forefoot).

An "ideal" load sequence for "normal gait" during ground contact is heel - midfoot - forefoot lateral - forefoot central - forefoot medial - toes (I and/or II/III).

The maximum load should not exceed 40~N/cm² under the heel and 55~N/cm² under the forefoot and all toes should support the load.

The force-time curve should have an M-shaped progression (camel hump).

For sensitive feet (e.g. diabetics etc.), local pressure peaks should be avoided and the maximum pressure load should be less than approx. 25 N/cm² to avoid plantar damage to the feet.

10.5 Extension: Marker tracking

Marker tracking enables the time-synchronous display of angle progressions by tracking passive optical markers in the video image.



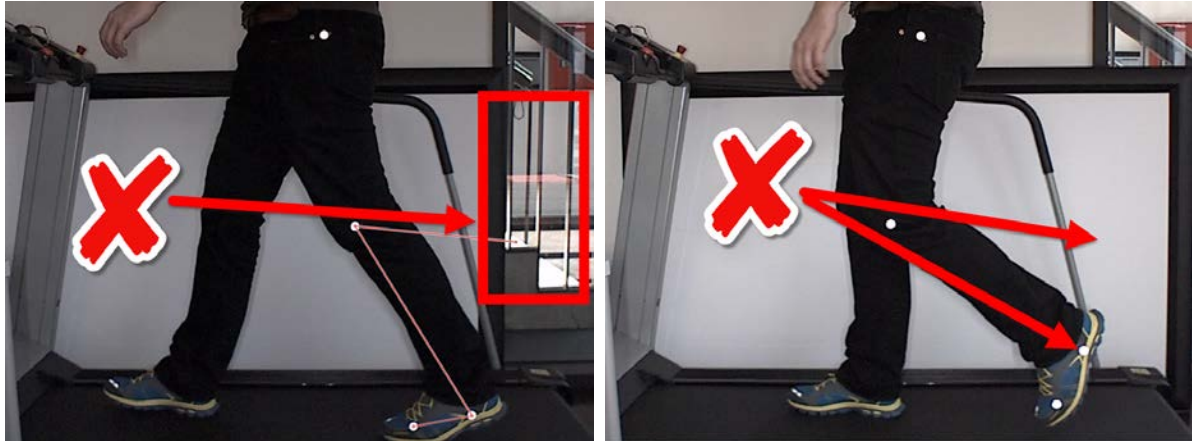
This extension for gait analysis is optionally purchasable and therefore only available if your license includes it.

10.5.1 Measurement environment

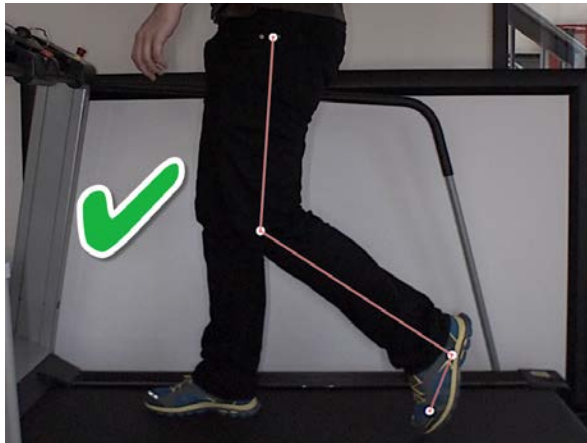
In order to achieve optimal results, no direct sunlight should fall into the measurement environment. The passive markers should be illuminated from the direction of the cameras to ensure optimal reflection. zebris recommends using the SYNCLightCam (30Hz) or SYNCLightCam HS (up to 120Hz) depending on the application scenario.

The following images show an environment that is too bright with reflections and sunlight in the image background, or an image setting that is too bright, causing the passive markers to appear almost as bright as the background.

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The following image shows a good setting where the markers are the brightest objects in the image and at the same time appear sharp and round, because the exposure time is chosen very low:



10.5.2 Camera settings

The cameras used must be set so that the release time is as short as possible and the markers appear as the brightest object in the image.

In the device settings, add your camera to the devices used (see chapter [Cameras](#))^[48] and open the camera settings, e.g. with a double click. A preview image appears. Now place a person covered with markers on the treadmill and change the positioning of the camera so that all markers are fully visible in the camera image. Switch on the camera lighting and adjust to a bright setting.

Please then follow the instructions below depending on the camera type.

SYNCLightCam

1. Activate the checkmarks for a manual setting of "Exposure" and "Gain".
2. Drag the slider for "Gain" to the left until the value displayed in the field in front of it is 0.
3. Drag the slider for "Exposure" in the direction in which the image becomes dark and set the darkest setting. In some camera series, the numerical value is reversed, so please always use the brightness of the preview image as a guide.

Gait analysis FDM/FDM-T

- Now drag the slider for "Gain" slightly to the right, your image will become brighter overall, but make sure that the markers remain the brightest object in the image.
- Confirm your setting by clicking on "Ok".

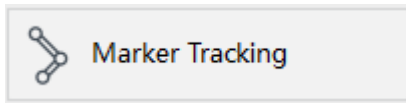
Basic	Advanced
Name	SYNCCam
Rotate	Video rotation: clockwise
Exposure	<input checked="" type="checkbox"/> 1/4
Gain	<input checked="" type="checkbox"/> 82

SYNCLightCam HS

- Activate the checkmarks for a manual setting for "Gain".
- Drag the slider for "Gain" to the left until the displayed value in the field in front of it is 0.
- Enter the number 500 in the "Limit for max. shutter speed" field in the box. The image should be relatively dark and the limit should be set at least 2.5 times the frame rate (FPS) used.
- Now drag the slider for "Gain" slightly to the right, your image will become brighter overall, but make sure that the markers remain the brightest object in the image.
- Confirm your setting by clicking on "Ok".

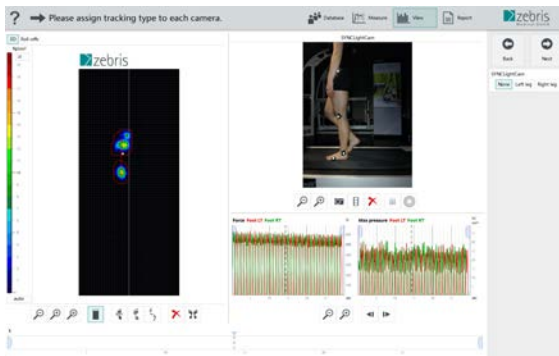
Name	SYNCLightCam HS
Rotate	Video rotation: no
Video sync	<input checked="" type="checkbox"/>
Lens	<input checked="" type="radio"/> Other <input type="radio"/> Lens 1
Configure	<input checked="" type="checkbox"/>
FPS	120
Resolution	640x480
Shutter time limit, s	1 / 500
Gamma	1,2
Gain	<input checked="" type="checkbox"/> 8,35

10.5.3 Evaluation



Clicking on **Marker Tracking** in the right navigation bar starts the tracking process.

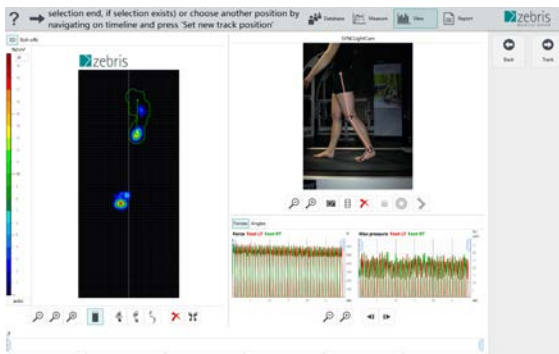
This button is available in the view for every measurement with video recordings.



Assign cameras

For each camera connected during the measurement, it can be defined whether the left or right leg is imaged. If no markers were used on a video recording, **None** can be specified.

Click on **Next** to search for markers on the corresponding camera images.



Correct markers

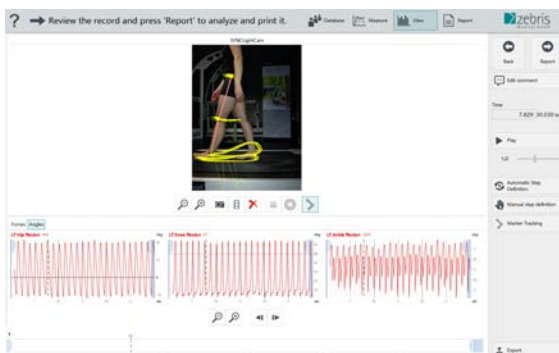
Found markers are connected by red lines.

If the points are set incorrectly, e.g. due to reflections in the background, corrections can be made here.

By clicking on **Next**, the start time of the tracking can be selected.

For this purpose, any point in the timeline can be selected. A click on **Set new track position** confirms the currently selected time.

After clicking on **Track**, the marker tracking is applied to the record from the selected start point.



View

In the view, the tracking tracks are displayed as yellow lines in the video.

In addition to the force diagrams, an **Angle** tab is created under which the angles of the hip, knee and ankle are each displayed as a diagram.

Gait analysis FDM/FDM-T

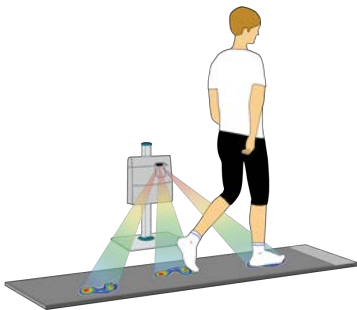


Use this button below the video display to show/hide the tracking trajectories in the video.

10.6 Extension: Projector Gait Analysis

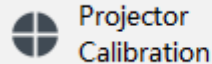


This extension module for gait analysis with a FDM platform is optionally purchasable and therefore only available if your license includes it.



In the Projector Gait Analysis, the measured pressure plots are projected onto the force plate simultaneous to the measurement.

After leaving the plate, the individual step lengths are additionally superimposed.



Projector
Calibration

For this purpose, you must perform a projector calibration before the first measurement. The procedure can be found in the [Measure \(Preparation, Settings\)](#)⁹¹ part of the Gait Training chapter.

Preview/ Measure

After leaving the platform, the last recorded gait cycle can be replayed by pressing the space bar.

View

If a projector is connected, the pressure distributions are also projected synchronously onto the plate when the recording is played back.

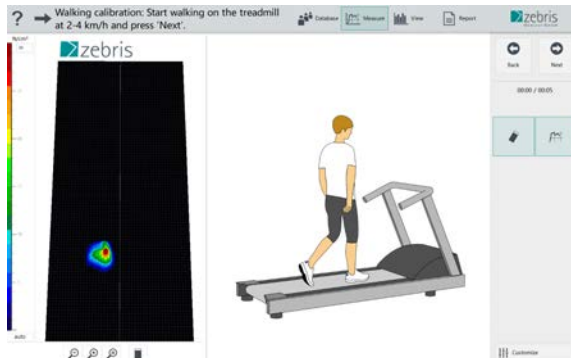
Measurement procedure, contents of the View and the Report correspond to the Gait Analysis FDM.

Running analysis

11 Running analysis

This module is for Running Analysis in combination with a zebris FDM treadmill system.

11.1 Measure



After platform calibration, a calibration in **walking speed** is first performed by a five-second measurement at 2-4 km/h.



If the treadmill speed is slower or faster than the required speed, a corresponding message is output.

If the walking calibration was successful, you can continue with the measurement for the running analysis. Otherwise, the calibration can be repeated.

The treadmill speed can afterwards be increased to the desired value. The following measurement procedure corresponds to that of the [Gait analysis FDM-T](#)^[71].

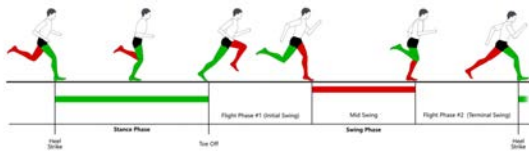
11.2 View (edit measurement)

The view and its functions correspond to the [gait analysis FDM/FDM-T](#)^[71].

Running analysis

11.3 Report (evaluate measurement)

The gait analysis report is comparable to the [gait analysis FDM/FDM-T](#).^[71] Additional contents are listed below:



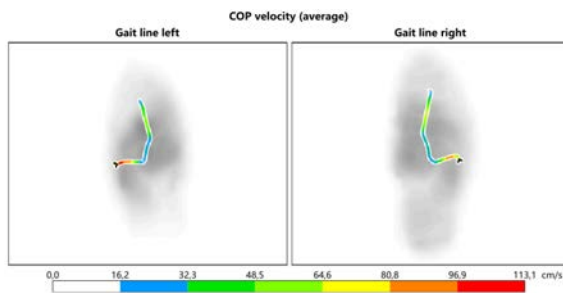
Running phases

The diagram shows the phases of the running analysis. These can be divided into a stance and swing phase.

The stance phase begins when the foot makes contact with the ground until the forefoot lifts off.

The swing phase describes the flight phase of a leg from leaving the ground to the next ground contact.

It can be divided into the three areas initial-, middle- and terminal swing phase.



Average COP velocity

The graph shows the averaged values from the individual lines of force application points (COP).

The color scale shows the average movement velocity of the COP points in the unit cm/s.

Stance Analysis

12 Stance Analysis

With this module you can perform stance analysis combined with a zebris FDM system .

The procedure for a stance analysis measurement is explained here using the stance analysis on a floor platform (FDM) as an example, but it also works analogously with treadmill systems (FDM-T).

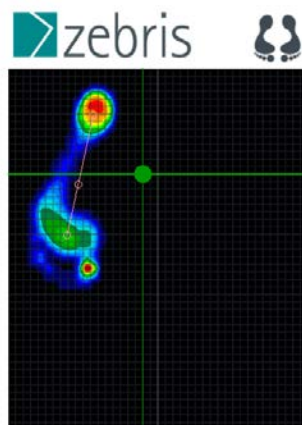
12.1 Measure



Stand position/ preview

In preview mode, the test person takes in the measurement position. The orientation should correspond to the feet symbol on the right above the pressure distribution display.

It can be rotated by 90° each by clicking on it; an adjustment is also possible after saving the measurement.



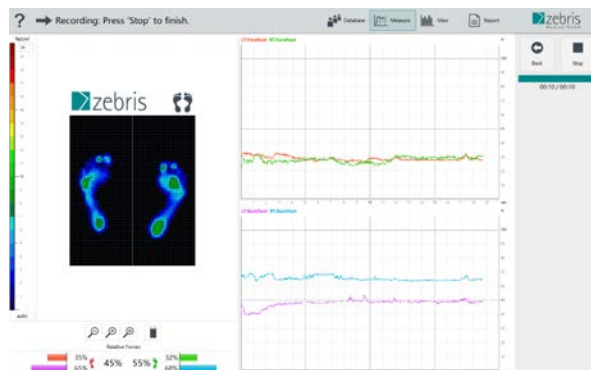
Determining the stand position

This step between preview and measurement must be activated manually in the measurement settings and is used, for example, when measuring in single-leg stand.

Here, the green cross for the division of left/right side and forefoot/backfoot can be adjusted manually by moving the center of the cross.

In the next step it is possible, for example, to perform a recording in the single-leg stand.

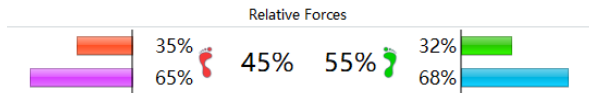
By clicking on **Record** you start the measurement in the following step.



Measure

The force curves for forefoot and backfoot (each left/ right) are displayed over time.

Stance Analysis



Load distribution

The bar chart shows the percentage distribution of the relative forces, divided between **left foot (red)**/ **right foot (green)**, as well as between **forefoot (upper bars)** and **backfoot (lower bars)**.

12.2 View (edit measurement)

12.2.1 Functions



Current pressure distribution

Displays the pressure distribution at the current cursor position. The cursor position is represented by the dashed line in the timeline.



Maximum pressure plot

Clicking this button displays the **maximum pressure plot**. This **setting is only active** as long as the measurement is **not** played. If the Play button is pressed, the setting jumps back to the Current pressure distribution.



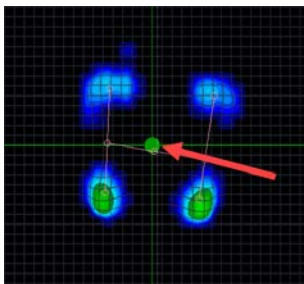
Average pressure distribution

This setting shows the average pressure distribution. Setting is only active as long as the measurement is not played. If the button Play is pressed, the setting jumps back to the Current pressure distribution.



Show/Hide COP

Displays the Center of Pressure as a white gradient line, at the same time the COP of the individual feet is also displayed.



Reposition separation cross

The green separation cross can optionally be repositioned in relation to the selected analysis interval.

Manually

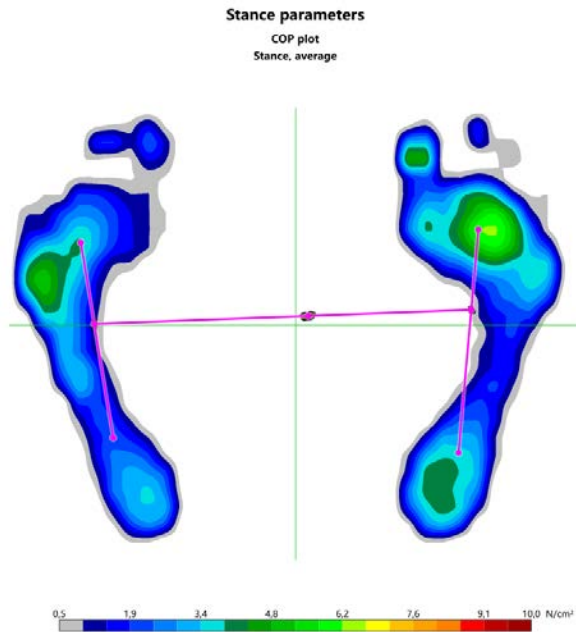
To do this, the center of the cross is moved to the desired position with the mouse button held down.

Automatically

Click with the right mouse button in the 3D display and select **Recalculate footprint separation**.

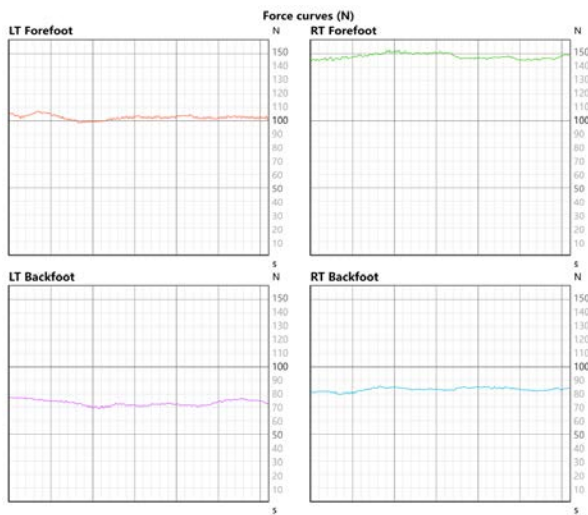
Stance Analysis

12.3 Report (evaluate measurement)



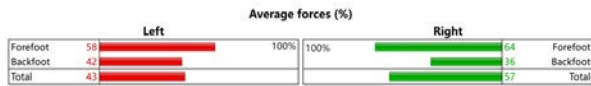
Stance phase, average

In this figure, the average load distribution under the feet is shown in color. The color scale allows quantification of the load distribution. The middle dots show the location points of the center of Pressure (COP) over time. Left and right dots represent the respective COPs of the left and right footprint.



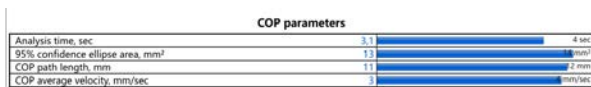
Force (N)

Four force-time diagrams show the time course of the vertical ground reaction forces of left/right contact surface as well as forefoot and backfoot.



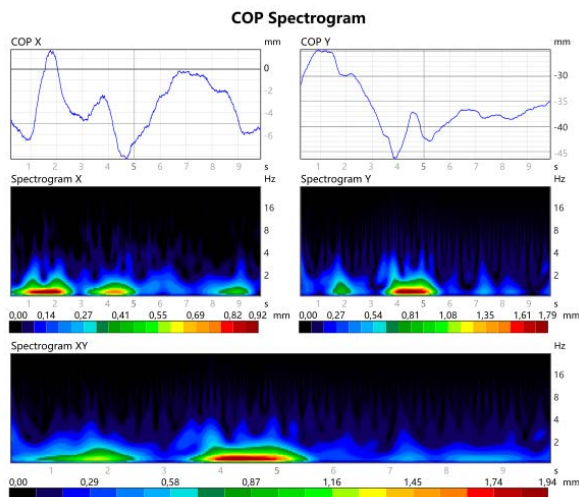
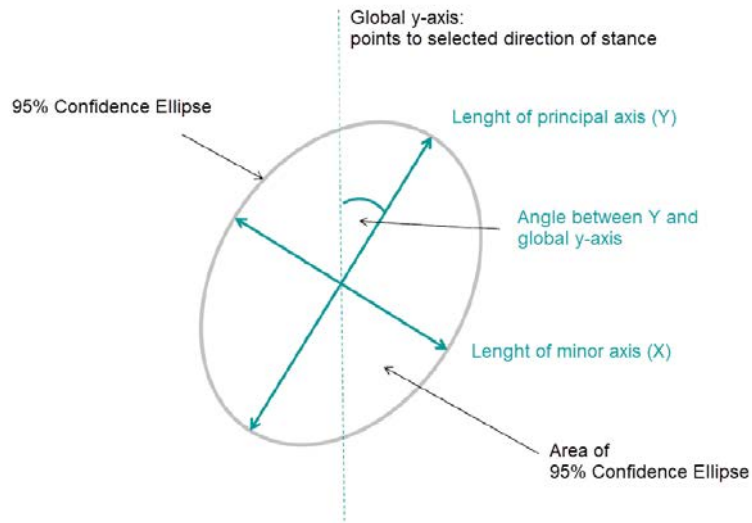
Average forces (%)

The bar chart shows the average percentage load distribution of left and right fore- and backfoot, respectively, as well as the percentage load distribution of left and right footprint.



COP parameters (see illustration)

Stance Analysis



COP Spectrogram

The spectrogram is not included in the stand analysis report by default and must therefore be added once to the desired report profile via **Customize**.

It relates to the movement of the total COP in the X and Y directions.

Settings for the spectrogram can also be made in the **Customize** dialog.

12.3.1 Help for the interpretation of determined data

These following values apply to a normal load distribution when standing upright, barefoot:

Ideal load distribution

An even load distribution of 50% each between the left and right bearing surface is considered ideal.

Distribution between forefoot and heel

Between the forefoot and heel, the load should be distributed approx. 1/3 (33%) on the forefoot and approx. 2/3 (66%) on the heel.

Maximum pressure load

Between the forefoot and the heel, the load should be approx. 1/3 (33%) on the forefoot and approx. 2/3 (66%) on the heel. In the case of sensitive feet (e.g. diabetics, etc.), the pressure should not exceed 11-N/cm² if possible, in order to avoid plantar damage to the foot.

13 Gait Training FDM-T

With this module, you perform gait training in combination with a zebris FDM system.

For setup and installation of the device or projection unit (beamer), please refer to the enclosed hardware manual.



Please make sure to keep the beamer switched off in all other applications except the "Projection" modules in order not to endanger the patient by irritations on the running surface.

13.1 Measuring (preparation, settings)

Before a training session can start, you must first set the screen output and perform a one-time calibration of the system.

13.1.1 Screen output setup

To use the "Gait Training" projection, set your screen output as follows:



Windows 10/11

Press and hold the **Windows key**. Press the **P** key repeatedly to set the selection to "Extended" and then release both keys. The application should now only be visible on the PC screen, while the projection shows the empty desktop.

Alternatively, right-click on the desktop (Windows background) and then click on **Display Settings**. Now select **Extended** from the Multiple Displays drop-down list and click **OK**.

Gait Training FDM-T

13.1.2 Projector setup

Due to transportation or a long period without power supply, it is possible that the projector loses the display configuration.

The following describes how to restore the correct display options.

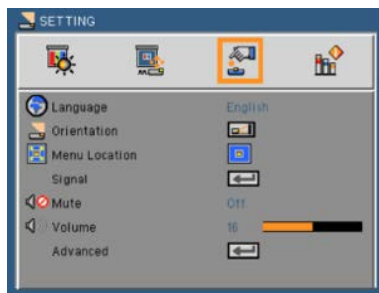


For the projector model shown here, follow the steps below. If your projector is different, skip this section.



The settings menu is projected. Therefore, make sure that you can see the projection, e.g. hold a sheet of paper in front of the projector at a small distance.

To be able to change the **settings of the projector**, use the buttons located on the device. Note that the arrow points downwards towards the MENU/EXIT buttons.



By pressing the **MENU button**, you will enter the adjacent projector menu, then use the **left/right** arrow buttons to select the **SETTING icon**.

By using the arrow keys **up/down** you get to the sub-item **Orientation**, this is confirmed by pressing **ENTER**.



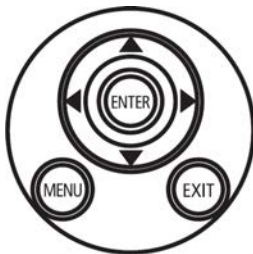
Use the **left/right** arrow keys to select the **CEILING FRONT** orientation. After successful selection, confirm again with **ENTER**.

Close the settings with **EXIT**.

Gait Training FDM-T



For the projector model shown here, follow the steps below.

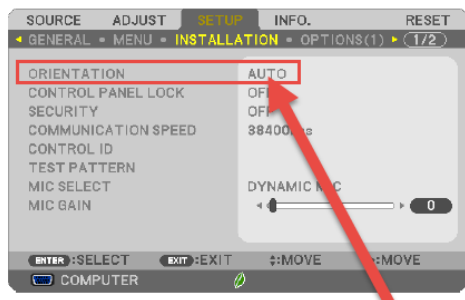


The settings menu is projected. Therefore, make sure that you can see the projection, for example, hold a sheet of paper at a short distance in front of the projector.

To be able to change the **settings of the projector**, use the buttons located on the device. Note that the arrow points downwards in the direction of the MENU/EXIT buttons.

Press the **MENU button** to enter the projector menu shown on the left, then use the **left/right** arrow buttons to select the **SETUP** tab.

[INSTALLATION]



Use the **left/right** arrow keys to go to the **INSTALLATION** sub-item, this is confirmed by pressing **ENTER**.

Use the **up/down** arrow keys to select the **ORIENTATION** menu item and then use the **left/right** arrow keys to select the **CEILING FRONT** alignment. After successful selection, confirm again with **ENTER**.

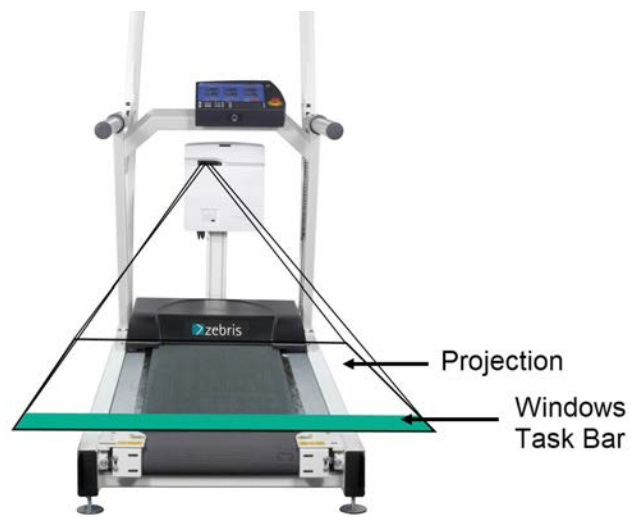
Close the settings with **EXIT**.

Gait Training FDM-T

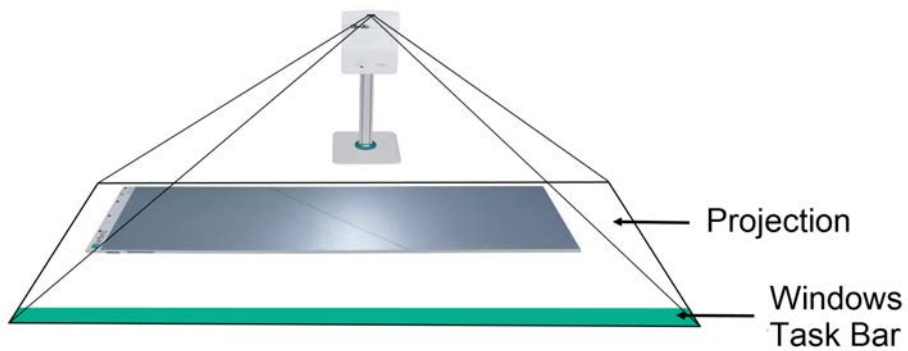
Orientation

After you have made the settings as described, the display should look like the following illustration. The easiest way to test the projection orientation is to use the Windows desktop. The Windows taskbar (at the bottom of the screen) should be oriented as in the sketches below. The displayed font should not be mirrored.

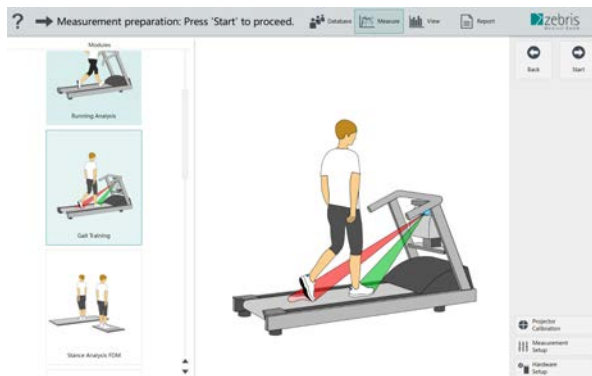
FDM-T



FDM



13.1.3 Projector calibration



1. Start calibration

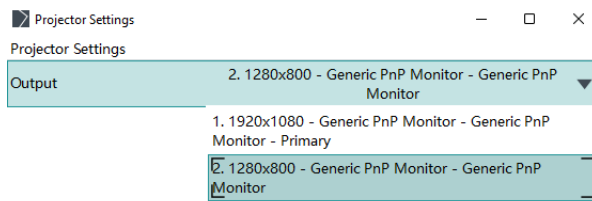
Click on **Projector Calibration** in the right-hand toolbar .

2. Selection of the display unit

When using multiple monitors/ projectors with extended desktop, the projection unit must be set here.

In case of duplicated or cloned display, select the primary display device.

Then click **Next** to start the calibration process



Calibration process

A green dot appears on the screen, which can be moved by **holding down the left mouse button**.

1. Have a look on the treadmill and move the point to a corner of the tread.
2. When you have placed the point, press with one finger in the center of the white cross without touching the tread elsewhere. The point will now disappear and the next one will appear for placement.
(If the dot does not disappear when you press it, it is probably placed outside the sensor area. Move it slightly out of the corner toward the center and press again in the center of the white cross.)

Repeat these steps for all four points in the four corners of the tread. You do not have to follow any order

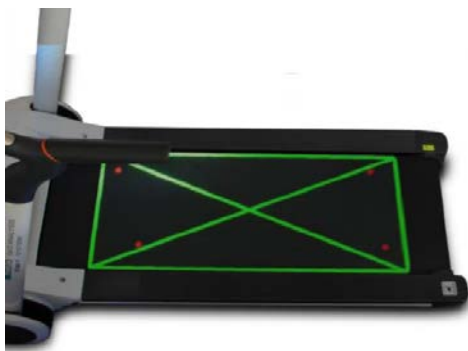


Please note that the measuring platform does not extend under the entire running surface for stability reasons. There is an edge on all sides, but especially towards the front and back in the running direction.

Gait Training FDM-T



After the fourth point, the result is displayed. After calibration, a green rectangle with a diagonal cross and four red dots appear on the treadmill for control. The four red dots show the points you pressed on the pressure measurement plate.



3. Checking the calibration

The green rectangle shows the position of the measuring platform in the treadmill as calculated by the calibration.

Please check if the edges of the rectangle are approximately parallel to the edge bars of the treadmill (the display on the monitor appears distorted). If this is not the case, please repeat the calibration.

Click **Next** to complete the calibration.



Calibration must be performed again if the screen resolution has been changed or the position of the projector has been changed.

Gait Training FDM-T

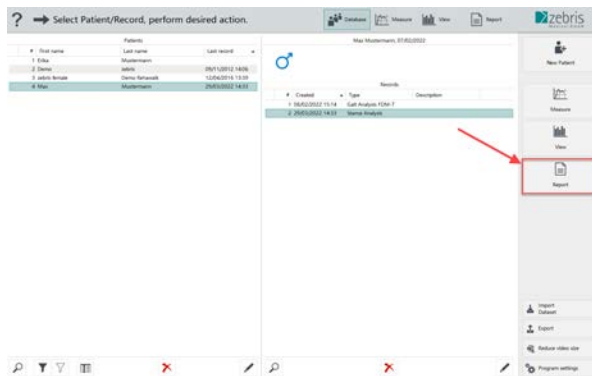
13.2 Measure (carry out training)

The basis of every training session with the Gait Training module are the gait parameters from a gait analysis or a already performed training session. To transfer gait parameters from existing records, first open the report of the selected record (see Report chapter [64](#)) and check the plausibility of the gait parameters.



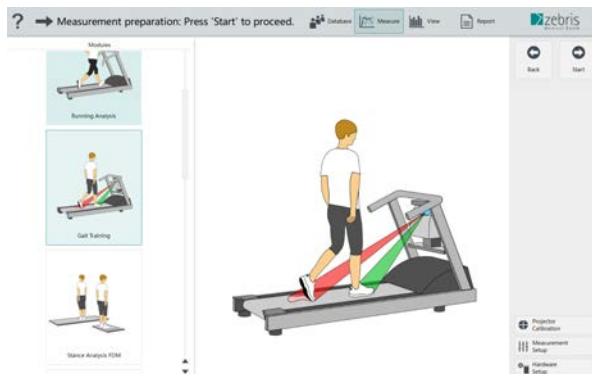
A patient's gait parameters cannot be used for training with other patients.

After a successful check, close the report again and proceed as follows.



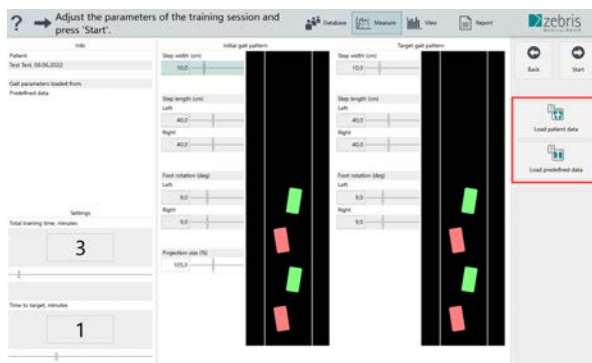
1. Database

First open the report of a previous gait analysis measurement of the corresponding patient via **Report**.



2. Module selection

Click on **Measure** and select the Gait Training module on the left. Then click on the **Start** button.



3. Load gait parameters

Load the gait parameters and foot contours from the last opened report by clicking on **Load patient data**.

Alternatively, you can load predefined sample data.

For notes on setting the training parameters see Training preparation [98](#).

Gait Training FDM-T

13.2.1 Training preparations

You define the total duration of the training with the slider Training duration total (FDM-T) or in the measurement settings (FDM).

Info

Patient
Test Test, 08.06.2022

Gait parameters loaded from
13.06.2022 17:06, Virtual Training, ForestWalk_Record
000

Speed: 0,8 m/s | 3,0 km/h | 1,8 MPH

Info

Displays patient data, description of the record and the average speed from the loaded gait analysis.

Display all steps within the calibrated area

In the settings, you can choose whether only the next target at a time or all targets within the calibrated area are projected.

Adaptive training

In adaptive mode, the next step target is adapted to the position of the last foot. This mode is optional and becomes active by checking the checkbox.

In the training preview, the user must walk a few steps without a target for calibration. After a short time the adjusted targets appear. Only then the training can be started.

As the position of the targets in adaptive mode can change with each step, it is recommended to project only the next step target at a time. To do this, remove the tick in front of "Display all steps within the calibrated area".

Display all steps within the calibrated area

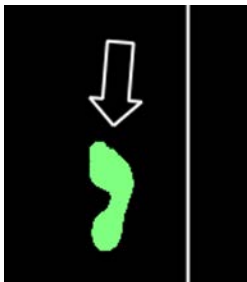
Adaptive mode

Helper arrow

Helper arrow

In the training settings or in the preview/ training mode below the record button, the helper arrows can be shown or hidden.

Arrows appear in front of the footprints to help the patient hit the steps.



Gait Training FDM-T


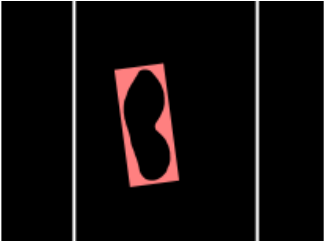
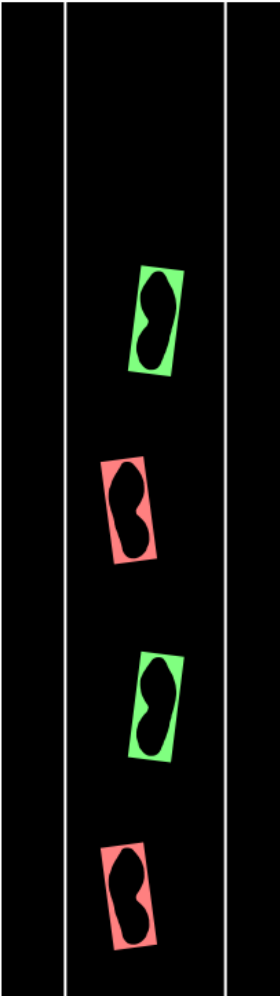
Initial gait pattern

Step width (cm)
5,2

Step length (cm)
Left
58,9
Right
57,3

Foot rotation (deg)
Left
7,6
Right
7,2

Projection size (%)
105,0



Training parameters

Set the gait parameters to be trained here. After loading the footprints, the parameters are set automatically.

By clicking on the small circle above each slider, the original value can be restored.

You can change the parameters either with the slider or by direct input into the text fields.

In the display area next to the parameters, your changes are visualized directly. The thick white lines represent the edges of the measurement platform, i.e. the measured area during a record.

For a correct record, you should make sure that the footprints do not overlap these edges to the outside.

Change projection pattern

1. The projection is inverted, making the displayed area appear larger and making it easier to hit the footprint inside.
2. Display as original footprints
3. Displaying the target areas as rectangles

Gait training with treadmill

During gait training with a treadmill, the gait parameters can be automatically adjusted step by step from the **start of training** to the **training goal**. You can set how long this takes under **Duration of gait pattern adjustment**.

Before you start the training, you should decide whether foot rotation, track width and track length should remain the same or be adjusted during the training:

Gait Training FDM-T

1. Parameters remain the same

Option a:

Set the desired gait parameters under **Training target** and set the **Duration of gait pattern adaptation** on the left to zero. You can disregard the settings under **Training start**. Please note that the target gait pattern is only displayed after starting the recording.

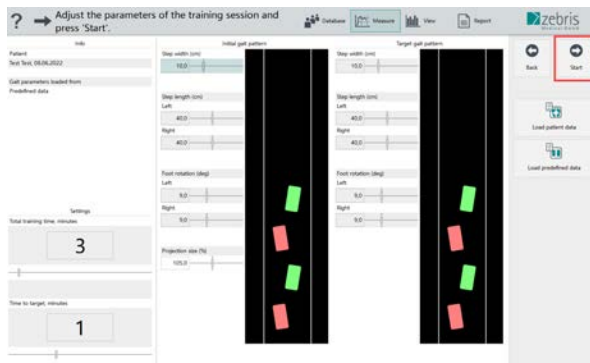
Option b:

Set the same gait parameters under **Training start** and **Training target**. You can disregard the setting for the duration of gait pattern adaptation.

2. Parameters should be adjusted linearly

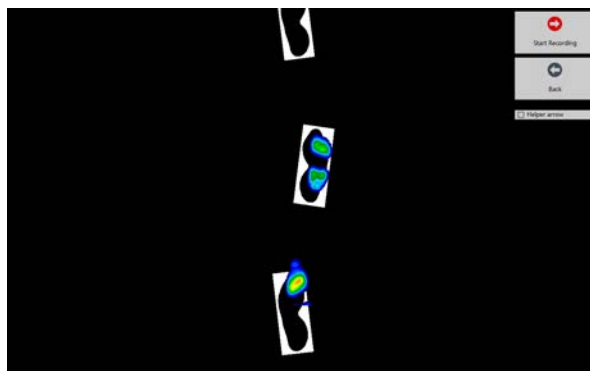
At **Training start** define the parameters that are active at the beginning, at **Training target** define the parameters at the end of the training. Then define the **duration of the gait pattern adjustment** in minutes at the bottom left. The transition is linear over the entire duration.

13.2.2 Training



Start

After defining the training settings, click **Start**. The display now switches to preview mode.



Preview mode

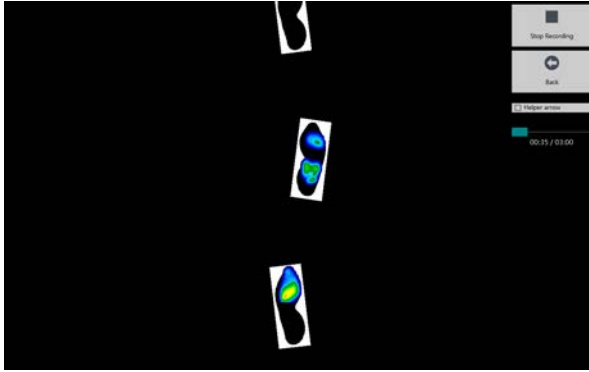
Now start the treadmill at the desired speed and let your patient get used to the projected footprints.

The pressure distribution is displayed in real time for better control.

To start the training, click **Record**. Only now the training time runs out and the parameters are adjusted linearly according to the setting.

Click on **Back** to return to the training preparation.

Gait Training FDM-T



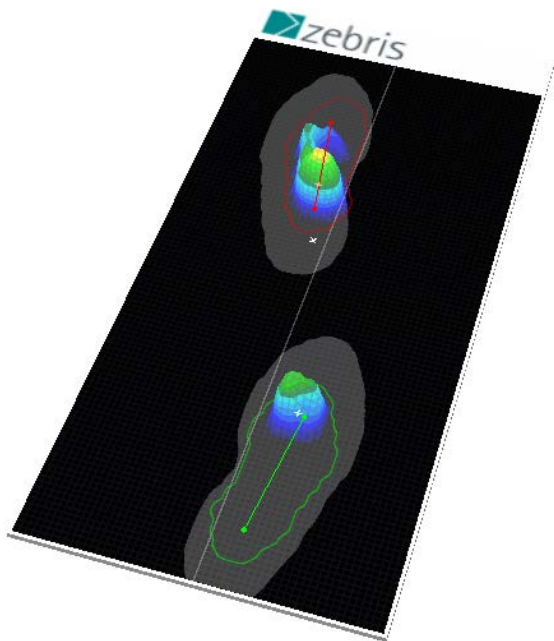
Measurement

To end the record early click **Finish**.

Click on **Back** to return to the preview mode.

13.3 View (edit measurement)

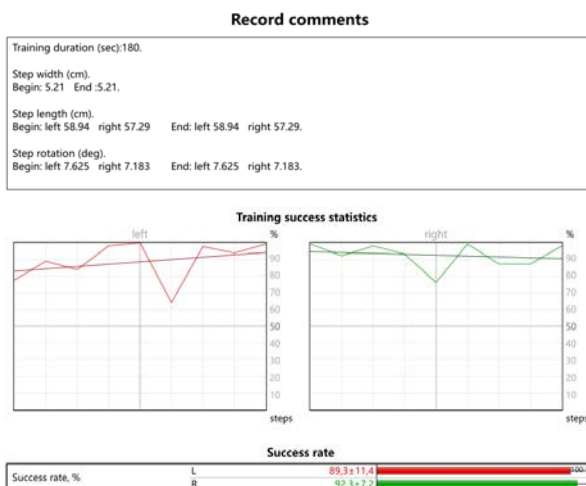
The **View** mode is equal in function to the Gait analysis, see chapter [View \(Edit measurement\)](#)⁵⁴.



In addition, the projected footprints are displayed as a gray shadow.

Thus, a visual assessment of the training can be made in advance.

13.4 Report (evaluate measurement)



Training parameters

The overview of the training parameters is automatically noted in the record comments.

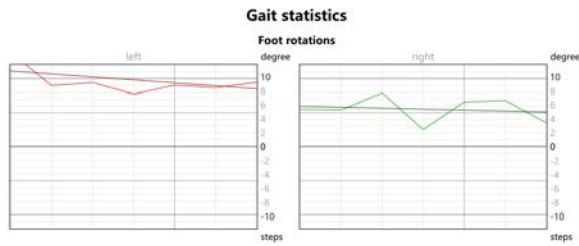
Training success statistics

This graph shows the percentage hit rate for each step, i.e., the percentage of the patient's footprint that is within the projected area.

Training success

Gait Training FDM-T

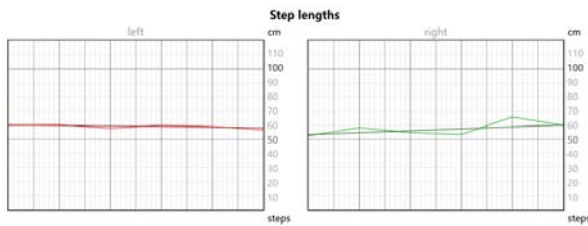
Display of the percentage hit rate over all steps for the left and right foot.



Foot rotation

Here the foot rotation left and right is displayed as a curve for each step. The superimposed straight line shows the target.

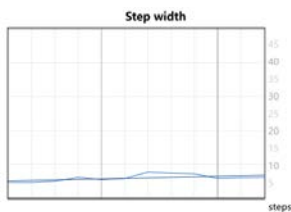
The foot rotation describes the angle between the longitudinal axis of the foot and the running direction (negative value = internal rotation, positive value = external rotation).



Step length

Display of the step length of each step. The superimposed straight line shows the target.

The stride length includes the distance between the heel strike of one side of the body to the heel strike of the contralateral side.



Step width

This figure shows the track width for each step. The superimposed straight line shows the target.

The track width describes the distance between the right and left foot.

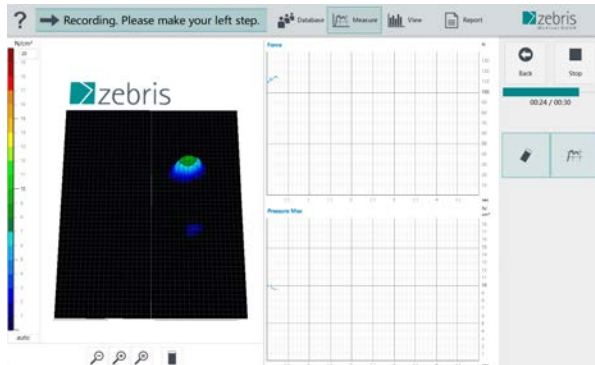
Roll-off Analysis

14 Roll-off Analysis

With this module, you perform Roll-off Analysis in combination with a zebris FDM system.

14.1 Measure

The measurement is started as in each module, see chapter [Performing a measurement](#)⁵¹.



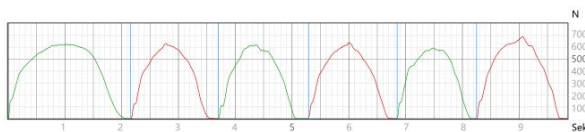
Measurement

Your patient can walk across the plate as many times as desired in the directions outlined on the plate, one foot at a time. Follow the **instructions as to which foot** is expected next.

You start with the left foot. The default changes to the other foot after each step. The assigned body side can also be changed later in the View mode.

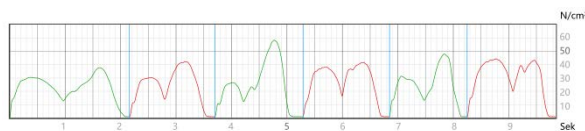
14.2 Report (evaluate measurement)

Many elements of this report are identical to the gait analysis report, see [explanation of report contents](#)⁷³. Specific contents of the roll-off analysis are described separately below.



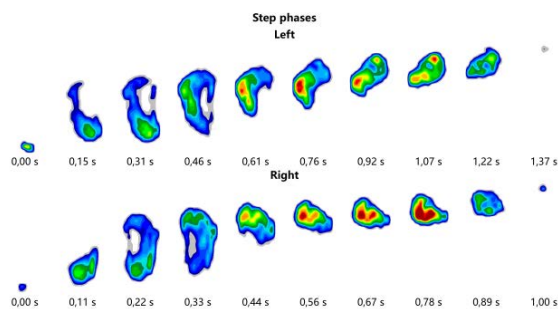
Force curves (raw data)

The force curve of each individual contact is shown here. Cycles are separated by vertical lines.



Pressure curves (raw data)

The pressure curve of each individual contact is shown here. Cycles are separated by vertical lines.



Step phases of the roll-off process

This representation draws a pressure plot per time point within an roll-off process. For this purpose, each roll-off process is divided into 10 equal time units.

15 Virtual Training

With this module, you conduct Virtual Training with the associated zebris FDM system.

15.1 Measure (carry out training)

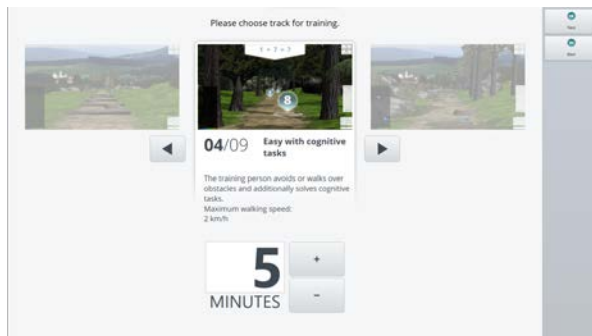
The procedure up to the start of the module can be found in the chapter [Performing a measurement](#) ⁵¹.



Preparation

Instruct your patient to stand next to the treadmill or on the side bars in order to perform a zero measurement in **an unloaded state**.

Click on **Next** to access the selection of the training distance.

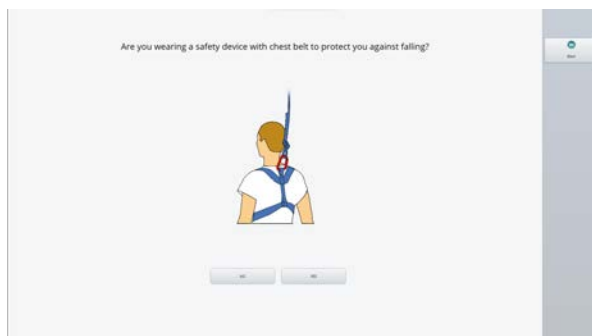


Training path

Here you select the training path by clicking on the left/right arrows and set the **training duration** with +/-.

If you have only purchased the demo version of the virtual training, the setting of the training duration is not possible and the training will be limited to 1 minute and 3km/h.

Click **Next** to start the training.



Safety query

If you have secured your subject with a safety belt, click **YES**.

If you only have a belt clip as a safety unit on your treadmill, click **NO**. The max. training speed will be limited to 3km/h in this case. If the speed is higher, a message will prompt you to reduce the speed.



The safety belt should be worn at all times to protect the user from physical harm and injury, regardless of the speed of the treadmill.

Virtual Training



Then wait until the track is loaded. Depending on the size of the track, the loading time varies between 10 and 30 seconds.



Training

Start the treadmill. The patient should first walk a few steps on the treadmill to get used to the walking sensation.

The track ends automatically after the previously set training duration has elapsed.



Recording

The recording duration can be determined in the **measuring settings** in the module selection.

Once the recording has been started, the measurement signals are recorded for 10 seconds as long as the predefined measurement time has not been changed. The green progress bar shows the elapsed measurement time. The measurement can be stopped at any time by clicking the **Stop** button.

Any number of recordings can be made in succession. These are automatically named in ascending order in the database.



End of training

After the set training duration has elapsed, the training parameters (training time, distance and points) are displayed.

Click on **Repeat** to repeat the training with the same training duration.

Back jumps to the training path selection.

Virtual Training

15.1.1 Description of the obstacles



Tree trunk

Tree trunks should be climbed over or bypassed.



Tree stump

The tree stumps sink when they are stepped on. The higher the pressure, the deeper the tree stumps sink into the forest floor.



Stones

Here you have to step on the stones. If the stones are not hit but the water, the water turns red and points are deducted.



Puddle

Puddles should be stepped over or bypassed. Stepping in the puddle will result in a loss of points.



Wooden plank

Points can be collected by balancing on the wooden plank. If you miss, you will lose a point.



Parallel planks

By balancing parallel on the wooden planks points can be collected.



Fallen trees

Fallen trees should be stepped over or avoided. Stepping on a tree trunk will result in a loss of points.



Rolling stones

Rolling stones should be stepped over or avoided. Stepping on one of the stones will result in a loss of points.

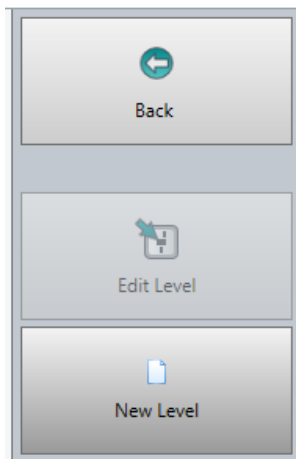
15.2 Level Editor



1. Open level editor

Click on Level Editor to open it.

Virtual Training



2. Create / edit level

Click on New Level in the right bar to create a new level with the help of a wizard.

After selecting a listed level and clicking on **Edit** Level you can open an existing level and edit it. Click on **Back** to return to the module selection.

3. Selection 3D environment

Here you can select the 3D world. At the moment only the "Forest Environment" is available.

Clicking **Next** will take you to the level properties.

With **Cancel** you end the assistant and get back to the level editor.

4. Level properties

Please enter the level properties here. Mandatory fields are "**Name**" and "**Description**".

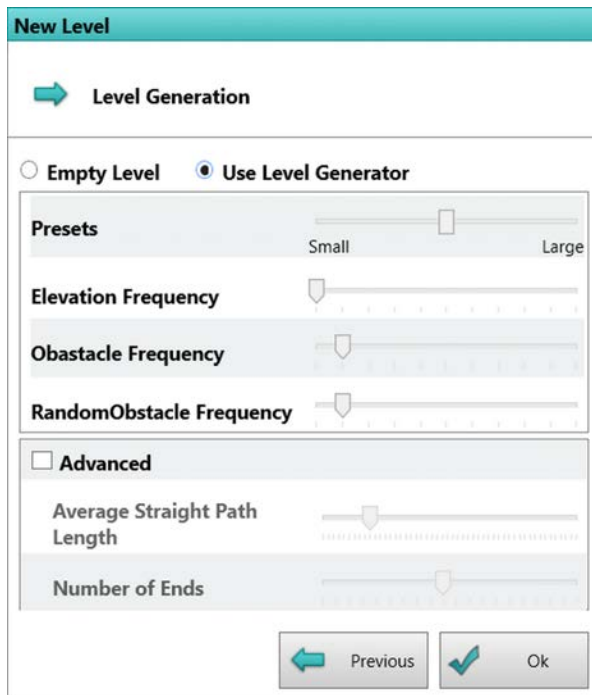
Click on the image to open a file selection. Here you can select and insert any image.

With a click on **Next** you get to the level generator, with **Previous** you get back to the level info.

You can leave the assistant by clicking **Cancel**.

15.2.1 Automatically create a level

There are two ways to create a new level with the Level Editor. The possibility described here is the more comfortable and faster principle with the help of the level generator.



To activate the automatic creation of a level, please click on **Use Level Generator**.

By dragging the sliders you now have the possibility to set the following **parameters**:

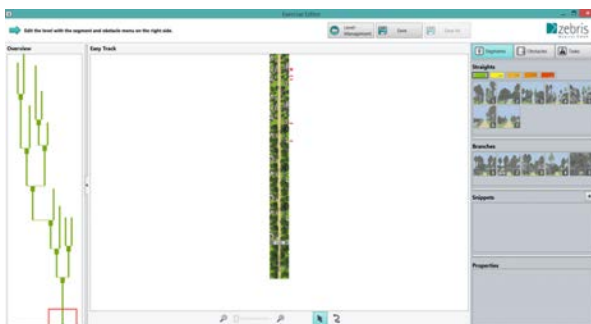
- Path slope
- Number of obstacles
- Number of random obstacles
- Path length
- Number of path ends

By clicking **OK** you finish the wizard and have the possibility to view the generated level in the level editor and edit it if necessary. Click **Previous** to go back one step.

To exit the wizard, click **Cancel**.

15.2.2 Level editor basics

If you have created a level with the help of the level generator, you have the possibility to edit, insert or delete individual segments.



You will see this screen after you have created a level using the level generator.

In the left part of the screen you will see an overall view of your previously created level. The section enclosed by the red rectangle is shown enlarged in the center of your screen. You can use the magnifying glasses or the middle mouse button to zoom in and out of this section. To the right are the elements that you can insert into your level.

Segments

Here you will find a description of the individual path segments that can be added to your level. Mark with a mouse click the spot in the level where the segment should be inserted.

Double-click on a single element to position the segment.

Virtual Training



Straight Segments

Straight Segments are the individual path segments that you pass through in the 3D environment.

Here you have seven different elements to choose from. You can also set their gradient.

Branches

Branches are the segments where the path divides in two directions.

Here you have five different elements to choose from, which you can insert by **clicking** on them.

Elements

Here you will find a description of the individual elements that can be added to the segments.

To position an obstacle, click the one you want on the right side of the Obstacles box and drag it to the desired location in the level.

The size and position of the placed obstacle can be changed with the mouse and the displayed slider.



Obstacles

Obstacles can significantly complicate a level and train the subject's coordination and cognitive skills.

Signs

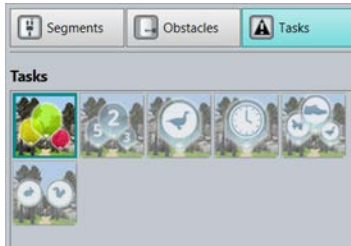
These warning signs are added in the same way as obstacles. They are intended to alert the runner to upcoming obstacles or inclines.

Tasks (Tasks)

Here you will find a description of the individual tasks that can be added to the segments. These are added analogously to the procedure for elements.

Afterwards, the distance between the markers and their number can be set.

Virtual Training



Tasks

The built-in tasks train the coordinative and cognitive abilities of the patient. You can choose from six different tasks.

16 Installing zebris device drivers

Drivers are located on the installation disk in the Drivers folder. If necessary, start the installation as described in the following sections.

16.1 zebris USB driver

The zebris USB driver required for the measurement platform is installed during the installation of zebris FDM. You may be asked to agree to the license agreement and confirm the installation of the drivers.

Please only perform the installation of the USB driver separately if the device is not found automatically or on the instruction of support staff.

16.2 SYNCCam driver



Please note: since Windows 10, the driver installation for the SYNCCam and SYNCLightCam is no longer required.

Data export interfaces

17 Data export interfaces

zebris FDM provides some interfaces to further process or evaluate the recorded data with other programs.

Some export interfaces are available in the **database**, others in the **View** mode, and others in the **Report** mode.

17.1 zebris-own formats

For zebris-own formats, naming is suggested as follows:

[date of birth YYYYMMDD][first letter first name][first letter last name]_[date of recording YYYYMMDD]-[recording time HHMMSS]_[module name]_[export name (optional)]-[type (optional)]-[subtype (optional)]_[numbering if files with the same name already exist at the destination (optional)].[file extension].

The naming of the files cannot be changed individually when fixing the destination paths (see [Export \(Always export to the same folder\)](#)³⁴).

17.1.1 CSV

This export interface is available in **Report** mode.

All curves visible in the report are each output as a single CSV file (comma separated values). The format for the CSV file is selectable.

You can open and edit this file in a simple way, e.g. in Excel as a table.

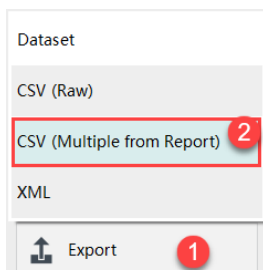
The first line contains all basic informations, starting with the patient and record information.

The standard deviation of parameters is displayed as an extra column, with the name of the parameter and the addition "SD" (standard deviation).

Text qualifiers are the quotation marks ("), separator is the semicolon (;), the default is taken from the defaults of your operating system, you can choose a different separator when exporting if necessary.

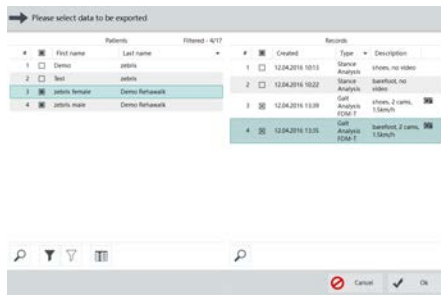
17.1.2 Multi-CSV

Multi-CSV enables batch processing of the report parameters of several patients and measurements in one csv file. To do this, select the following procedure:



In the database under **Export** select **CSV (Multiple from Report)**.

Data export interfaces



Select and confirm the desired measurements.

G	H	I	J	K	L
Record type	Record description	Average max load Forefoot L [N]	Average max load Forefoot R [N]	Average max load Backfoot L [N]	Average max lo Backfo [N]
7	Gait Analysis FDM-T shoes, 2 cams, 1.5km/h	691,317	772,47	587,222	63
9	Gait Analysis FDM-T barefoot, 2cams, 1.5km/h	611,543	571,04	569,092	50
5	Gait Analysis FDM-T barefoot, 2 cams, 1.5km/h	558,153	529,832	440,915	45
9	Gait Analysis FDM-T shoes, 2 cams, 1.5km/h	521,721	512,86	414,212	42

A csv file is then created containing one line per measurement.

17.1.3 JPG

This export interface is available in **View** mode.

One footprint per page is saved as a .jpg graphic. The graphic has a point density of 72dpi, white background and a 20mm wide white border.

You can choose to export the average print, the maximum print image or the average stance phase, if available.

The generated graphics correspond to those generated in the report.

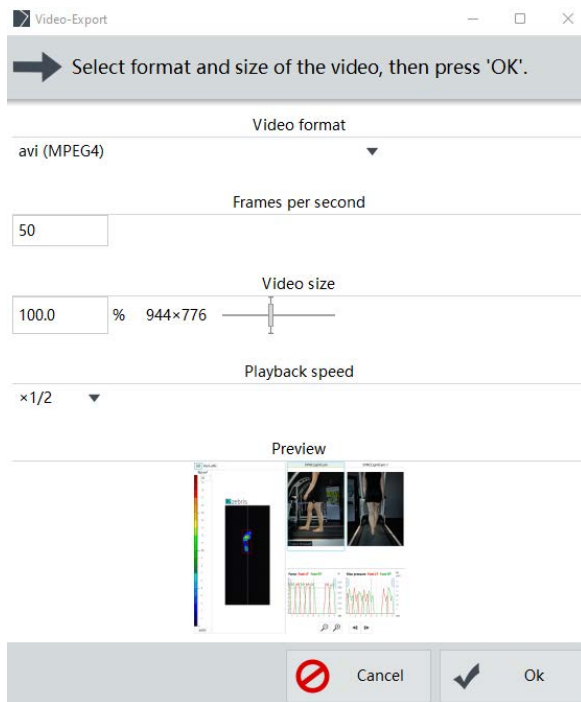
17.1.4 Video export

This function allows you to create a video of the displayed image in **View** mode.

In the video, all buttons are removed and the display elements are shown according to your setting.

When you call the function, you will see a preview image of the video and you can make settings that affect the created video.

Data export interfaces



Video format

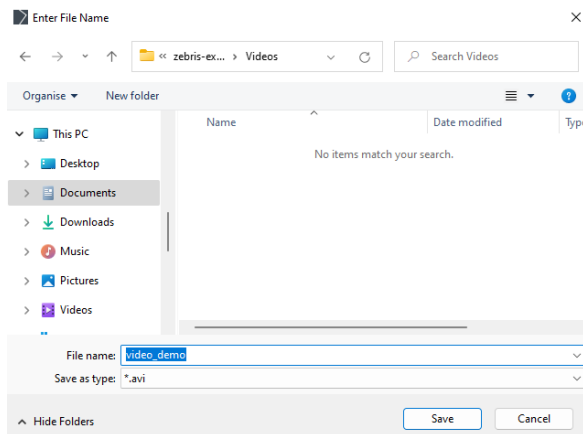
If your video player has problems playing, you can select a different file format here. Please note that the resulting file size will vary due to different compression of formats.

Dimensions (resolution)

Here you can change the image size of the video, default setting is the size available on your monitor (100%).

Playback speed

Set the playback speed here, please note that exporting the measurement at lower speed will take longer because more intermediate frames are generated.



In the second step you choose a location and a name for the video.

After you confirm the location, the video export will run in live mode. After clicking into the image, you will be asked if you want to end the video at this point. The display speed may differ depending on the processing power of your computer, but the video will always be generated at the playback speed you specified.

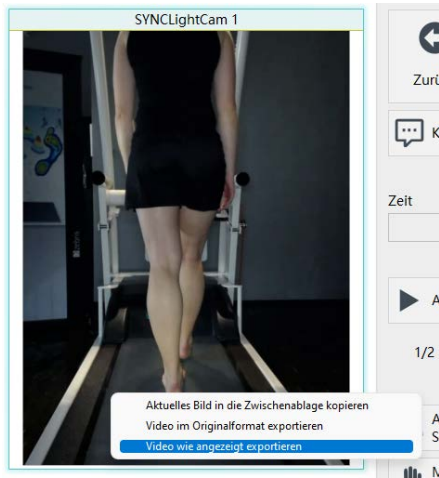


You can play the finished video with any video player that supports the generated format.

If errors occur during playback or playback is not possible, try to generate the video in another format or contact the manufacturer of your video player.

Data export interfaces

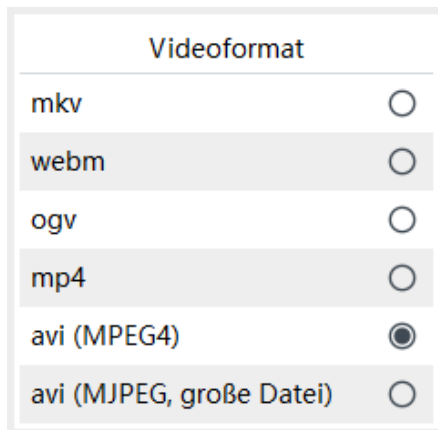
17.1.4.1 Export videos as displayed



Export video as displayed

Videos can also be exported "as displayed". The current settings for analysis interval, zoom and grid are taken into account.

To do this, right-click on the desired video and select **Export** video as displayed.



Select video formats for export

In addition to the avi format, various other formats can also be selected for the video export with this export variant.

17.1.5 XML

This export interface is available in the **database** for Gait Analysis FDM/FDM-T and Stance Analysis FDM/FDM-T modules .

The data format is intended for further processing by software packages with XML parser function or self-programmed software.

In addition to basic information such as patient and record data, the size of the force plate used for the measurement and all pressure plots in the analysis interval are output, in the case of gait analysis both the individual plots of the rolling processes and the associated maximum pressure plot.

The XML structure used is shown below, relevant tags are commented in the text (for the structure of an XML file, refer to the technical literature):

```
<type>gait_treadmill</type>
```

Measurement module used

```
<program>zebris FDM</program>
```

Software name

Data export interfaces

<code><program_version>1.12</program_version></code>	Software version
<code><format_version>1.0</format_version></code>	Format version
<code><measuring_system/></code>	(used internally)
<code><patient></code>	
<code><first_name>Demo</first_name></code>	
<code><last_name>zebris</last_name></code>	
<code><born>2012-01-01</born></code>	Patient information
<code><sex>female</sex></code>	
<code><code/></code>	
<code></patient></code>	
<code><measured>2012-11-09T12:06:06Z</measured></code>	
<code><description>Demo</description></code>	Record description
<code><cell_count></code>	
<code><x>56</x></code>	Size of the measurement matrix used in the measurement
<code><y>128</y></code>	
<code></cell_count></code>	
<code><movements></code>	Order structure according to the following content, several sublevels possible
<code><movement></code>	
<code><type>gait</type></code>	Type of recorded data
<code><id>gait_1</id></code>	Consecutive numbering
<code><clips></code>	Division of measurement cycles, if available (e.g. at module gait analysis FDM)
<code><clip></code>	
<code><type>events</type></code>	Type of recorded data

Data export interfaces

<code><id>events</id></code>	Designation of the data
<code><count>47</count></code>	Total number of similar data blocks
<code><data></code>	
<code><event></code>	Event within a data block
<code><type>gait_step</type></code>	
<code><id>event.1</id></code>	
<code><begin>0.250</begin></code>	Start time (event)
<code><end>1.020</end></code>	End time (event)
The following information is only available for recordings with step detection:	
<code><side>left</side></code>	Body side
<code><cell_size></code>	
<code><x>8.464</x></code>	
<code><y>8.464</y></code>	Size of the sensors in [mm]
<code></cell_size></code>	
<code><heel></code>	
<code><x>38.53</x></code>	
<code><y>134.3</y></code>	Heel point of the rotation line
<code></heel></code>	
<code><toe></code>	
<code><x>40.14</x></code>	
<code><y>153.8</y></code>	Forefoot point of the rotation line
<code></toe></code>	
<code><max></code>	Characterization of the following content (e.g. maximum pressure)

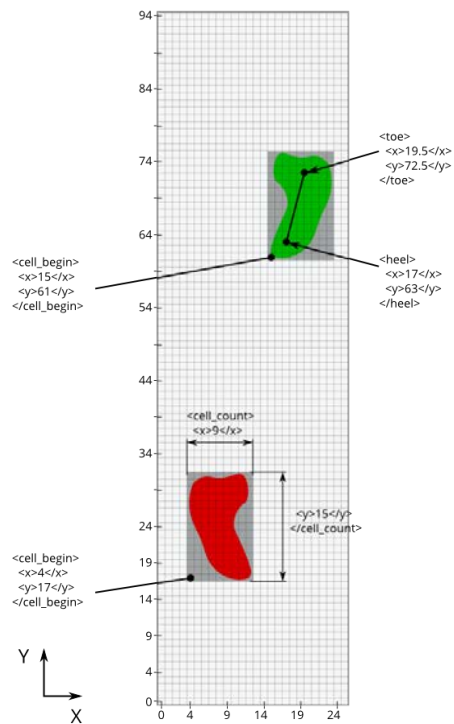
Data export interfaces

plot, average plot, data package
"Quant", etc.)

```
<cell_begin>
  <x>4</x>
  <y>17</y>
</cell_begin>
<cell_count>
  <x>9</x>
  <y>15</y>
</cell_count>
<cells> 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0
[... ] </cells>
```

Coordinates and matrix

zebris XML export: gait



Data export interfaces

17.1.6 XML (raw)

In contrast to the XML export, only the matrix data for each individual measurement in the entire interval is output here.

For recordings with a treadmill, the speed per measurement time point is output in [m/s] at the end of the file:

```
<clip>
<type>analog</type>
<id>velocity.treadmill.1</id>
<begin>0.000</begin>
<frequency>100</frequency>
<count>3012</count>
<units>m/s</units>
<data>
<quant>0.62</quant>
<quant>0.84</quant> [...] </data>
```

17.2 Third party formats

17.2.1 APD export

Allows you to save gait and stance analysis data in APD format according to pedcad GmbH specifications.



The file name is automatically generated according to the following scheme:

```
{last name}_{first name}_{birthday}_me-{date taken}-{time taken}_{type taken}-{AVG for average pressure image or MPP for maximum pressure image}_{L for left foot or R for right foot}.apd
```

Example filename:

```
Mustermann_Max_1983-03-26_me-2014-01-31-16-03_Standanalyse FDM-T-AVG_L.apd
```

Stance Analysis

To export a stance analysis plot, click **APD Export** in the lower right corner .

Data export interfaces

This will generate a maximum pressure plot per page from all data within the specified analysis interval. Please note that the distinction "MPP" at the end of the file name is omitted.

Gait analysis

1. To export from a gait analysis, click **APD Export** in the lower right corner of the view screen .
2. You will be prompted to first select a left contact for export. Please now place the cursor in the timeline on the left contact you wish to export.

At this point, it is useful to **zoom** into the pressure plot, if necessary, activate the maximum pressure plot in the 3D view so that you can better distinguish between the individual contacts .

4. Then click **Next**. Now you have to select the right contact in the same way. Then click Next again, four files will now be exported (average and maximum pressure plot for each side).

18 Data import interfaces

zebris FDM provides some interfaces for data exchange with other software packages, such as practice management software.

To find out whether your software can handle one of these interfaces, please refer to the information provided by the manufacturer.



Mandatory information for the patient database in the zebris FDM software is the first name, last name, date of birth, and gender of a patient.

If measurements are transferred from older software packages that are missing mandatory information, the field will initially remain empty.

However, if the missing field is a prerequisite for an action, you will receive a corresponding message.



In each case, the setup of the interface, as well as the available scope, is described below.

If the interface is provided by multiple vendors, your third-party vendor's software is referred to below as **third-party software**.

18.1 GDT

18.1.1 Short introduction

The GDT interface can be used to transfer patient data from one patient management software to another. GDT is a German standard of the Quality Ring Medical Software (<http://www.qms-standards.de>).

Data transfer takes place via a file in text format generated by the patient management software (referred to below as **PVS**). One file is generated for each patient. This contains the data to be imported by the target software in a predefined structure.

For details on the records and the structure, please refer to the GDT interface specification of the Quality Ring Medical Software (<http://www.qms-standards.de>).

18.1.2 Implementation in the zebris software

Both individual patients and a folder with several records can be imported. Supported records are 6301, 6302 according to GDT version 2.1. After successful import the source files are deleted.

18.1.2.1 XML file

An xml file (e.g. "import_gdt.xml") with the following content is used for the import:

```
<?xml version="1.0" encoding="utf-8"?>
<Scripts.Script xmlns="zebris.shell.3,1">
  <Struct id="commands">
    <Scripts.Interfaces.GDT.Import id="import_gdt">
      <String id="path" value="c:\Exchange\GDT\*.*/>
    </Scripts.Interfaces.GDT.Import>
  </Struct>
</Scripts.Script>
```

Data import interfaces

```
</Struct>  
</Scripts.Script>
```

The yellow highlighted path must correspond to the location of the exported GDT files. A "*" at the end means that all files in the folder are checked for the GDT format. An asterisk stands for any characters allowed in the file system.

It is possible to specify the following for the file filter:

- a specific file (e.g. "patient.gdt", "patient.txt", "patient.xyz"), then only this file will be searched for
- a file extension (e.g. "*.txt", "*.dat", "*.gdt"), then only the file or all files with this extension will be checked
- partial names, e.g. with "G*.txt" all .txt files in the specified folder are checked, which begin with a G

The name and location of this xml file must be passed as a command line parameter to the zebris software (see [Command prompt parameters](#)^[122]).

18.1.3 Setting up the interface

Since the GDT functions are implemented in various ways, only the process and the necessary transfer parameters are described here. Details about settings of the PVS can be found in the corresponding manufacturer information.

18.1.3.1 Command prompt parameters

The call from the PVS must be as follows:

```
{complete path to the zebris-Software.exe} execute import_gdt.xml
```

Both yellow highlighted parts must be replaced with the corresponding file paths, the xml file can either be in the same path as the .exe file of the zebris software, then only the file name must be specified. If the xml file is located in a different path, this must be noted as an absolute path specification.

Example

```
"C:\Program Files\zebris\zebris FDM\zebris.fdm.exe" execute "C:  
\Interfaces\GDT\import_gdt.xml"
```

Please note: Paths must be enclosed in quotation marks, especially if spaces are included.

18.1.3.2 Procedure of data transfer PVS - zebris-software

Your PVS stores the data to be exchanged in one place, e.g. on your hard disk. The PVS then starts the zebris software and passes a command prompt parameter.

The zebris software then performs the import and searches for GDT-formatted patient data at the transfer location specified in the xml file.

The transfer location is now searched for files to be imported. Valid files are imported into the zebris database. The last imported patient is preselected.

If a patient with the same mandatory fields has already been created, the information will be overwritten with the imported information.

The import can only be triggered when the zebris software is closed, otherwise you will receive a message informing you that the zebris software must be closed first.

Data import interfaces

18.2 PAEDUS

18.2.1 Short introduction

The PAEDUS interface can be used to transfer patient data from one patient management software to another software. PAEDUS is an interface of pedcad foot technology GmbH(<https://www.pedcad.de>).

The data transfer takes place via a file in text format generated by the patient management software (hereinafter referred to as **PVS**). One file is generated per patient. This file contains the data to be imported by the target software in a predefined structure.

18.2.2 Implementation in the zebris software

Only one patient can be imported at a time. After successful import, the source file is deleted.

18.2.2.1 XML file

An xml file (e.g. "import_paedus.xml") with the following content is used for the import:

```
<?xml version="1.0" encoding="utf-8"?>
<Scripts.Script xmlns="zebris.shell.3,1">
  <Struct id="commands">
    <Scripts.Interfaces.Paedus.Import id="import_paedus">
      <String id="path" value="c:\Exchange\paedus\data.txt"/>
    </Scripts.Interfaces.Paedus.Import>
  </Struct>
</Scripts.Script>
```

The path highlighted in yellow must correspond to the location of the exported PAEDUS file. File names with (e.g. "patient.txt") and without file extension (e.g. "file") are accepted.

The name and location of this xml file must be passed as a command prompt parameter to the zebris software (see [Command prompt parameters](#)^[123]).

18.2.3 Setting up the interface

At this point, only the process and the necessary transfer parameters are described. For details on the settings of the PVS, refer to the corresponding manufacturer information.

18.2.3.1 Command prompt parameters

The call from the PVS must be as follows:

```
{complete path to the zebris-Software.exe} execute import_paedus.xml
```

Both yellow highlighted parts must be replaced with the corresponding file paths, the xml file can either be in the same path as the .exe file of the zebris software, then only the file name must be specified.

If the xml file is located in a different path, this must be noted as an absolute path specification.

Example

```
"C:\Program Files\zebris\zebris FDM\zebris.fdm.exe" execute "C:
\Interfaces\paedus\import_paedus.xml"
```

Data import interfaces

18.2.3.2 Procedure of data transfer PVS - zebris-software

Your PVS stores the data to be exchanged in one place, e.g. on your hard disk. The PVS then starts the zebris software and passes a command prompt parameter.

The zebris software now performs the import. The file stored in the xml file at "path" is now checked for format. A valid record is imported into the zebris database. The last imported patient is preselected.

If a patient with the same mandatory fields has already been created, the information will be overwritten with the imported information.

The import can only be triggered when the zebris software is closed, otherwise you will receive a message informing you that the zebris software must be closed first.

Troubleshooting

19 Troubleshooting


This section lists hint messages of the software and offers you some suggested solutions.

If you receive such a message, please first follow the suggested solutions in this list before contacting our technical support. The list does not claim to be complete.

If you have a suspicion which device is not working correctly, please follow the instructions below step by step and check each time if the system is working again.


19.1 SYNCCam



1. Check if the USB plug is plugged into the computer (if the LED is green, the camera gets power via USB) and if the other USB plug is firmly plugged into the socket of the camera.
2. Open the Device Settings (see Device Settings )⁴⁴, delete the current hardware profile ('Delete' in the upper right corner), press 'Ok' and open the Device Settings again. The automatic device detection starts, confirm and now check if the camera has been added.
3. Plug the USB cable into another socket on your PC and repeat step 2.
4. Open Windows Device Manager and look for the entry Image Processing Devices >> "Logitech HD Pro Webcam C920". If it does not exist, unplug the USB cable and plug it back in. Windows will now install the camera drivers, then the device will show up in the list. If this does not happen, or if the name of the camera is only "HD Pro Webcam C920", right-click this entry and select "Update Drivers...". Windows will now update the drivers and may require a reboot.

19.2 Pressure measuring plate / instrumented treadmill



1. Check that the USB plug is plugged into the computer and the power supply is plugged into a live power outlet (if the LED is green, power is available, the color changes to orange during data transfer, flashing green means there is no USB connection).
2. Check the connections at the bottom side of the force plate or at the interface box in case of treadmills, for details please refer to your hardware user manual.
3. Call up the device settings (see Device settings )⁴⁴, delete the current hardware profile ('Delete' top right), press 'Ok' and open the device settings again. The automatic device detection starts, confirm and now check whether the force plate/ treadmill has been added.

Troubleshooting

19.3 Common

"Could not create frame buffer"

Possible cause	Solution
OpenGL 4.6 not supported / graphics driver was changed	<p>During the software installation it is checked if your graphics hardware supports OpenGL 4.6 that is necessary to run the software correctly. If you receive this error message after installation, you may have two graphics chips or your graphics driver has been changed in the meantime.</p> <p>Systems with two graphics chips usually offer a switching option, in case of a driver change please update the graphics drivers.</p>

"COM-Error: [...] If you use multiple USB devices, please use a different USB port."

Possible cause	Solution
Two or more USB cameras on one controller	<p>When using multiple cameras, depending on the performance of your system, one USB controller per camera is required for correct operation. Plug one camera at a time into another free USB port until the message is no longer displayed.</p> <p>If this does not solve the problem, an external USB plug-in card (e.g. Express card) may be necessary, especially for laptop systems.</p>

Possible cause	Solution
USB camera was unplugged	<p>This error message may also appear if you disconnect the USB cable during recording. Re-establish the connection and start a new measurement.</p>

Troubleshooting

„Winsock error 100061“

Possible cause	Solution
No Internet connection available. (If you activate the software via the Internet, the software will attempt to connect to the license server after you press the activation button).	For example, use an Internet browser to check whether you are actually connected to the Internet. Restart your computer and then try again

19.4 FDM-T Treadmill System

"No speedometer found."

Possible cause	Solution
Tachometer bar code defective	There is a black and white bar code on the front face of the treadmill, to the right of the front idler pulley. This must be intact for the tachometer to function correctly. Typically, the bar code becomes worn when the treadmill belt runs off-center over the roller due to lack of maintenance. The bar code is available as a replacement part to stick on.

"Communication timeout."

Possible cause	Solution
Defective USB cable / connection disconnected.	Check if the USB connection cable is intact, i.e. no cracks, kinks or crushed spots. If in doubt, please test again with another USB cable.
Hardware defect	If the cable connections are intact, the electronics of the pressure measuring plate may be defective. In this case, please contact the support.

"Force plate not found."

Possible cause	Solution
No profile defined	Check whether a device profile has been created in the hardware setup.
Not plugged in/ no power supply	Check the cable connections and the power supply.