Digital X-ray imaging with image plate technology

IMAGE PLATE SCANNER DÜRR VISTASCAN PLUS

With integrated deletion of the image plates

Diagnostics

Application

Investment
A decision with vision

FUTURE-PROOF DIGITAL RADIOGRAPHY FOR THE PRACTICE

Look towards the future with VistaScan Plus

► Digital X-ray imaging with Dürr image plate technology
   > Excellent image quality
   > Simple conversion in the surgery
   > Use of existing X-ray units
   > Reduced radiation dosage
   > Fast, efficient work flow
   > Diagnostics with software support
The Dürr image plate technology ensures "peace of mind" when making major decisions:

**Safe diagnostics**

The conversion from X-ray film to "digital" image plate technology is a logical choice. The excellent image quality and the large application range that film has offered for years can now be provided by Dürr image plate technology – intraoral, bitewing, Panoramic or CEPH may all be used, complementing the advantages of diagnostic radiography. The software Dürr DBSWIN enhances the diagnostic quality of the images through automatic and personal image optimisation.

**Safe application**

Well-practised procedures in the surgery are easily transformed from film based to image plate technology. There is no change in the X-ray procedure in the surgery, but many things are simplified. Positioning and taking of exposures is exactly the same as film except for reduced patient dose. Thankfully the large exposure range of the plate reduces the risk of over and under exposure. The scanning and controlled deletion of the plates is done automatically with the Dürr VistaScan Plus in a single process: Position foil cassette, start – finish. Only a few seconds later, the image is on the screen and, at the same time, the plate is ready for the next exposure.

**Safe investment**

Satisfied and reassured patients are the basis for the success of a practice. The consultation as well as explanation of results and treatment is done conveniently on the screen. In addition to this cost effective argument for digitisation, efficiency is optimised using Dürr image plate technology. Using one single VistaScan Plus system, you can digitise the diagnostic radiography of the complete practice using existing X-ray units.
Image plate – the medium for all formats

DIGITAL DÜRR IMAGE PLATE TECHNOLOGY

Compared with sensor systems, the image plate shows excellent performance

**Positive points for image plates**

- Film-like in application
- Conventional film holders
- Wireless system
- All standard formats
- Large exposure range
- High grey scale range
- Image available in seconds
- One system for the whole practice
- Use of existing X-ray units possible in most cases

**Comparative info on sensors**

- Rigid and relatively thick, which strongly limits the positioning
- Special holders required
- Cables
- Range of formats limited
- Smaller exposure range and grey scale range
- Problems with cephalometric systems
- Higher costs for multi-user-systems
- Sensors and cables easily damaged

The new VistaScan Combi Plus – for all image formats up to 18 x 24 cm.
**Dürr image plates in dentistry**

Through the introduction of the Dürr VistaScan product range in recent years, the image plate can show its specific advantages:

- Easy positioning
- Film-like procedures
- High exposure tolerance
- Excellent image quality
- Long-term system reliability

The image plates can be exposed, scanned and deleted hundreds of times, sometimes more than 1000 if handled carefully. Processing chemicals are not required, thus eliminating the need for stocking and disposal.

**Use for intra and extraoral exposures**

**Intraoral** – there is no re-education required for the application of image plates, as the handling, positioning and choice of formats are the same as with analogue film. Standard holders for analogue films can still be used in most cases.

**Panoramic and Ceph radiography**

- the X-ray film is simply replaced with the image plate and the X-ray machine can be used immediately for digital images without conversion (replacement of the film cassette if necessary or screen removal recommended).

**Exposure range and sensitivity**

Image plates have the largest exposure range compared to CCD/CMOS sensors and X-ray films. This makes it possible to obtain usable exposures even with very low X-ray doses. Furthermore, the image plate boasts the highest tolerance for underexposure and overexposure. Therefore the image areas are always correct.

**Dürr image plates are suitable for almost any film holder.**

**Image dynamics and contrast range**

The grey scale range of a film is usually 30–100. Today, semiconductor sensors can obtain 1,000 to 10,000 grey scales. With up to 100 million storable grey scales, the image plate covers the largest range available (M. Thoms (1997), Nucl. instr. Meth. a (389)). This means that the image plate can offer the image dynamics and the contrast range of analogue X-ray films.

**The re-usable Dürr image plates Plus are available for all intraoral and extraoral image formats. The "plus" offers higher sensitivity and durability.**
Excellent image quality and better diagnostics

Diagnostic radiography with Dürr VistaScan Plus

Diagnose with the finest grey scale detection

Diagnostic advantage using Dürr PCS technology

- Imaging of finest structures up to ISO 06 endo instrument
- Detection of finest grey value differences for carious D1 lesions
- Close to 100 percent detection efficiency, leading to minimum dose requirements
- Analysis of the raw data with filters to support the diagnosis

The grey scale gradation of the plate, used to its full potential by VistaScan, allows imaging which is on par with film.
The diagnostic value of the whole Dürr image plate system makes the difference – Dürr VistaScan Plus, the Plus image plates and the image processing software DBSWIN 4 meet the highest standards of image quality.

Safe diagnostics

The early diagnosis of the smallest defects or of early apical infection require high-resolution imaging, for the diagnosing dentist as well as for the interested patient. Even today, VistaScan Plus can safely detect carious D1 lesions or endo instruments down to ISO 06. For panoramic imaging the image shows clear and detailed representation of bone structure, hard and soft tooth tissue.

Compared with other media, Dürr VistaScan Plus takes the clear lead with its resolution.

Leading in terms of resolution, grey scale range and efficiency

The scanners of the Dürr VistaScan range work with a very fine laser beam of 12.5 µm, which is unprecedented and enables a class leading image resolution currently up to 22 LP/mm intraorally 16 bit data retrieval and processing and a high grey scale range ensure the dynamics are ideal for the human eye.

Perfect imaging in DBSWIN

With its X-ray module, the image processing and archiving software Dürr DBSWIN 4 controls the digitisation of the images in the scanning process, presents the images for diagnostic evaluation and offers tools and filters to support the diagnosis. Thus, DBSWIN 4 can extend the diagnostic possibilities.

*Small is beautiful* – the laser spot of only 12.5 µm in the VistaScan attains a class leading image resolution.
Advanced diagnostics shown over and over – in different patient cases and associated imaging situations.

An excellent image quality is never a coincidence. In collaboration with clinics and operators worldwide, the software DBSWIN is continuously adapted to meet new challenges in dentistry. DBSWIN can optimise X-ray images for the eye automatically. The software records the individual procedure of the dentist in a personal user profile, if desired. This can save a lot of time for the next diagnosis.
Image comparisons with filters supporting the diagnosis and automatic optimisation:

Original image  With caries filter K1  Original image  With gamma correction

Original image  With endo filter

Original image  With paro filter

Original image  With personal user profile

Filter, magnifying and measuring functions to support the diagnosis

New filters supporting the diagnosis on the basis of the 16 bit raw data can optimise images in contrast and definition in such a way that detailed diagnoses up to carious D1 lesions become possible. The magnifier function zooms so far into individual areas that, for instance, the early detection of an apical infection can be communicated easily to the patient. The loss free archiving of the images ensures a long-term documentation.

Representation of the 3rd dimension with occlusal images

The step to the 3rd dimension for diagnoses in the occlusal and approximal area as well as for the planning of implants can be achieved with occlusal images in many cases. Reading this image format becomes more important.

Dental image sizes with VistaScan Plus Combi/Omni

**Extraoral**
- OPG 12.7 x 30.5 cm
- OPG 15 x 30 cm
- CEPH 18 x 24 cm
- CEPH 20 x 24 cm
- CEPH 24 x 30 cm (Omni only)

**Intraoral**
- Child 2 x 3 cm
- Bite wing 2 x 4 cm
- Standard 3 x 4 cm
- Bite wing 2.7 x 5.4 cm
- Occlusal 5.7 x 7.6 cm
Update surgery procedures easily

DIGITAL X-RAY PROCESSING WITH DÜRR IMAGE PLATES AND VISTASCAN PLUS

Working fast and efficiently with VistaScan Plus

- X-ray imaging as with film – but significantly faster
- Integration of VistaScan Plus at any desired location in the surgery
- Scan – delete – ready to restart in one step
- 1 to 4 images on the screen within 15 seconds

The new VistaScan Plus reads the image plates and deletes them automatically.
For every patient the efficiency of diagnostics – from the image to the diagnosis, from processing the image to archiving, it is highly valued for intraoral and extraoral images:

Keep it simple: one single VistaScan Plus meets all the demands for a diagnostic practice. Intraoral, bite wing, panoramic and CEPH – the VistaScan Plus is the universal device for all image formats in a dental surgery.

From film to plate

Image plate diagnostics with Dürr Dental is the logical upgrade for the surgical team. The radiographic processes for the surgical team remain virtually unchanged. The need for buying the films, dark room and X-ray chemicals are eliminated. Maintenance and film storage costs will also be considerably lower, and the waiting time for film processing will be drastically reduced.

Intraoral: Image plates are flexible, thin and wireless

Image plates are much more user-friendly for the patient. The thin flexible plate, which is positioned in the same way as a film, is much more comfortable. In particular, for images in the molar region, with flat palates, children or even patients with TMJ dysfunction. Furthermore, the use of plates in disposable sleeves covers have a very hygienic appearance.

Extraoral: Conversion and further use of existing panoramic X-ray equipment

In the field of the panoramic and CEPH radiography, film and plate hardly differ at all. This makes the upgrade to digital diagnostics while using the existing X-ray units in the surgery very simple. This maintains the image quality with cephalometric techniques through the short exposure times similar to those of film. During the scanning process, the image plates are protected in a flexible cassette.
The image of a modern surgery

HIGH TECH EFFICIENCY WITH VISTASCAN PLUS

An X-ray image within 15 seconds

The intraoral image plates are protected by a transparent hygiene sleeve during the X-ray exposure.

Simple handling transfers the image plate from the hygiene sleeve to the cassette.

The reading and deleting process is started with a touch.
DÜRR DENTAL IMAGING

Extraoral, the image plates are used in flexible foil cassettes.

Scanning times incl. deletion of the image plates with Dürr VistaScan Plus

<table>
<thead>
<tr>
<th>Format</th>
<th>Extraoral</th>
<th>Introral</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 LP/mm</td>
<td>10 LP/mm</td>
</tr>
<tr>
<td>OPG</td>
<td>21 sec</td>
<td>14 sec</td>
</tr>
<tr>
<td>CEPH</td>
<td>29 sec</td>
<td>15 sec</td>
</tr>
<tr>
<td>Child</td>
<td>21 sec</td>
<td>14 sec</td>
</tr>
<tr>
<td>Bite wing</td>
<td>29 sec</td>
<td>15 sec</td>
</tr>
<tr>
<td>Standard</td>
<td>30 sec</td>
<td>20 sec</td>
</tr>
<tr>
<td>Bite wing</td>
<td>30 sec</td>
<td>20 sec</td>
</tr>
<tr>
<td>Occlusal</td>
<td>30 sec</td>
<td>20 sec</td>
</tr>
<tr>
<td></td>
<td>6.7 LP/mm</td>
<td>20 LP/mm</td>
</tr>
<tr>
<td>OPG</td>
<td>28 sec</td>
<td>27 sec</td>
</tr>
<tr>
<td>CEPH</td>
<td>38 sec</td>
<td>30 sec</td>
</tr>
<tr>
<td>Child</td>
<td>27 sec</td>
<td>20 sec</td>
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<td>Bite wing</td>
<td>39 sec</td>
<td>29 sec</td>
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<tr>
<td>Standard</td>
<td>30 sec</td>
<td>30 sec</td>
</tr>
<tr>
<td>Bite wing</td>
<td>39 sec</td>
<td>30 sec</td>
</tr>
<tr>
<td>Occlusal</td>
<td>51 sec</td>
<td>30 sec</td>
</tr>
</tbody>
</table>

Digital image plate diagnostics is welcome by patients – because of dose reduction, short waiting times and easy-to-understand information:

You can gain greatly by allowing the patient to participate in the diagnosis and treatment plan. Well-informed patients are usually more loyal and willing to accept services than others. The diagnostic systems have a large part to play in patient acceptance. If the image of a modern surgery is highlighted with modern diagnostic equipment, the use of minimum doses and digital images will help to build a strong relationship between dentist and patient.

The location of the VistaScan Plus can be selected anywhere in the surgery

Whether in the X-ray room, centrally in the practice or in the surgery – It’s easy to decide the optimum location of the VistaScan Plus. Space can be saved by wall mounting. The influence of artificial light or daylight is not important for scanning. Operation is virtually silent and vibration free.

Simple operation for all formats

Reading the plates in the foil cassettes is much easier than developing X-ray films. The intraoral process can take up to 4 plate sizes at a time, the scanner and software will detect the respective formats automatically. For pure endo control images, the reading time can be reduced even further with the quick scan in DBSWIN 4. With extraoral images, the flexible cassettes are introduced ergonomically to the machine and enable the automatic start of the process. Both processes are equally gentle on the re-usable image plates.

Controlled deleting function with VistaScan Plus

Automatically and without any delay, the new VistaScan Plus deletes the image plates available once the scanning process has been completed. In one single step, the plates passed through a red LED array after scanning. This step is controlled by the software, so as to ensure complete deletion.

Connection to X-ray PC or directly via VistaScan Net into the surgery network

Each Dürr VistaScan can be installed as stand-alone or network solution. The specific integration of the VistaScan Plus into the practice can be planned by your specialised VistaScan consultant.

Archiving and communication with DBSWIN 4 — DICOM-compatible

After every exposure, DBSWIN takes care of the data security, as the original image is automatically optimised and stored. The automated exchange of patient data, images and other information is done via a connection to the practice software (eg VDDS media interface). The compliance with the DICOM 3.0 standard also makes DBSWIN 4 compatible for clinical and hospital use and the simple import and export of images can be achieved.
Choose leading-edge technology

FUTURE-PROOF DIGITAL DIAGNOSTIC RADIOGRAPHY – BY DÜRR DENTAL

Advantages in the surgery with VistaScan Plus

> Excellent image quality
> Simple and with integrated deletion
> Gentle on image plates
> Flexible installation
> Market leading technology

With the Dürr PCS technology, it is the laser that turns, instead of the image plates on a drum. This delivers an outstanding image quality in no time at all.
With the PCS technology of the Dürr VistaScan, Dürr Dental has re-established the image plate as a digital medium for dental imaging:

**Guaranteed future with the 2nd generation of PCS scanners**

Dürr PCS – Photon Collecting System (Patent DE 19942211C2) – since its introduction in 2002, it has revolutionised the power of modern dental scanners worldwide. The fast-turning and super fine laser, the double reflective parabolic mirrors and the powerful photo multiplier are key features. They were all developed by Dürr Dental in Germany. The results of these technical features are: best resolution, largest grey scale range, maximum data efficiency and, therefore, highest exposure sensitivity. Even in markets such as the US or Japan, Dürr PCS is the leading technology for dental scanners. PCS is constantly developed and refined and can now be seen with the new Dürr VistaScan Plus.

**Guaranteed future of the overall system of Dürr Dental**

PCS technology is currently even ahead of the development of image plates, as the VistaScan Plus can obtain a theoretical resolution of 40 LP/mm, while the latest image plate generation offers only about 22 LP/mm, which is on par with film. In any case, a decision for the Dürr VistaScan Plus today ensures that future advances in plate technology are already catered for.

Dürr Dental is a leader in dental diagnostic radiography

Since the mechanical X-ray film developer was introduced in dentistry, Dürr Dental has been an invaluable part of diagnostics in surgeries worldwide. The generation of perfect image quality has and will always be our goal as we continue to develop both digital and conventional techniques. Dürr Dental’s development engineers and production staff take pride in continuous improvement and careful manufacturing of all essential components in their factories in Germany. Dürr Dental - one of the major partners for diagnostics in dentistry, now and in the future.
Digital X-ray processes with image plates

IMAGE PLATE SCANNER DÜRR VISTASCAN PLUS

<table>
<thead>
<tr>
<th>Models</th>
<th>Dürr VistaScan Combi Plus</th>
<th>Dürr VistaScan Omni Plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (HxWxD)</td>
<td>61 x 38 x 38 cm</td>
<td>72 x 38 x 38 cm</td>
</tr>
<tr>
<td>Weight</td>
<td>24 kg</td>
<td>25 kg</td>
</tr>
<tr>
<td>Setup options</td>
<td>Wall mounting or on work surface</td>
<td>Wall mounting or on work surface</td>
</tr>
<tr>
<td>Reading noise</td>
<td>approx. 45 dB(A)</td>
<td>approx. 45 dB(A)</td>
</tr>
<tr>
<td>PC connection</td>
<td>LPT in EPP mode, USB 1.1, USB 2.0</td>
<td>LPT in EPP mode, USB 1.1, USB 2.0</td>
</tr>
<tr>
<td>Power connection</td>
<td>100-240 V/50-60 Hz</td>
<td>100-240 V/50-60 Hz</td>
</tr>
<tr>
<td>Connection power</td>
<td>&lt; 140 W</td>
<td>&lt; 140 W</td>
</tr>
<tr>
<td>Medical device class</td>
<td>acc. to directive 93/42/EEC</td>
<td>acc. to directive 93/42/EEC</td>
</tr>
<tr>
<td>Smallest pixel size</td>
<td>12.5 µm</td>
<td>12.5 µm</td>
</tr>
<tr>
<td>Theoretical resolution</td>
<td>depending on image plate max. 40 LP/mm</td>
<td>depending on image plate max. 40 LP/mm</td>
</tr>
<tr>
<td>Grey scales</td>
<td>16 bit (65,536)</td>
<td>16 bit (65,536)</td>
</tr>
<tr>
<td>Deletion</td>
<td>integrated, with control</td>
<td>integrated, with control</td>
</tr>
<tr>
<td>Software</td>
<td>DBSWIN 4</td>
<td>DBSWIN 4</td>
</tr>
<tr>
<td>Formats Intraoral</td>
<td>2 x 3 / 2 x 4 / 3 x 4 / 2.7 x 5.4 / 5.7 x 7.6</td>
<td>2 x 3 / 2 x 4 / 3 x 4 / 2.7 x 5.4 / 5.7 x 7.6</td>
</tr>
<tr>
<td>Formats Panorama</td>
<td>15 x 30 / 12.7 x 30.5</td>
<td>15 x 30 / 12.7 x 30.5</td>
</tr>
<tr>
<td>Formats Ceph</td>
<td>18 x 24 / 20 x 24</td>
<td>18 x 24 / 20 x 24 / 24 x 30</td>
</tr>
</tbody>
</table>

Dürr VistaScan Net

Foil cassettes in cassette holder

Dürr VistaScan Plus

Image plates in all common dental formats

Image processing and archiving software Dürr DBSWIN 4