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

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
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
**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 more than 5,000 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.
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.

**Workflow**

Patient registration at reception
Patient data is entered into or retrieved from the PC and the insurance is checked. Any documents submitted by the patient, such as doctors’ letters or X-ray images can be scanned and attached to the digital patient file.

Examination by the doctor
Prior to the appointment, the doctor can access the digital patient file to get a clear overview of the patient's status.

Placing an imaging request on the PC
An unobtrusive acoustic signal at the computer workstation of the CR system notifies the staff that a new imaging request has been placed.

Imaging request
The imaging request allows even inexperienced users to work under optimal conditions.

Selecting a patient
The imaging request is displayed automatically on the monitor of the CR system.

X-raying the patient
According to the imaging request, the selected anatomic region is X-rayed using a conventional X-ray unit and a re-usable imaging plate (IP) cassette.

Reading the X-ray image
The cassette is inserted into the CR system and immediately read within a few seconds. Image processing parameters are selected automatically according to the anatomic region. Enhancements such as Brighten, Invert, Contrast etc. can be applied on the monitor before the image is downloaded to the network.

Entry into the X-ray journal
The X-ray journal software facilitates the capturing of X-ray data for registration in accordance with legal requirements. The patient data as well as all other relevant data is imported. The X-ray dosage or the dose area product are then automatically entered – provided the functionality is supported by the X-ray unit.

Entry into the medical record
The X-rayed anatomic region of the patient is automatically documented in the medical record.

The digital X-ray image
The X-ray image is available at the highest quality at all diagnostic evaluation and viewing stations in the practice. A network interface for communication with the medical record system guarantees that the image and diagnostic report are attached to the respective patient data.

Diagnostic evaluation
High resolution monitors allow optimal image display in accordance with the German Medical Devices Act.

Forwarding X-ray images
X-ray images can be burnt onto CD in original quality, to be handed to the patient. Diagnostic quality images can also be printed out on laser printers. Allows images, diagnostic reports and patient data to be transmitted to private practices and hospitals via network.
Direct radiography – X-ray imaging without cassettes

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
- Excellent image detail quality
- Flexibility
- Space saving
- Low maintenance

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

- X-ray images have a very high dynamic range (simultaneous display of soft parts and bones).
- System and function stability is extremely high since there are no mechanical parts like rollers, films etc. The system is virtually maintenance free.

Workflow

1. Selecting patients for X-raying
   - The patient to be X-rayed is called up in the control software of the flat panel system. This software is directly integrated with the existing patient management system.

2. Planning of the imaging request
   - The ergonomic touchscreen surface allows even inexperienced users to work under optimal conditions.

3. Automatic generator control
   - Depending on the anatomic region to be examined, the parameters are automatically suggested in the configured generator interface. This configured generator interface facilitates the operation and control of the X-ray generator.

4. X-raying the patient
   - The selected anatomic region is X-rayed using a conventional X-ray unit and a flat panel. The digital image signal is converted immediately and the X-ray image is available without delay at all the workstations in the practice.

5. No need to read the X-ray image
   - The X-ray image is now available in the highest quality at all diagnostic evaluation and viewing stations in the practice. A network interface for communication with the patient management system guarantees that the X-ray images and diagnostic reports are attached to the respective patient data.

6. Diagnostic evaluation
   - High-resolution monitors allow optimal image display in accordance with the German Medical Devices Act.

7. Forwarding X-ray images
   - X-ray images can be burnt onto CD in original quality, to be handed to the patient. Diagnostic quality images can also be transmitted to private practices and hospitals via networks.

8. Entry into the medical record
   - The X-rayed anatomic region of the patient is automatically documented in the medical record.
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.

**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
- **Web Server** - enables image distribution within the hospital or to referring doctors via the internet and guarantees very fast image accessibility in original quality (DICOM)
- **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**
Web server
for internal image sharing and external distribution to referring doctors

Making images available via the internet (or intranet) is an increasingly important daily requirement in the medical practice. One purpose is the distribution of images or other documents in a larger clinic. Equally important is the integration of external referring parties (hospitals, medical practices) or home workstations.

The intention is always the same: faster, cheaper downloading of archived images and diagnoses via the internet or intranet (also via slow internet connections), in diagnostic quality if possible, to every clinic or internet PC. The use of older PCs, thin clients or terminal servers must also be made possible.

To accommodate as many requests as possible from the medical practice and hospital, we have developed our dicomPACS® Web Server in cooperation with respected doctors.

Efficiency
Advantages of using web server

Installation:
- The web viewer does not require any extra investment; Internet Explorer is all that is needed. Some minor configuration changes regarding security settings may be necessary in Internet Explorer.
- The web server always displays the latest version of user interface as updates take place automatically when needed.
- For larger hospital installations there is the option to install several web servers (scaling), e.g. in order to have a separate web server available for each division.

Hardware requirements:
- Workstations need only a minor increase in RAM, processing speed and possibly an update of the operating system.
- A narrow band network e.g. GPRS, ISDN, internet, fixed lines etc. is sufficient to ensure adequate download speed for images.
- The installation of the web server may also be located on the archive server itself, which means that a separate PC is not required.

Web server advantages at a glance
- Images are available in their original quality (DICOM).
- High speed availability of images even in slow networks/ with slow internet thanks to special streaming technology and compression procedures → no compromises between image quality and loading speed.
- Automatic email notification
- Extensive research options
- Simple, intuitive operation
- No installations costs
- Extensive configuration of user and access rights
- Automatic updates
- The use of several web servers is possible
- Only modest hardware requirements
- Thin clients, terminal servers, mobile computing and WLAN can be used
- Central administration eliminates need for support to the clients
- Multilingual

| Web preview | Web viewer with hip joint images | Image processing tools (for example magnifier) |
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.
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 DOConcept - 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: Dr Grunert’s practice shares its equipment with two other medical practices. This large 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.