Digital X-ray
in the modern medical practice
**Digital images and documents**

*dicomPACS®* is an up to date and sophisticated high tech solution for intelligent image management both for private practices and hospitals. All images created by digital X-ray, CT, MRI and ultrasound units as well as any type of documents such as doctors' letters, diagnostic reports, records of healing processes and faxes may be stored in the digital patient file with the help of *dicomPACS®* and are accessible immediately with one mouse click.

Our carefully thought out archive and backup solutions guarantee fast access to all data while observing maximum security standards in accordance with the German Medical Devices Act. In addition, the software can be integrated easily with all common administration systems.

*dicomPACS®* software includes acquisition, processing, transfer and archiving of image material. Since the software was designed and developed in close cooperation with practicing doctors, you are looking at a well tested and easy to operate instrument for daily diagnosis.
Benefits
Digital X-ray imaging in private practices

Fast access
to all digital patient information such as X-ray images or documents in practices and hospitals

Economical
through time and material savings

No loss of information
as a result of misplaced X-ray images or index cards

Space saving
due to digital archiving of all patient data, eliminating the need for archive space and dark rooms

Images may be accessed worldwide
through the web-based Cloud solution *dicomPACS® MobileView*

Easy communication
between different facilities through exchange of information with other IT systems via a network, intranet or internet

Improved diagnosis
due to optimal image quality and the option of computer assisted image manipulation

Data security
in accordance with European legislation due to an excellent security concept for storing, archiving and distributing of medical data as well as long-term archiving with the in-house solution *Cloud Archiving ORCA*
Benefits of dicomPACS® at one glance

- Full diagnostic software for all workstations in your practice (no ‘light’ versions)
- User friendly and clearly arranged structure, minimal training requirements and short familiarisation period
- Individual adjustment of the user interface to your field of specialisation and individual requirements
- Flexible allocation of shortcut keys for many functions to allow fast work without a mouse
- Parallel processing (e.g. option to continue working during a CD burning process)
- Permanent online availability of all images and data in the network – no need to store old images on CDs
- “Perfect memory” – re-opening of images with all previous markings and settings incl. zoom and orientation
- Parallel diagnostic evaluation of several patients made possible by opening any number of programme windows without loss of speed - depending on the size of the working memory
- Import of any external documents such as doctors’ letters, faxes or X-ray images – no additional module required
- Installation with Windows, UNIX, LINUX or Apple Macintosh
- Optimal data security, speed and compatibility by using standardised SQL database technology
- All images and documents are filed in the international DICOM standard at all times
dicomPACS®

Digital image management by OR Technology

With several thousand installed image processing systems nationally and internationally, the system has consistently proved itself (as of 11/2014)
Structure

Professional work flow with **dicomPACS®**

*dicomPACS®* encompasses the acquisition, processing, communication and archiving of image material.

Thanks to its versatility and many specialised features, *dicomPACS®* allows you to customise each workstation perfectly to your individual needs. Our software has been conceived and developed in close consultation with specialist doctors, which enables us to offer you a versatile and easy to use tool for daily diagnosis. Its success up to now has given us something to be proud of.

With several thousand workstations installed nationally and abroad, our system has proved itself over and over and has shown every day what it is capable of doing.

*dicomPACS®* masters simple image processing requirements as competently as it does those of complex radiological networks.

Thanks to its modular design, a *dicomPACS®* network can grow as needed. It can be expanded and amended to incorporate special features such as telemedicine, pre-operative planning or 3D reconstruction into your system.
Connectivity

The diversity of **dicomPACS®**

![Diagram of connectivity in radiology](image-url)
A Computed Radiography (CR) system does not change the process of conventional X-ray imaging substantially. Instead of the normal film cassette you use an imaging plate cassette that is identical in shape and size. After the usual X-ray process this cassette is inserted into the CR system and read within a few seconds. The resulting image data is stored automatically and can be viewed on your diagnostic evaluation monitor in optimal quality.

CR technology includes all the advantages of up to date image processing technologies

**Increased security**
X-ray exposures are always optimally processed – irrespective of anatomic region.

**Low radiation dose**
The higher sensitivity of imaging plates results a distinctly lower exposure to X-ray radiation than conventional technologies.

**Clear diagnosis**
X-ray imaging proceeds as usual. The X-ray images, however, are more accurate, richer in contrast and can be optimised and post-processed on the computer.
If you decide to use digital Direct Radiography, your images will be of excellent quality.

Flat detectors convert X-rays directly or indirectly into a digital image signal. The in-between step to read the imaging plate as well as cassette handling is dispensed with. After about 5 seconds the X-ray image is already available for diagnosis. DR systems stand out through **very fast image creation** and **excellent image detail quality**.

In addition to the advantages of the CR system, there will be further benefits for you:

**Flexibility**
X-ray images have a very high dynamic range (simultaneous display of soft parts and bones).

**Space saving**
The direct radiography system can be combined with existing X-ray units.

**Low maintenance**
System and function stability is extremely high since there are no mechanical parts like rollers, films etc. The system is virtually maintenance free.
MobileView
Web-based viewer dicomPACS® MobileView for mobile devices

The web-based viewer dicomPACS® MobileView counts among the many extension modules of dicomPACS® diagnostic software. As a virtually independent browser, it allows the viewing of image material on mobile devices also outside a clinic or a practice. The doctor or the nursing staff can access all image material from the dicomPACS® system worldwide via a network connection.

In addition to mere diagnostic evaluation of images, the dicomPACS® MobileView viewer allows diagnostic reports to be captured and exported. Documents may be attached and exchanged. All diagnostic reports of a patient are always displayed. Individual diagnostic reports of a patient may be selected for exporting and formatted.

There are many applications. On-call hospital doctors can promptly make a first diagnostic thanks to dicomPACS® MobileView. This saves the patient a lot of time and additional visits. But also during a ward round, further treatment can be discussed together with the patient or colleagues directly at the bedside using a mobile device.

dicomPACS® MobileView can be installed in addition to existing dicomPACS® diagnostic modules (diagnostic workstations). It is irrelevant whether the dicomPACS® MobileView software is used on a network PC (pure viewing workstation) or/ and on a mobile device. Worldwide access to all image material is available via a network connection, e.g. VPN access via the internet, of the used mobile device to the central dicomPACS® system in the office or clinic.

The main advantages at a glance:
- High flexibility through the use within various internet browsers, including Microsoft Internet Explorer, Mozilla Firefox, Google Chrome, Safari 5, Safari for iPad and Android browser
- Intuitive operation
- Supports the multi-touch operating technology (e.g. zoom in and out with two-fingers)
- Supports full screen mode
- Allows accessing the dicomPACS® database without any additional modules
- Allows playing series (e.g. ultrasound)
- High loading speed with modern streaming technology
Features of ORCA online viewer:
The web-based viewer offers an important range of functions of a professional PACS viewer:

- Draw annotations
- Measurements
- Registration of diagnostic findings
- Attach documents
- Draw lines and arrows (multi-coloured)
- Compare images in different grids
- Adjust brightness/contrast
- Flip and rotate images
- Adjust brightness/contrast
- Invert, zoom in/out
- Full screen, fit image
- PAN
- Scroll through image series
- Cine loop for multi frame series and CT/MRI
- Export images and documents
- Print images and documents
**Value**

**dicomPACS® features**

*dicomPACS®* is a so-called „Picture Archiving and Communication System“, acronym: PACS, and it performs many different, at times highly complex tasks. It connects, controls and administrates everything related to your images: from the acquisition of images and the compilation of diagnostic reports to the archiving and transfer of image data.

It ensures that the images can be distributed quickly and without complications and viewed e.g. via the web server. In addition, the system is extremely flexible and open for many applications.

**Selection of features:**

- **Prosthesis documentation** - enables the user to plan operations with digital prosthesis templates by one or more manufacturers
- **Report Module** - for easy preparation of different reports (e.g. operation reports, ultrasound reports etc.) incl. Word macros with images and a digital dictation system
- **Statistics Module** - enables freely configurable analysis of the complete database
- **Video Modules** - enable standard and non-standard video signals to be recorded as single images and video sequences
- **MobileView**: distributes images within a hospital and displays the images in a web browser
- **ORCA - Intelligent cloud solution**: enables worldwide image distribution to referring doctors and patients via the internet
- **Processing of CT and MRI series** - *dicomPACS®* includes professional tools such as MPR and MIP to evaluate cross section series
- **Hanging protocols**
- **Special function for mammography analysis**
- **Integration of speech processing systems**
- **Telemedicine**
- **Special solution for multiple archives**
The operational idea is based on an interface that can be freely configured down to the smallest detail. Depending on your needs and demands – based on your field, specialisation, or specific use of the system – you can arrange your dicomPACS® user interface yourself. Customising fast access to the most important tools is child’s play – just click on the selection menu. The selection will remain in place when you re-start your PC.
Cloud-based

Cloud-based telecommunication solution and data archiving for images, documents and diagnostic evaluations for stationary and mobile applications

Even for state-of-the-art practices and hospitals, the rapidly rising data flood of digital images, diagnostic reports and other documents is becoming increasingly challenging. Current legislation demands safe and long-term storage of patient data which generally requires investing in expensive hardware infrastructure as well as maintenance and corresponding staff costs.

To this end, we developed the ORCA Cloud archiving solution, thus paving the way for cost-effective and safe Cloud-based data archiving in practices and clinics. ORCA offers two application options:

→ Archive function: Safe, long-term archiving of patient data with intelligent usage of internal databases
→ Share function: Communication platform (exchange of images and diagnostic reports) with colleagues and specialists or as an easy way to forward image data to patients (an alternative to creating patient CDs)

Data is exclusively archived on European servers with the relevant safety certificates.

Benefits of Cloud archiving through ORCA

Minimal expenditure: ORCA does not require investing in expensive infrastructure such as server and data cables.

Scalability: The amount of memory required when using ORCA is determined by the demand.

Long-term security: ORCA archives data on many individual European servers in professional and air-conditioned data centres. Server technology is continuously updated.

Accessibility: ORCA stands out by being highly accessible. Since data is saved with multiple redundancy, ORCA guarantees more continuity than a mere server solution.

Environmentally friendly: ORCA is sustainable – through the optimised use of resources and their distribution.

Location-independent: ORCA guarantees access to archived patient data – worldwide.

Simplicity: ORCA allows easy access to data from any computer – from your place of work, from the comfort of your home or from any other computer or tablet PC.

Stress-free: ORCA deals with everything – no need to struggle with loose network cables, removed hard drives or software problems.
Safe long term archiving of patient data with intelligent use of professional data storage

ORCA

"Archive" function

Password protected remote access via mobile or stationary devices

"Share" function

Communication platform for colleagues and specialists as well as an easy way to forward image data to patients

Share functionality

1. Authorise access to a report in the cloud with the help of the integrated address book
2. Automatic e-mail notification with diagnostic report transfer
3. Diagnosis by referring physicians, diagnostic centres, or colleagues (second opinion)
Special Chiro Tools
Diagnostic tools for optimal diagnosis

The Chiro Tools have been developed in cooperation with experts from the USA and Canada and offer great possibilities for diagnosing accurately as well as for planning further treatment. According to the tool used, automated center lines and points, defined curves, angle measurements etc., are generated after the manual selection of the points of interest.
Of course all the standard tools (like distance measurement, angle and Cobb angle, mark spots etc.) are also included.

**Axis line**
The tool creates a vertical or horizontal axis by holding down the left mouse button, depending on the direction, in which the mouse pointer is moved.

**Orthogonal line**
This tool is used to mark perpendicular lines on existing or yet to be drawn baselines. Furthermore the aberrancy of the x/y-axis (nearer axis) is displayed by default.
Chiro tools

**George’s line**
This tool is used to draw vertical lines on each vertebra along the spine in a lateral view and to calculate their distances (in mm or inch).

**Horizontal or vertical aberrancy**
This tool calculates the horizontal or vertical aberrancy to the horizontal or vertical axis. By default the nearer axis is used for the calculation of the aberrancy.

**Circumscale**
An arc is drawn through three defining points and the diameter of the corresponding circle is displayed by default.

**Spinal curve**
This tool is used to draw an arc in the lateral view of the spine. The annotation uses a fixed radius set by default to 220 mm. Radius or degree can be adjusted manually.
Vertebrae line
This tool generates a vertical line of six points (2x3) along the spinal canal and displays the lateral aberration and side of laterality in degrees.

Center point
This tool calculates the center point between two points.

Distance comparison
This tool compares the distances between three set points (between point 1 and point 2 and between point 2 and point 3) and shows the larger distance.

Pelvic obliquity
This tool is a measurement that is calculated automatically after two simple clicks which generate two horizontal lines showing the distance between these two parallels.
Special NUCCA Tools

Diagnostic tools for optimal treatment

The NUCCA tool set has been created in cooperation with leading NUCCA experts from the US and Canada. It offers a variety of ways to reach a fast and accurate diagnosis. Templates like the Cephalometer, grid, Circumscale, and Relatoscope enable you to continue working as you are used to.

**S-Line and Hard Palate Line and Raw Data Box**

You simply set two points each on C1 and the hard palate to create the S-Line and the Hard Palate Line. We will show you the horizontal aberrancies. All measured values will be shown in the raw data box. You can also show and hide values manually.

**Atlas Plane Line and Atlas Check Line**

The horizontal aberrancy and the angle between Atlas Plane Line and Atlas Check Line will be shown in the raw data box.

**Cephalometer and Central Skull Line**

Use the Cephalometer to draw the Central Skull Line. Laterality and Skull Tippage will be calculated automatically. The Four Elements and Listing Information will be inserted and are completely editable.
Condylar Circle
Choose between the three point and four point Condylar Circle. The middle point will be shown. You can set the calculated measurement manually to the value you prefer. The Relatoscope will use the shown value.

Odontoid Center and Vertex Square
Mark the lateral aspects of the dens and the Odontoid Center Line will be inserted. After marking the C2 canal, the Vertex Square will be inserted and the Spinous value will be calculated depending on the Condylar Circle.

Odontoid, Spinous and Relatoscope
Use the Relatoscope to apply the Spinous value from Vertex to Nasium View. Mark the lateral aspects of the dens and the (corrected) Odontoid will be inserted automatically.

Axial Circle
The Body Center Line will be set automatically and the Axial Circle will be calculated and shown on the side of laterality. You can set the calculated measurement manually to the value you prefer.
**Vertex Skull Line**

After marking the nasal structures, click the Inferior Point button. The point will be set automatically depending on the Listing Information value and the Vertex Skull Line will be inserted. Atlas Rotation will be calculated.

**Lower Angle and Angular Rotation**

The Lower Angle and Angular Rotation will be calculated automatically after setting the Inferior Point. You can also set a corrected Inferior Point.

**Intermastoid Line**

Mark the inferior tips of the mastoid processes. The measured value, its aberrancy to the Central Skull Line, will also appear in the raw data box.

**Vertex Atlas Line**

After marking the transverse foramina of the atlas with three points each, we will draw the Vertex Atlas Line and show the convergence of C1 and C2.
Network
Global Competence

Our users come from all areas of medicine, particularly radiology, cardiology, orthopaedics and surgery. All of them work with our *dicomPACS*® image processing system and they are very enthusiastic about its multi-faceted services.

However, it is not only the product that will satisfy you, but also the cooperation with a team that strives to treat their clients as partners. This attitude is necessary because we can only find the perfect solution together.

It is important that our clients can be sure that we will always do our best; but this works only if we approach even the smallest task with the highest possible concentration, while being as highly motivated as ever.

OR Technology has set up a global competence network of local partners who will provide quick assistance should any problems occur after installation. You, as our valued customer, are investing in a high quality product "made in Germany" while making use of the service and support provided by one of our qualified and authorised local partners.

Overview of the countries with *dicomPACS*® systems (as at 11/2014)
Satisfied Customers
Digital X-ray and image processing in the orthopaedic practice of Dr Stephan Grunert, Germany

Dr Stephan Grunert about digital X-ray with dicomPACS®:
"I felt a little adventurous when I decided to convert the entire practice IT in one go whilst introducing digital X-ray with dicomPACS® and Fuji. This included the incorporation of the ultrasound scanner and a document scanner, introducing the dictaDECT® networked voice recognition system and changing the practice management software to DOCconcept - all done while the practice was in full operation.

Thanks to the competent and professional advice given and the installation of all systems by OR Technology from Rostock (Germany), there were no problems during or after the installation in the practice.

Specific to our practice is the fact that due to the responsibility of the company for all IT areas, there is one contact person for all queries. Our orthopaedic practice is highly satisfied with the implementation and has come to appreciate the enormous benefits of digital X-ray and the fantastic voice recognition facility."

Specifics of the image processing system
OR Technology installed a complete IT system including speech recognition and digital X-ray in the orthopaedic practice.

The details: Grunert's practice shares its equipment with two other medical practices. This large initiative of Dr Grunert. By sharing network was created on the digital X-ray equipment, the archive server, practice IT system and parts of the speech recognition system, the costs for each practice could be substantially reduced.

The system includes two double monitor workstations. One monitor displays the practice management system and speech input, the other the imaging system. Both monitors are operated with one mouse and keyboard and are connected to the same PC. No electronic switching is needed. When a patient's index card is called up, the relevant images and documents appear automatically on the other monitor.

Images can be burnt onto a CD including a viewing software and handed to the patient for consultations with other doctors.
Overview - products of OR Technology

**Portfolio**

- **Medici DR Systems**
  - **DR retrofits** - digital upgrade set for existing X-ray systems incl. *dicomPACS DX-R* acquisition software, also available for stationary and mobile X-ray machines

- **Leonardo DR Systems**
  - **DR suitcases** - compact suitcase solutions for mobile and portable X-ray incl. *dicomPACS DX-R* acquisition software

- **Amadeo X-ray Systems**
  - **Complete digital X-ray systems** (incl. stand, bucky, generator, flat panel incl. *dicomPACS DX-R* acquisition software etc.) as well as mobile and portable X-ray solutions

- **Divario CR Systems**
  - **CR solutions** - CR systems for digital X-ray with cassettes incl. *dicomPACS DX-R* acquisition software

- **X-ray Accessories**
  - **Accessories for X-ray** (e.g. radiation protection walls, gloves etc.)

- ***dicomPACS*®**
  - **Image management (PACS)** - comprises acquisition, processing, diagnosis, transfer and archiving of image material

- **ORCA**
  - **Cloud-based archive solution** - safe, long-term archiving of patient data with intelligent usage of internal databases, communication platform with colleagues and specialists and transfer of image data to patients

- ***dicomPACS*DX-R**
  - **X-ray acquisition software** [only for OEMs] - acquisition and diagnostic software for X-ray images from flat panels or CR systems

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**OR Technology**

(Digital X-ray and Imaging Solutions)

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