Critical Care Suite enables expedited treatment of a spontaneous pneumothorax in an intubated COVID-19 patient

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Background

A patient with 2019 Novel Coronavirus (COVID-19) pneumonia was admitted to the COVID ICU at University Hospitals of Cleveland Medical Center. The patient was intubated and placed on mechanical ventilation due to significant respiratory distress.

PACS Worklist Management

This institution uses Sectra PACS worklist flags, a "red dot" for STAT and a "yellow dot" for Urgent, on radiology exams from the emergency department and intensive care units, according to how the ordering physician requests the exam.

To enhance this method of worklist prioritization, Critical Care Suite was implemented to flag critical findings discovered by AI after image acquisition, which may have been unknown to the physician at the time of ordering the exam.

Diagnosis and Treatment

The intubated ICU patient with COVID-19 received a mobile chest x-ray on a Saturday morning, ordered as Urgent, "yellow dot" priority. The attending radiologist had approximately 150 exams on their worklist and estimated it may have taken up to 6 hours to read this case.

Fortunately, this exam was conducted using GE Healthcare's AMX 240 mobile x-ray system enabled with the Critical Care Suite. Upon acquisition, the AI algorithms embedded within the X-ray system flagged the case as suspicious for pneumothorax. The PACS worklist displayed the AI result of a "Suspicious Finding," via the use of public DICOM tags.

A radiologist prioritized reading the case within an hour of acquisition. The patient was quickly diagnosed with a spontaneous pneumothorax and a chest tube was placed within 15 minutes.

Conclusion

The use of public DICOM tags that integrate within existing PACS worklists to complement standard prioritization schemes can help radiologists reduce time to diagnose unsuspected pneumothoraces and reduce time to treatment.
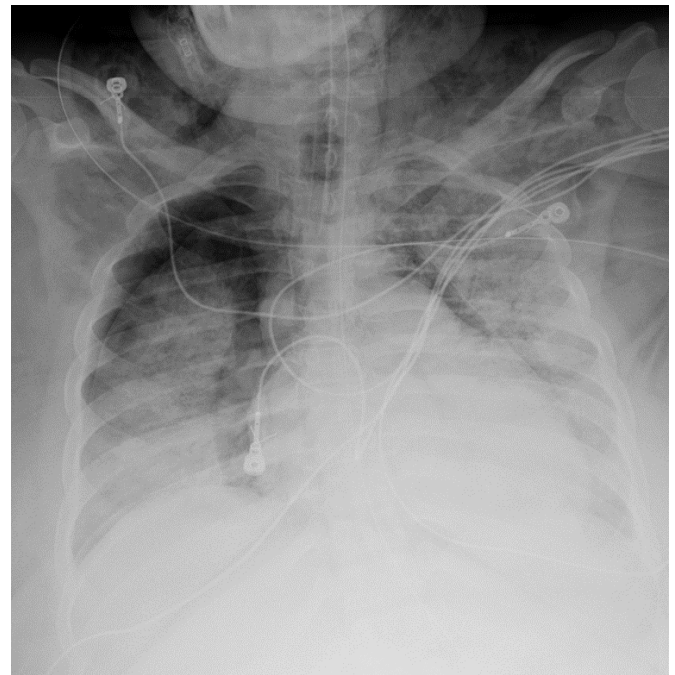
Chest X-ray Image

Sectra PACS Worklist with AI Flag

"The seamless integration of the AI alert into PACS has significantly impacted patient care and has been integrated into our standard radiology workflow."
- Dr. Amit Gupta, Modality Director of Diagnostic Radiography, University Hospitals Cleveland Medical Center

"The AI alert made a significant difference in this patient's care."
- Dr. Robert Gilkeson, Division Chief Cardiothoracic Imaging, University Hospitals Cleveland Medical Center

About Critical Care Suite

GE Healthcare's Critical Care Suite is the world's first, on-device AI solution that enables triage of critical conditions such as pneumothorax and provides AI-based tools for improving quality and efficiency. Critical Care Suite automatically analyzes images upon acquisition for critical findings (pneumothorax), producing triage notifications to be sent directly to PACS for review by the Radiologist.

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FlashPad HD Wireless Digital Detector

With Helix™ Advanced Image Processing

Four times the information with exceptional dose efficiency

The ultra-high definition and dose efficiency of FlashPad™ HD detectors allows visualization of extraordinary anatomical detail at low dose where it matters most even for your most challenging patients.

100 micron detectors pack four times more pixels in the same area than the original Flashpad for sharp x-ray images, with extraordinary anatomical detail.
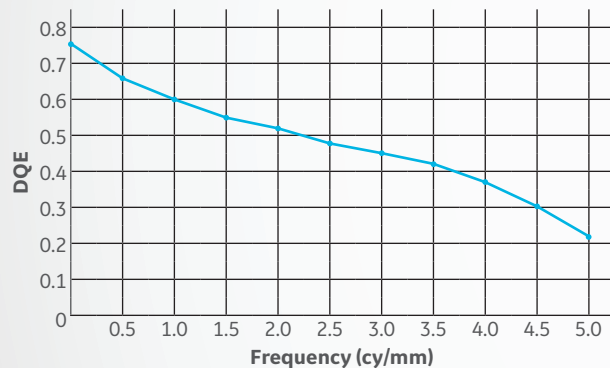
The Detective Quantum Efficiency (DQE) refers to the efficiency of a detector in converting incident X-ray energy into an image signal. High DQE values indicate that less radiation is needed to achieve identical image quality.

Typical DQE
• 75% (0 cy/mm), 60% (1 cy/mm), 40% (3 cy/mm) for RQA5

Typical MTF
• 70% (1 cy/mm), 40% (2 cy/mm), 15% (4 cy/mm) for RQA5
  Limiting resolution: 5 cy/mm

Ready when you need it

QuickCharge
• Detector battery can be charged in-place whether it is in the table, wall stand or mobile storage bin

QuickConnect
• Adaptive wireless connectivity (802.11n) with automatic channel switching to improve image transfer and avoid wireless interference

QuickShare
• FlashPad HD detector pairing <30 seconds, allowing you to interchange detectors seamlessly with compatible systems
• Conforms to the ISO/DIN standard size for 10x12, 14x17 and 17x17 detectors which allow the detector to be use in most surgical tables or accessory positioners
• FlashPad HD detectors can support up to 330 lbs (150 kg) of distributed load for bariatric applications

Key specifications

Single panel (non-tiled) amorphous silicon detector with a directly deposited cesium iodide scintillator
• 100 microns pixel pitch
• Removable, rechargeable battery
• 802.11n link between the system and detector with three internal antennae for the fastest image wireless transfer
• Housing – aluminum frame with carbon-fiber entrance window
• Wi-Fi interface (Station modes)
• Back-up tether (optional)
• OLED display with Wi-Fi, LAN, battery, and sensor indicators
• On-board pixel corrections and data storage
• Includes QAP (Quality Assurance Procedure) with all necessary hardware and software
• Available with 6:1 and 8:1 removable grids

FlashPad HD	2530 (10" x 12")
External dimensions	282 mm (w) x 332 mm (l) x 15.5 mm (h)
Pixel matrix	2508 x 3004 pixels
Weight	1.9 kg (4 lbs)

FlashPad HD	3543 (14" x 17")
External dimensions	384 mm (w) x 460 mm (l) x 15.5 mm (h)
Pixel matrix	3524 x 4288 pixels
Weight	3.2 kg (7 lbs)

FlashPad HD	4343 (17" x 17")*
External dimensions	460 mm (w) x 460 mm (l) x 15.5 mm (h)
Pixel matrix	4288 x 4288 pixels
Weight	3.8 kg (8 lbs)

*The 17x17 detector is currently only available on Fixed Systems.

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X-ray. The future. Now.

Definium™ 656 HD X-ray system powered by Helix™ 2.0

Definium 656 HD is a commercial configuration of the Discovery XR656 HD

gehealthcare.com

Definium 656 HD powered by Helix 2.0

A new frontier in digital X-ray image quality. Effortless precision.

Definium 656 HD is a commercial configuration of the Discovery XR656 HD

# Get the diagnostic clarity you need from that first X-ray

Helix™ 2.0 advanced image processing delivers all of the benefits of Helix plus improved noise reduction and with AI-driven automated brightness and contrast—delivering **improved consistency despite variations** in exposure technique and challenging exam conditions.

Extraordinary anatomical detail at low dose in every X-ray image

Anatomy specific image enhancement for exquisite bone detail and clear delineation of soft tissue
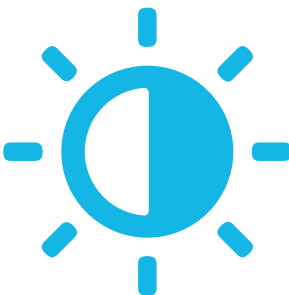
Automated brightness and contrast regardless of variations in dose, patient positioning, field of view, and metal implants

**Up to 40% increase in detectability* harnessing the ultra-high resolution and dose efficiency of FlashPad™ HD**

Don't miss a thing

Extraordinary anatomical detail at low dose in every X-ray image.

Helix 2.0 advanced image processing algorithms harness the full high-resolution power and exceptional dose efficiency of FlashPad HD detectors to deliver outstanding clarity and extraordinary anatomical detail where it matters most.

Double your resolution

Resolution test pattern image

| FlashPad | FlashPad HD |
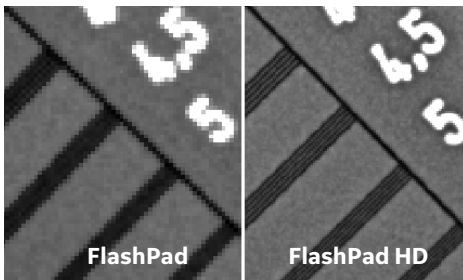
The **FlashPad HD** detectors pack four times more pixels per area for sharp X-ray images. Plus, they capture extraordinary anatomical detail at low dose. Available in 10"x12", 14"x7", and 17"x17" standard cassette sizes.
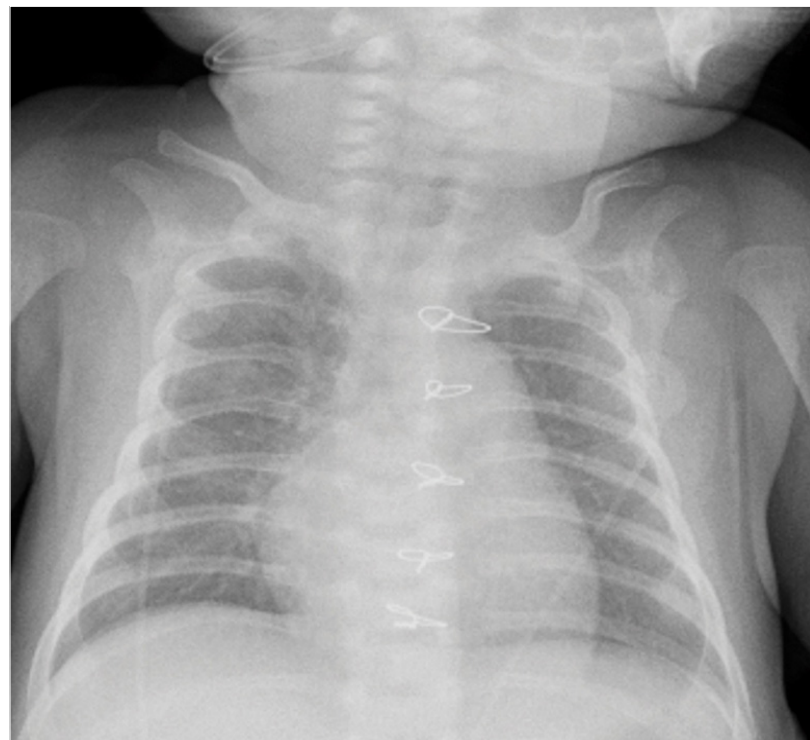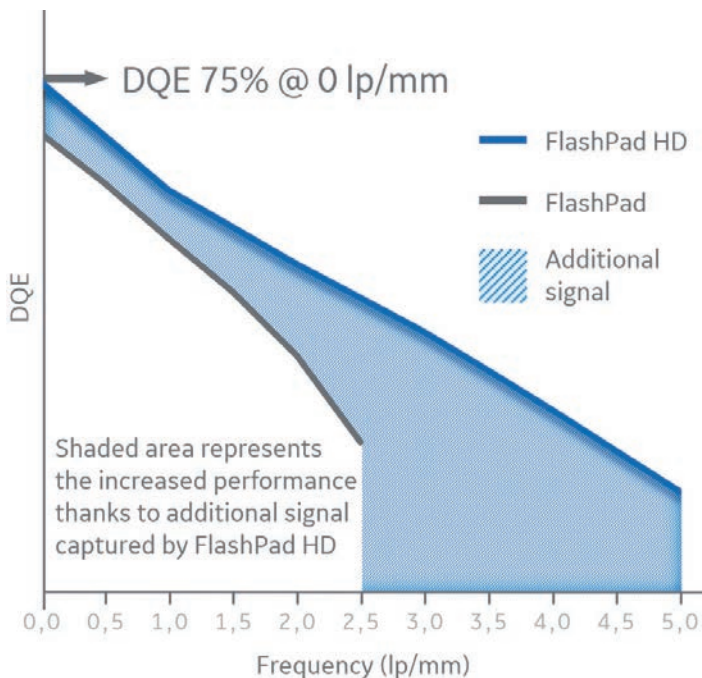
5 lp/mm resolution
100 micron pixel pitch

Exceptional dose efficiency for your tiniest patients (and the largest ones too)

The ultra-high dose efficiency helps enhance diagnostic imaging quality at low dose for all patient types.

DQE 75% @ 0 lp/mm

— FlashPad HD
— FlashPad
Additional signal

Shaded area represents the increased performance thanks to additional signal captured by FlashPad HD

DQE

Frequency (lp/mm)

0,0 0,5 1,0 1,5 2,0 2,5 3,0 3,5 4,0 4,5 5,0

Acquired at 64 kVp/0.4 mAs.
Typical DR/CR technique 0-6 mo. AP Chest: 63kVp/1.6mAs*

Consistent performance and presentation despite challenging exam conditions

Helix 2.0 delivers consistent brightness and contrast across variations in dose exposure with Smart Windowing and enhanced contrast restoration.

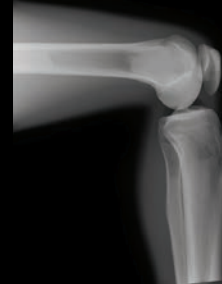**Without Helix**

~0.25 mAs | ~2 mAs | ~16 mAs
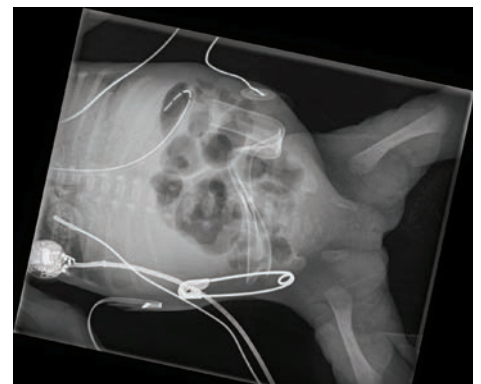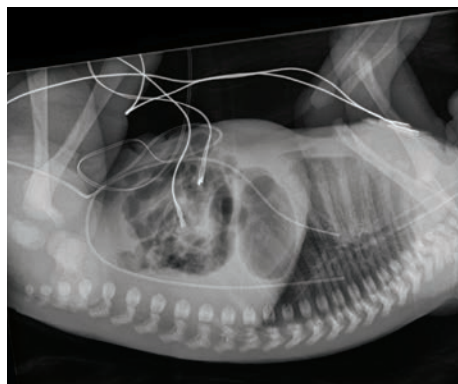
With Helix

~0.25 mAs | ~2 mAs | ~16 mAs

Consistent performance despite variations in collimation and patient positioning with Helix 2.0

Intelligent collimator edge detection with outstanding accuracy in pediatric applications.

Definium 656 HD is a commercial configuration of the Discovery XR656 HD

Excellent handling of metal implants

Clear bone-metal interface without halo artifact.

We know speed
and efficiency matter

Definium 656 HD is a commercial configuration of the Discovery XR656 HD
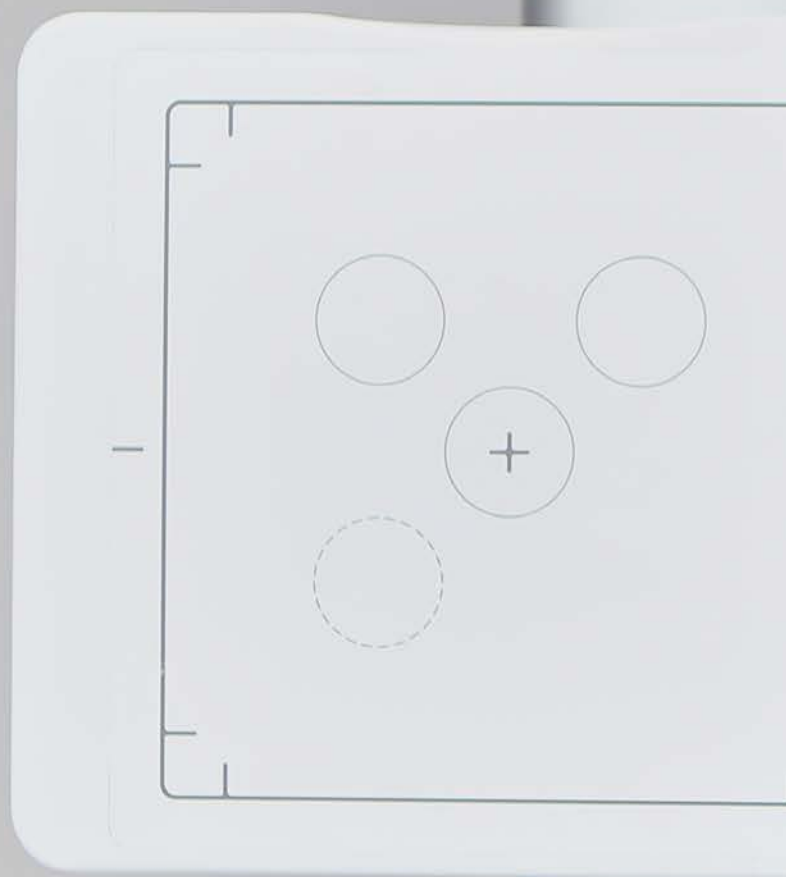
Helix workstation

The supplemental Helix workstation allows a technologist or a radiologist to edit and reprocess images without system impact, keeping the system available for patient exams. It also provides a central location to perform quality control by physicists and technologists for exams needing reprocessing.

Comprehensive workflow automation suite

Fast and easy X-ray exams, effortless patient positioning

AutoRAD Suite offers an extensive set of automation and workflow enhancing features, to make exam setup fast, intuitive, and easy for X-ray technologists and comfortable for patients.

New user interface
Redesigned navigation and **QuickTools** for fewer clicks and intuitive operation

QuickCharge
Detector charging in the table and wall stand bucky

Auto field-of-view
Predefined collimation sizes for each view

Auto protocol assist
Automatic selection of anatomy and technique based on modality work list

High-precision auto positioning
Preset and programmable positions for effortless exam setup

Auto-tracking
Maintain SID and tube-detector alignment with table and wall stand receptor automatically
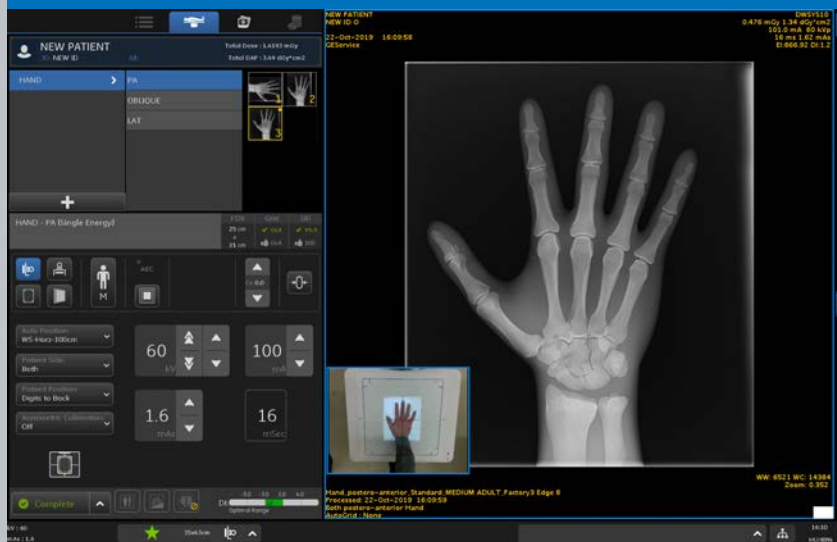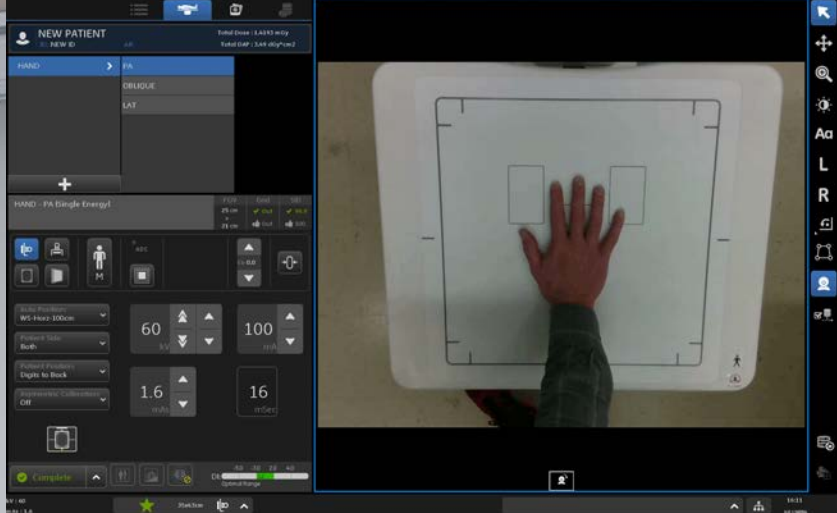
QuickShare
Hassle-free sharing and pairing of multiple wireless detectors

QuickConnect
Automatic wifi channel switching to avoid wireless interference

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Live Stremaing Patient Video

The Definium 656 HD with live streaming patient video keeps technologists' eyes on the patient for a greater portion of the exam, helping to monitor patient safety and potentially reduce rejects that stem from patient motion.

- User interface puts the camera view front and center

- At the time of image preview, the camera view moves to a smaller area of the screen

- Streaming window can be maximized (1140x1140) or minimized (320x240)

- 720p HD resolution

- 30 frames per second

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VolumeRAD Digital Tomography

VolumeRAD Digital Tomography creates multi-level image slices that provide similar data to CT at very low doses. VolumeRAD helps improve clinical diagnosis of doubtful findings seen on routine radiographs by removing superimposition and overlying structures—all while increasing diagnostic confidence with your X-ray equipment.

Metal Artifact Reduction

Metal implants often cause difficulty in advanced imaging that result in artifacts, such as streaking and ring artifacts. Flexibility in acquisition, relative to the anatomy and Metal Artifact Reduction algorithms, removes these effects and helps:

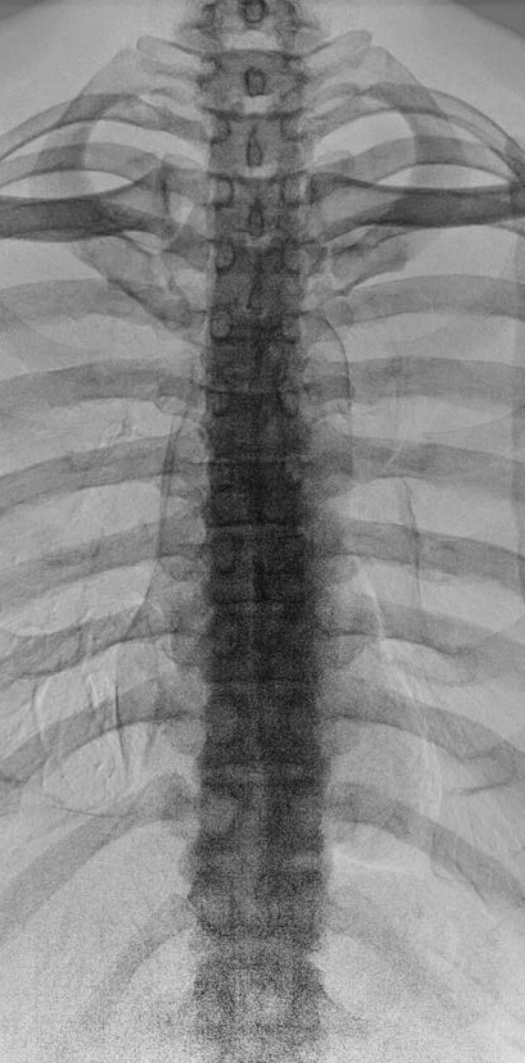**Weight bearing exams**   **Pediatric obstructions**   **Orthopedics with metal**

Dual Energy Subtraction

Dual Energy Subtraction moves beyond image processing to create bone and soft-tissue images based on the physical interaction of the X-rays with the anatomy.

Improved assessment of chest pathology
Dual Energy Subtraction enables physicians to remove the bones from a PA/AP chest image leading to the detection of abnormalities that may have been obscured by bones in a conventional radiograph.

See more than in a standard radiograph
The bone image is powerful on its own, enabling the radiologist to more clearly visualize calcified information for a given abnormality.

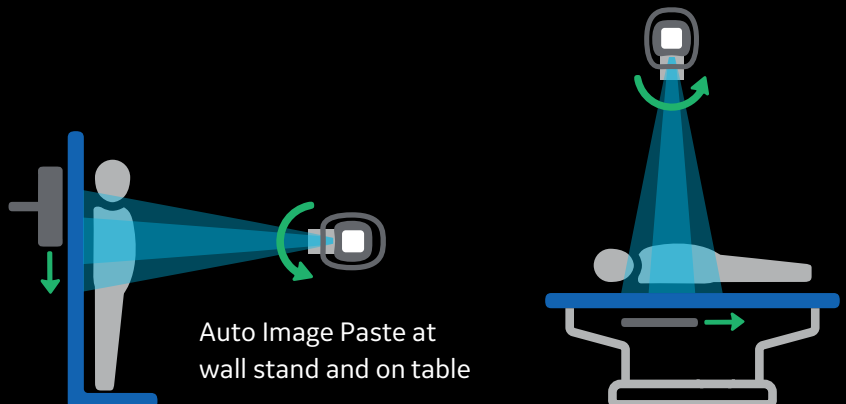**Reduced opportunity for patient movement**
Dual Energy acquisition of two images is taken less than 160 milliseconds apart.

In less than a few seconds, Dual Energy Subtraction can help to eliminate obstructions from overlying bones while providing additional information on calcifications in chest studies.
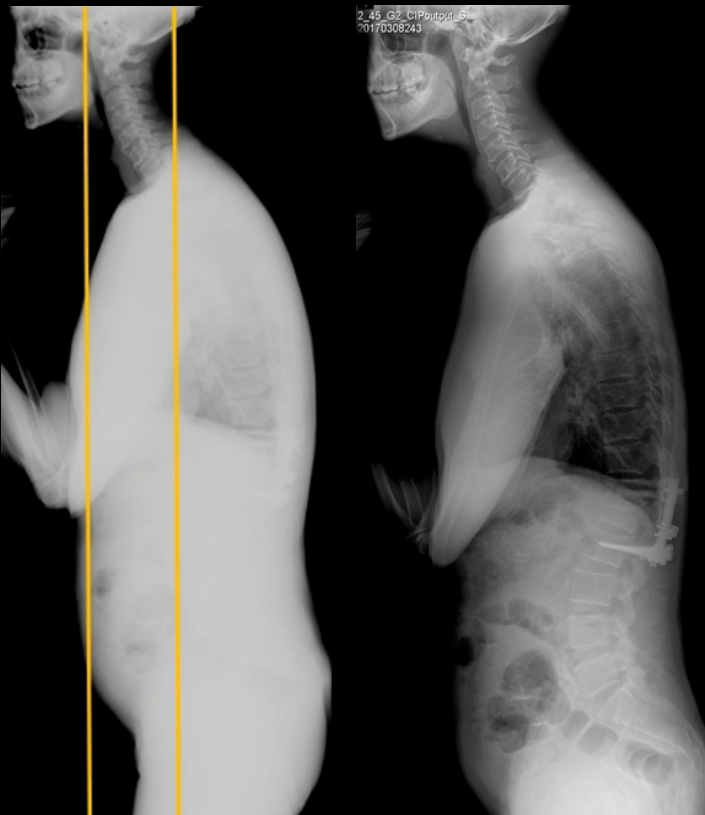
Auto Image Paste
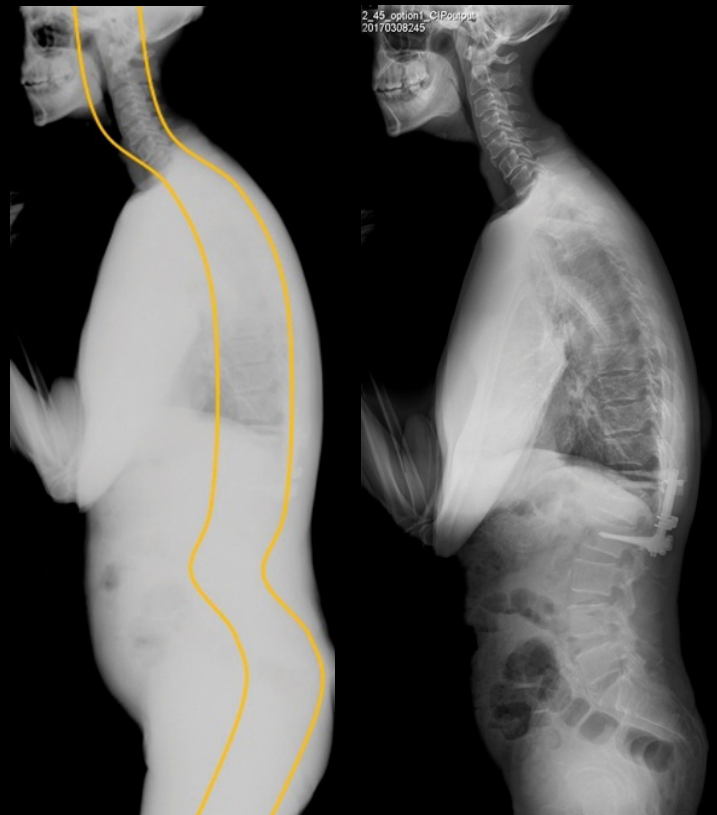## Seamless long bone and spine imaging at the wall stand and table

One fast, precise, and highly automated exam.

Auto Image Paste at wall stand and on table

Definium 656 HD is a commercial configuration of the Discovery XR656 HD

Without AutoSpine

With AutoSpine

Auto Image Paste has been enhanced with AutoSpine—an intelligent pasting algorithm that follows the contour of the spine for vertical equalization— enabling a natural balance of brightness and contrast along the patient body.

Your patient's safety, comfort, and dignity in mind

A bariatric X-ray table capable of supporting up to 400 kg/882 lbs* that lowers to 50cm/20 inches.
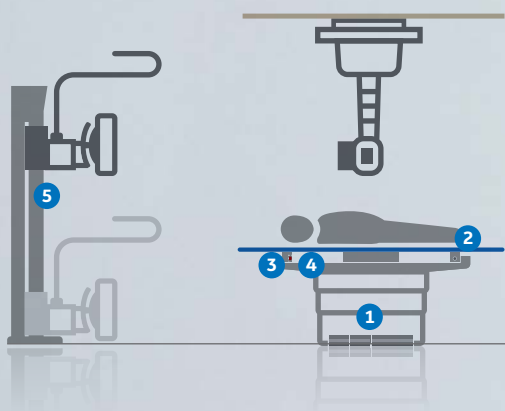
Extensive patient safety features

1. Double-tap safety foot pedals (table and wall stand)
2. Safety switches to disable motion during patient transfer
3. Two emergency stop buttons
4. Anti-collision and anti-pinch sensors on table, wall stand, and ceiling suspension
5. Electromagnetic brakes securing vertical motion of wall stand

* Table weight limit: 400 kg/882 lb static and 320kg/705 lb dynamic (elevating).

Data isn't just about looking backwards—it helps you plan the future.

X-Ray Quality Application

Identifying root causes and enabling action.

Definium™ 656 HD is compatible with GE Healthcare's X-Ray Quality Application which is built upon the Edison Platform.

X-Ray Quality Application is an **on-premise enterprise solution** which automatically collects, aggregates, and reports quality assurance data to tackle X-ray rejects, exposure/deviation indices and detector QAP test results. Uncovers the root cause of rejected X-ray exams, paving the way for targeted training, improved efficiency, and reductions in unnecessary patient dose.

iCenter asset management software platform

Optimize utilization of your X-ray equipment. Balance workload using the full power of healthcare data analytics.

iCenter empowers you with data and analytics for valuable insights into the utilization and workload of your X-ray assets—to help when making strategic decisions concerning workflow optimization.

Definium 656 HD is a commercial configuration of the Discovery XR656 HD

X-ray service and support

Our X-ray systems, applications, and support never rest, so you can focus on your patients.

GE X-ray machines are fully supported by expert field engineers you know and trust. Our advanced service technologies* help you maximize uptime and ensure your X-ray system is ready when you are.

InSite™ remote connectivity

Remote diagnostics and troubleshooting for fast resolutions, often without a field engineer visit.

Remote applications assistance with engineer connecting online in real time.

Proactive monitoring, helping detect issues so they can be resolved before downtime occurs.

Ready whenever you are

Education

Get the education you and your team need to stay sharp.

From intensive technical and clinical product training to our extensive continuing education opportunities for technologists and radiologists, we can help you meet your training needs, online and onsite.

* Service and education offers may vary by country. Check with your local representative.
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