



Workstation CD Viewer User's Guide

OrthoPACS™

v. 5.0

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INDICATIONS FOR USE:

OrthoPACS facilitates storage and communication of medical images. Together with a suitably configured Internet-standard (Web) browser on the user's computer, OrthoPACS forms an integrated client-server software system. This system is designed to allow access to medical images by radiologists, referring physicians, and other licensed professionals. It is the user's responsibility to consider the display monitor's quality and the trade-off between compression ratio and clinical effectiveness for specific image study indications.

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NOTE: The AMICAS brand is now a Merge Healthcare brand.

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Chapter 1. System Requirements

The following is a list of the minimum hardware requirements for using the basic features of the OrthoPACS Workstation CD Viewer:

1.1. Hardware

Specification	Recommended
# of CPUs	One single-core 32-bit (x86) or 64-bit (x64) CPU
CPU Clock Speed	1 GHz or higher
RAM	1GB
Video Card	128MB, Pixel Shader 2.0 in hardware, 32 bits per pixel
CD/DVD Drive	CD/DVD+/-RW (if Personal CD Burning feature will be used)
Storage	5400RPM, 40GB of space
Audio	Must be equipped with functioning speakers and a sound card to listen to audio annotations via the optional VoiceClip feature.

1.2. Software

Specification	Recommended
Operating System	XP Professional, Vista Business or Windows 7, 32-bit or 64-bit
Communications	TCP/IP stack
Java Client	Java Runtime Environment v. 1.5 or later. Note that if no version of JRE is currently installed, JRE 1.6 (6.0) will be automatically installed when the Welcome Screen is first accessed.
Web Browser	Microsoft Internet Explorer, versions 7 and 8
Anti-Virus Software	Full-featured (i.e., "corporate" or "enterprise") version of an industry-standard anti-virus program

Chapter 2. Selecting a Study

When you first insert the CD containing patient images into your computer's CD player, the main CD Viewer page will be displayed with a list of all studies contained on the CD, as in the following example:

Actions	Name	DOB	Sex	Date & Time	Description	Modality	Accession ...	Status	Image
	Doe, Jonathan Q	5643	M	08/11/2004 10:03 PM	SC (VRT)	CT	1		3 3
	Doe, Jonathan Q	5643	M	06/27/1997 12:30 PM	DR	RF_DR			1 1
	Doe, Jonathan Q	5643	M	08/18/1998 12:00 AM	DX	DX	123456		1 1 1
	Doe, Jonathan Q	5643	M	01/28/2000 10:05 PM	MR	MR			8 4 9
	Doe, Jonathan Q	5643	M	11/07/1997 1:02 PM	NM	NM			4 4
	Doe, Jonathan Q	5643	M	08/22/1997 4:13 PM	CR	CR	G-13343...		1 1
	Doe, Jonathan Q	5643	M	10/20/1998 11:05 AM	MG	MG	12345		1
	Doe, Jonathan Q	5643	M	05/13/2000 3:04 PM	CT	CT			5 4 7 74 8 18
	Doe, Jonathan Q	5643	M	01/16/2001 9:51 AM	Angio	XA			7 4 7 2
	Doe, Jonathan Q	5643	M	10/04/2001 11:06 AM	Renal Sc...	NM			1 1
	Doe, Jonathan Q	5643	M	07/16/2003 2:18 PM	Specials*	CT,PT			126 154
	Doe, Jonathan Q	5643	M	04/23/2002 12:17 PM	PET	PT			12
	Doe, Jonathan Q	5643	M	08/17/2001 9:05 AM	Liver Scan	NM			1

List of Studies on CD

Click on the patient name for the study you want to view, as in the following example:

Actions	Name	DOB	Sex	Date & Time	Description
	Doe, Jonathan Q	5643	M	08/11/2004 10:03 PM	SC (VRT)
	Doe, Jonathan Q	5643	M	06/27/1997 12:30 PM	DR
	Doe, Jonathan Q	5643	M	08/18/1998 12:00 AM	DX
	Doe, Jonathan Q	5643	M	01/28/2000 10:05 PM	MR
	Doe, Jonathan Q	5643	M	11/07/1997 1:02 PM	NM

Selecting a Study to View

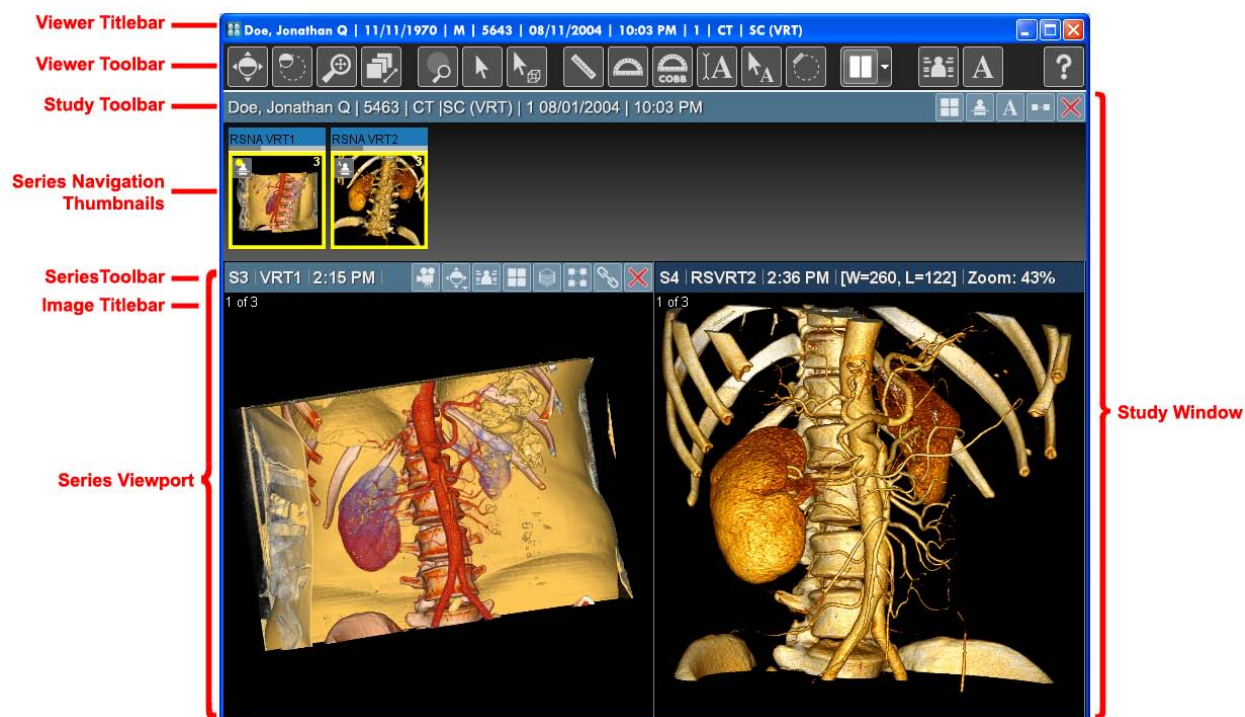
NOTE: If there are more studies on the CD that can be displayed on the screen, a scroll bar will be displayed on the right side of the screen that you can use to view the additional studies.

NOTE: You can sort the list of studies by clicking on any of the column headings (Date & Time, Description, Modality, etc.)

The **Halo Viewer** will be launched in a separate window and will display the selected study, as described in the next Section.

Chapter 3. Viewing Studies

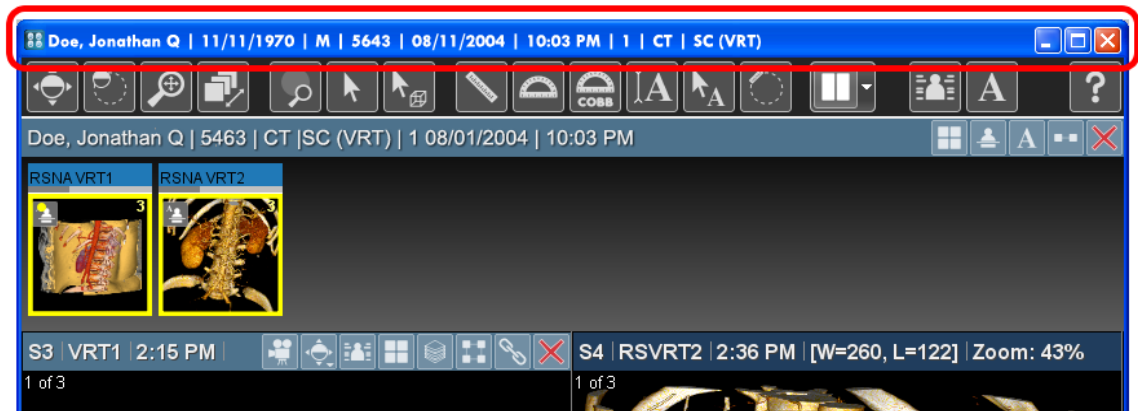
As described in the previous Section, when you select a study for viewing it will be displayed within the Halo Viewer, as in the following example:



Study Displayed in Halo Viewer

3.1. The Viewer Titlebar

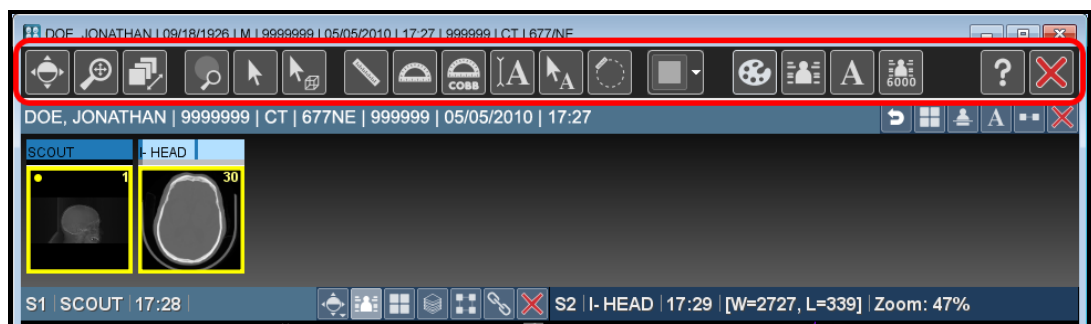
The **Viewer Titlebar** displays information about the patient and study currently being viewed:



The Viewer Titlebar














3.2. The Viewer Toolbar







The **Viewer Toolbar** displays various tools that apply to the Halo Viewer as a whole:



The Viewer Toolbar

The following tools may be available, depending on the type of study and how you have configured the Viewer Toolbar. Note that once a tool has been selected, your mouse cursor will change to reflect that tool.

Tool	Name	General Description
	Window/Level	Lets you adjust the Window and Level [contrast and brightness] of an image "on the fly" by dragging the mouse cursor over the image.
	Zoom/Pan Combo	Lets you simultaneously pan an image with the mouse cursor and resize it using the mouse center wheel.
	Page Images	Lets you page sequentially ("scroll") through the images in a Series Viewport by clicking and dragging the mouse cursor up or down.
	Magnify	Lets you enlarge selected portions of an image with the mouse cursor.
	Probe	Lets you use the mouse cursor to determine the intensity value for a selected pixel of an image in a Series Viewport.
	3D Cursor	Lets you click any part of an image displayed in one Series Viewport with the mouse cursor and have the images displayed in the other Series Viewports (containing orthogonal or other planes) be updated based upon the position of the cursor.
	Line Measurement	Lets you use the mouse cursor to measure in millimeters the actual (as opposed to the displayed) distance between two points on an image, as well as mark the image with an appropriate annotation.
	Angle Measurement	Lets you use the mouse cursor to add an angle measurement to an image.
	Cobb Angle Measurement	Lets you use the mouse cursor to add a Cobb angle (or "Cobb's angle") measurement to an image.
	Text Annotation	Lets you use the mouse cursor to add annotated text to an image.
	Arrow Annotation	Lets you use the mouse cursor to add a labeled arrow to an image.
	ROI Measurement	Lets you use the mouse cursor to add a statistics display for a specified area of an image. The tool displays the minimum and maximum pixel intensity values for a selected area of an image, as well as the average pixel value and the standard deviation for the selected region.
	Study Layout Menu	Lets you determine the screen layout for use when multiple studies are being displayed at the same time.

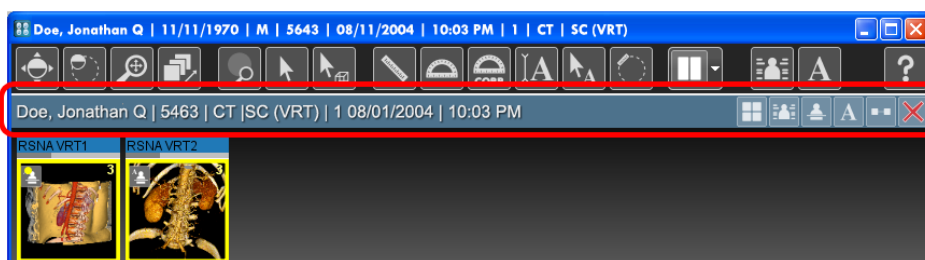
Tool	Name	General Description
	Comparison Toggle	Once you have selected a screen layout from the Study Layout Menu, lets you toggle between the default layout and the last selected layout.
	Toggle DICOM Overlay	Turns the DICOM Overlay display off for all Series Viewports that currently have images displayed in them.
	Toggle Annotations	Toggles the display of any existing annotations on and off.
	Toggle DICOM 6000 Overlay	Toggles the display of DICOM 6000 Overlays, if available, on and off for all Series Viewports that currently have images displayed in them.
	OrthoPACS CD Viewer Help	Launches this User Guide in PDF format.
	Exit Viewer	Closes the Halo Viewer.

Repeatedly right-clicking on an **image** will toggle the cursor among the following commonly used mouse modes:

- **Window/Level**
- **Line Measurement**
- **ROI Measurement**







3.3. Study Toolbar

The **Study Toolbar** displays information about the currently open study as well as tools that apply to that study:



Study Toolbar

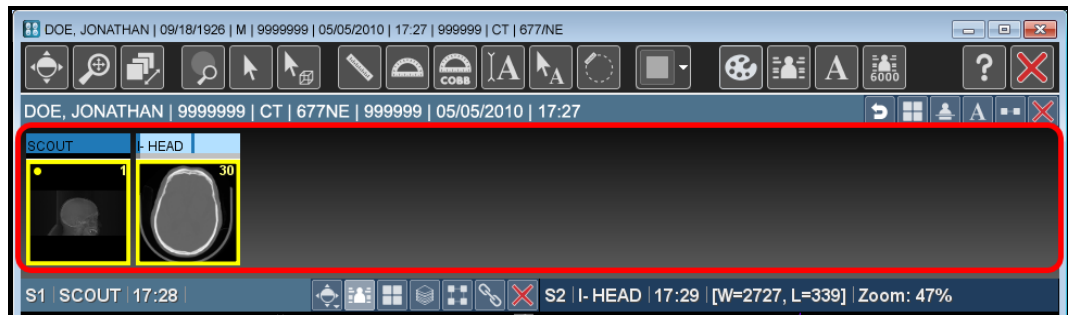
The following tools may be available, depending on the type of study and how you have configured the Study Toolbar. Note that once a tool has been selected, your mouse cursor will change to reflect that tool.

Tool	Name	General Description
	Series Layout	Displays the Series Tiling Menu that allows you to select a preset Series tiling layout or enter a manual layout. This determines the number and layout of Series Viewports on the screen for this study.
	DICOM Overlay	Toggles DICOM Overlay display for the entire study on and off.
	Cross-reference Lines	Toggles the display of any available reference lines on and off when you are viewing multiple Series. This feature is used primarily for CT and MR images where there are sequential "slices". With CT studies, there is typically a master or "scout" image against which the images of a second Series are referenced. With MR studies, on the other hand, there are typically multiple viewing angles of the same set of images, and the references lines will show the relationship between the linked Series.
	Display Annotations	Toggles the display of any annotations on and off.
	Auto Series Synchronization	Toggles Series synchronization on and off. When enabled, this will link together all Series in the same plane for navigational purposes. Thus, if you have three axial Series displayed in different Series Viewports and turn on Auto Series Synchronization, paging through the images in one of the axial Series will cause the images in the other axial Series to page as well.
	Close Study	Closes the study currently being viewed and prompts you to set study status.

Right-click on the Study Information section of the **Study Toolbar** to select which of the available tools you would like to appear on the Study Toolbar itself.

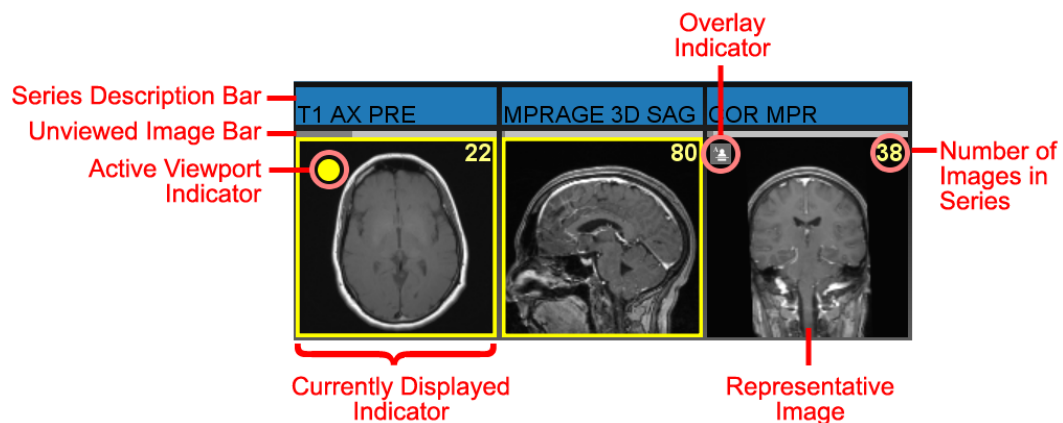
3.4. Series Navigation Thumbnails

The **Series Navigation Thumbnails** let you quickly move among multiple Series of images.



Series Navigation Thumbnails

Each Series Navigation Thumbnail can display a variety of information, as illustrated in the following example:

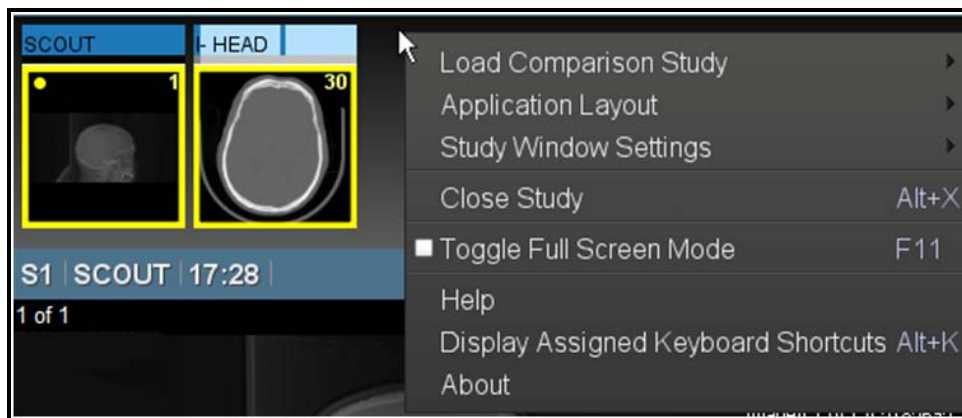


Series Navigation Thumbnails Overview

To load a particular Series into a Series Viewport, use your left mouse button to **drag and drop** the navigation thumbnail for the desired Series into an existing Series Viewport.

3.5. Study-Right-click Menu

Right-click anywhere to the right of the Series Navigation Thumbnails to display the **Study Right-click Menu**:



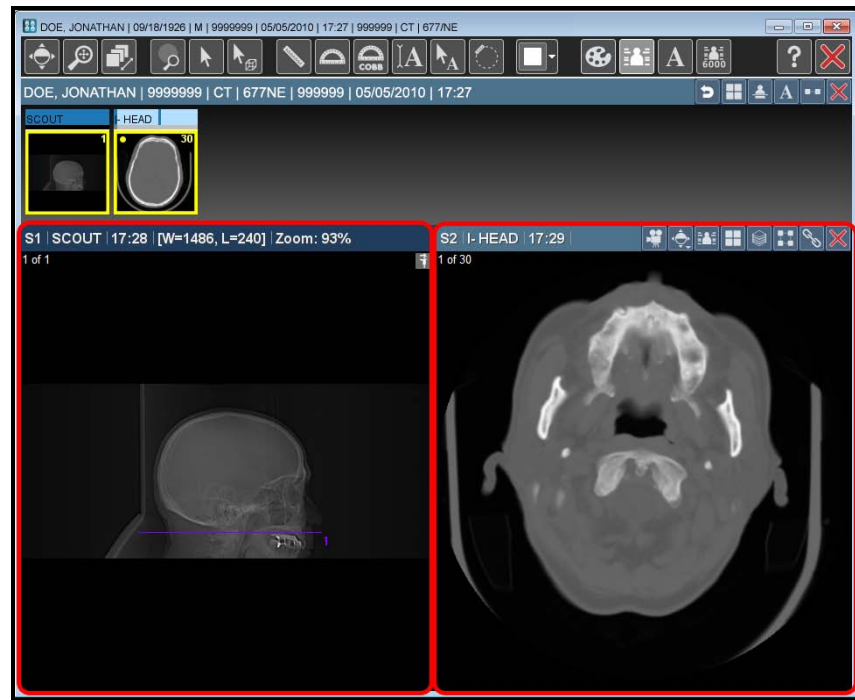
The Study Right-click Menu

The Study Right-click Menu has the following possible options:

Option	General Description
Load Comparison Study	Select from a list of available comparison studies that can be opened within the Image Viewer alongside the currently open study or studies.
Application Layout	Select the general layout for viewing multiple studies.
Study Window Settings	Change any of the following study-level settings: <ul style="list-style-type: none"> • DICOM Overlay Toggle • Show Annotations • Show Cross-reference Lines • Study Invert Toggle • Study Window Layout
Close Study	Close the current study.
Toggle Full Screen Mode	Display the current study in full-screen display mode with all non-image details hidden. Full Screen Display mode can be toggled on and off by pressing F11.
Help	Launches this User Guide in PDF format.
Display Assigned Keyboard Shortcuts	Displays a printable list of currently assigned keyboard shortcuts in a separate pop-up window.
About	Displays system information, including the current version of the OrthoPACS Workstation you are using, your Windows operating system and username, memory and disk usage, etc.

3.6. Series Viewports

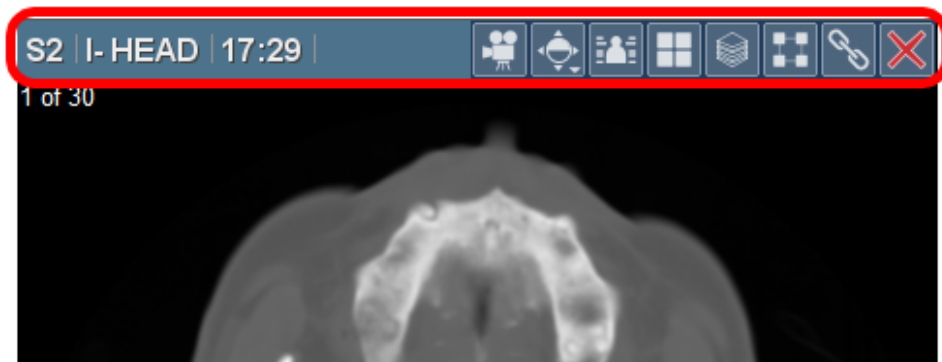
The Halo Viewer can be divided into a number of individual viewing windows called “Series Viewports,” as shown in the following example:



Series Viewports









3.6.1. Series Toolbar

Each Series Viewport has a **Series Toolbar** that displays information for the Series in the Series Viewport as well as various tools that apply to that Series Viewport, as in the following example:



Series Toolbar

The right side of the Series Toolbar shows the available tools that apply to the series currently being displayed in the Series Viewport:

Tool	Name	General Description
	Cine	Rapidly pages through the images in this Series. The speed of the paging can be controlled by dragging the mouse cursor up and down within the Series Viewport.
	Window/Level Menu	Choose a window/level option for the selected Series Viewport.
	DICOM Overlay	Toggles DICOM Overlay display for this Series Viewport on and off.
	Image Layout	Lets you change the number of images that can be displayed simultaneously within this Series Viewport.
	Global Stack	Lets you to page from the end of one series to the beginning of the next one.
	Grouping	Lets you group together multiple Series Viewports so that various tools (Window/Level, Pan, Zoom, etc.) will be applied to all selected Series Viewports when applied to one.
	Manual Linking	Lets you link series that are in different frames of reference (whether in the same study or between two studies in Compare Studies Mode, as described in subsection Error! Reference source not found. below). The Manual Linking feature can also be used if you want to link only certain related series instead of all of them.
	Clear Viewport	Removes the currently displayed Series from the Series Viewport.

3.6.2. Image Titlebar

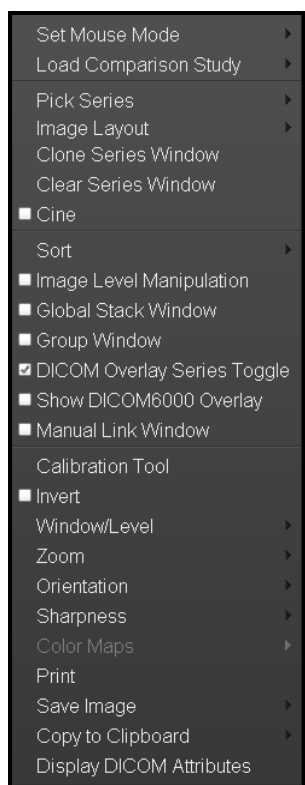
Each Series Viewport has an **Image Titlebar** that displays information about the image currently showing in the Series Viewport, as in the following example:



The Image Titlebar

NOTE: By default, the Image Titlebar will display just the image number and the compression ratio (if the image has been lossy compressed). If the Image-level Manipulation option has been enabled for this Viewport from the **Series Right-click Menu**, as described in subsection 3.6.3 below, Window/Level and Zoom factor will also be displayed here.

3.6.3. Series Right-click Menu



Right-clicking on a Series Viewport and holding the mouse button down for a few seconds will bring up the **Series Right-click Menu**, as shown in the example to the left.

The Series Right-click Menu contains a variety of additional navigation, layout, and image manipulation options, as well as the ability to save and print an image. Some of the options available on the Right-click Menu are also available elsewhere in the Image Viewer, and are included here for your convenience.

Note that, depending on the study and the type of modality involved, your login privileges, and your general system configuration, one or more of these options may not be available, in which case they will appear "grayed out" in the menu.

The Series Right-click Menu

The Series Right-click Menu has the following possible options:

Option	General Description
Set Mouse Modes	Select from a variety of tools (note that your mouse cursor will change to reflect the chosen tool).
Load Comparison Study	Select from a list of available comparison studies that can be opened within the Image Viewer alongside the currently open study or studies.
Pick Series	Pick a Series to be viewed in the selected Series Viewport, including Series from prior exams.
Image Layout	Change the number of images that can be displayed simultaneously within this Series Viewport.
Clone Series Window	Display the contents of the active Series Viewport in a new pop-up Series Viewport window, as described in subsection 0 below.
Clear Series Window	Remove the series being displayed in the selected Series Viewport.
Cine	Turn on the Cine feature to rapidly page through images in a series.
Sort	Change the order of the images displayed in the selected Series Viewport.

Option	General Description
Image Level Manipulation	When selected, various image manipulation tools (Window/Level, Pan, Zoom, etc.) will only apply to the image currently displayed and will not affect other images in the Series. Also, when selected, the Viewport Title will display the Window/Level and Zoom factor for each image.
Global Stack	Lets you page from the end of one series to the beginning of the next one.
Group Window	Manually link multiple Series Viewports together for display purposes.
DICOM Overlay Series Toggle	Turn on the DICOM Overlay display for the selected Series Viewport.
Show DICOM6000 Overlay	Turn on the DICOM6000 Overlay display for the selected Series Viewport.
Manual Link Window	Link series that are in different frames of reference (whether in the same study or between two studies in Compare Studies Mode). The Manual Linking feature can also be used if you want to link only certain related series instead of all of them.
Calibration Tool	Manually calibrate the various measurement annotations for DICOM images that do not have valid pixel spacing information associated with them when they are sent from the modality.
Invert	Reverse the black and white pixels of the images in the selected Series Viewport
Window/Level	Select a window/level option for the selected Series Viewport, as well as manage your personal Window/Level presets.
Zoom	Select a magnification level for the images in the selected Series Viewport.
Orientation	Temporarily change the orientation of the selected image (flip, rotate, etc.)
Sharpness	Apply a filter that improves the edges of certain structures within an image
Color Maps	Choose a color mapping option, if available, for the selected Series Viewport
Print	Send the selected image, together with any user annotations, to a printer
Save Image	Save the selected image, together with any user annotations, to your hard drive as a standard jpeg file
Copy to Clipboard	Temporarily copies the currently displayed image to your computer's memory so that it can be pasted into another application (e.g., by pressing Ctrl-V while inside that application).
Display DICOM Attributes	View the complete set of DICOM attributes for the selected image

3.6.4. Clone Windows

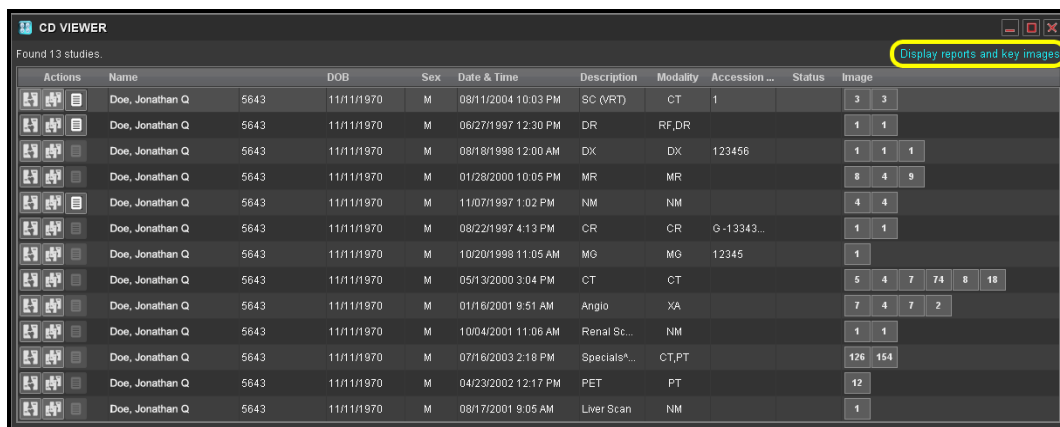
Clone windows are stand-alone Series Viewports that are displayed as separate pop-up windows. A typical use case scenario would be to position the clone window on a color monitor so as to easily view color images on that monitor when needed.

Clone windows can be invoked in two ways:

- From within an **existing Series Viewport**, by selecting the **Clone Series Window** option from the **Series Right-click Menu** for that Viewport. If invoked this way, the clone window will display the contents of that Series Viewport and preserve all the current settings of that Series Viewport (Window/Level, Zoom, etc.).
- From a **Navigation Thumbnail**, either by double-clicking on the Thumbnail or by selecting the **Open in Window** option from the **Thumbnail Right-click Menu** for that Thumbnail. Note that if you want to open additional series in separate clone windows (as opposed to reusing the currently open clone window), hold down the **Shift** key while double-clicking.

Chapter 4. Viewing Key Images and Reports

If there are any reports and/or key images associated with the studies on the CD, you can view them by clicking on the **Display reports and key images** link at the top of the main CD Viewer page, as in the following example:



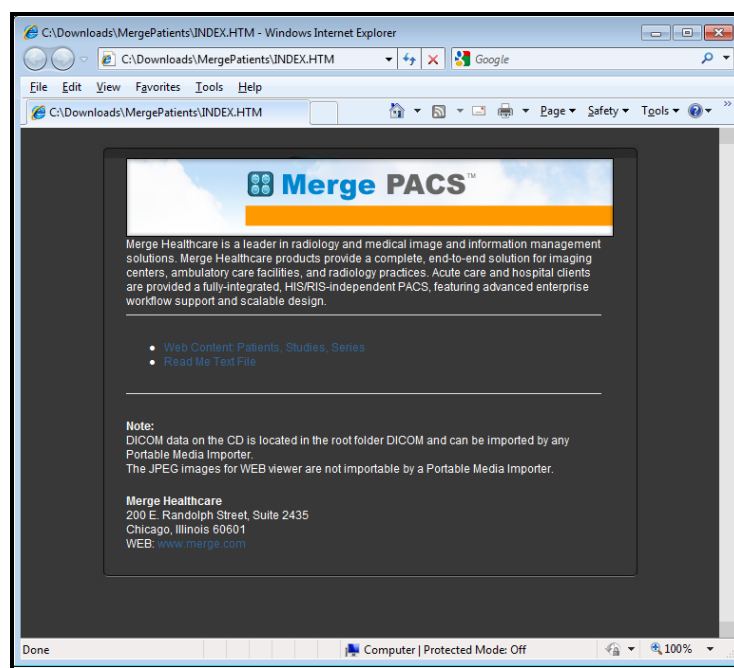
CD VIEWER

Found 13 studies.

Actions	Name	DOB	Sex	Date & Time	Description	Modality	Accession...	Status	Image
	Doe, Jonathan Q	5643	M	08/11/2004 10:03 PM	SC (VRT)	CT	1		3 3
	Doe, Jonathan Q	5643	M	06/27/1997 12:30 PM	DR	RF,DR			1 1
	Doe, Jonathan Q	5643	M	08/18/1998 12:00 AM	DX	DX	123456		1 1 1
	Doe, Jonathan Q	5643	M	01/28/2000 10:05 PM	MR	MR			8 4 9
	Doe, Jonathan Q	5643	M	11/07/1997 1:02 PM	NM	NM			4 4
	Doe, Jonathan Q	5643	M	08/22/1997 4:13 PM	CR	CR	0-13343...		1 1
	Doe, Jonathan Q	5643	M	10/20/1998 11:05 AM	MG	MG	12345		1
	Doe, Jonathan Q	5643	M	05/13/2000 3:04 PM	CT	CT			5 4 7 74 8 18
	Doe, Jonathan Q	5643	M	01/16/2001 9:51 AM	Angio	XA			7 4 7 2
	Doe, Jonathan Q	5643	M	10/04/2001 11:06 AM	Renal Sc...	NM			1 1
	Doe, Jonathan Q	5643	M	07/18/2003 2:18 PM	Specials...	CT,PT			126 154
	Doe, Jonathan Q	5643	M	04/23/2002 12:17 PM	PET	PT			12
	Doe, Jonathan Q	5643	M	08/17/2001 9:05 AM	Liver Scan	NM			1

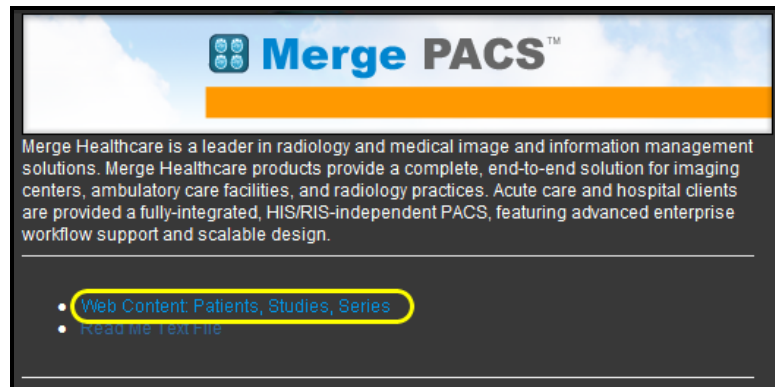
Accessing Reports and Key Images

When you click on the **Display reports and key images** link, the OrthoPACS Report and Key Image HTML page will open up in your default web browser, as in the following example:



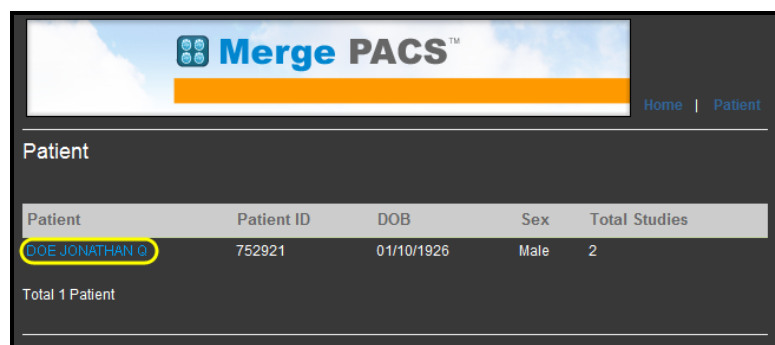
OrthoPACS Report and Key Image HTML Viewer

Click on the **Web Content: Patients, Studies, Series** link in the middle of the page, as in the following example:



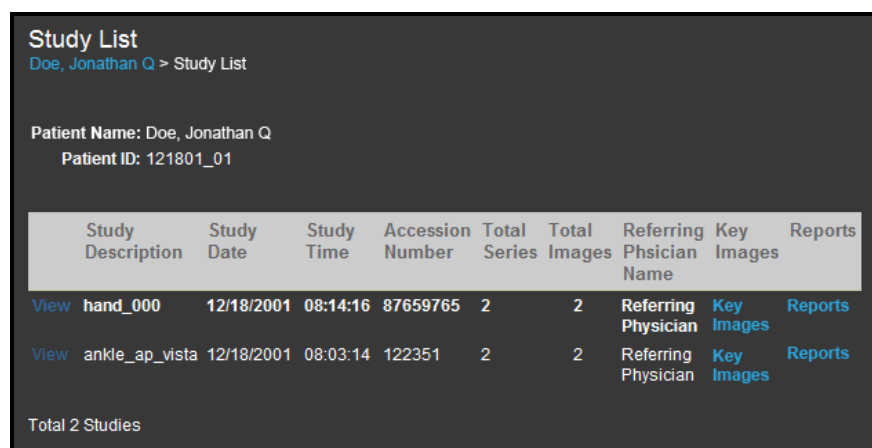
The Web Content: Patients, Studies, Series Link

At the **Web Content: Patients, Studies, Series** page, click on the name of the patient, as in the following example:



Name of Patient

The **Study List** page is displayed, as in the following example:



The Study List Page

4.1. Viewing Key Images

If there are any key images, you can click on the **Key Images** link for the desired study on the **Study List** page, as in the following example:

Study List
Doe, Jonathan Q > Study List

Patient Name: Doe, Jonathan Q
Patient ID: 121801_01

	Study Description	Study Date	Study Time	Accession Number	Total Series	Total Images	Referring Physician Name	Key Images	Reports
View	hand_000	12/18/2001	08:14:16	87659765	2	2	Referring Physician	Key Images	Reports
View	ankle_ap_vista	12/18/2001	08:03:14	122351	2	2	Referring Physician	Key Images	Reports

Total 2 Studies

Selecting Key Images to View

. Small versions of the key images will be displayed as in the following example:

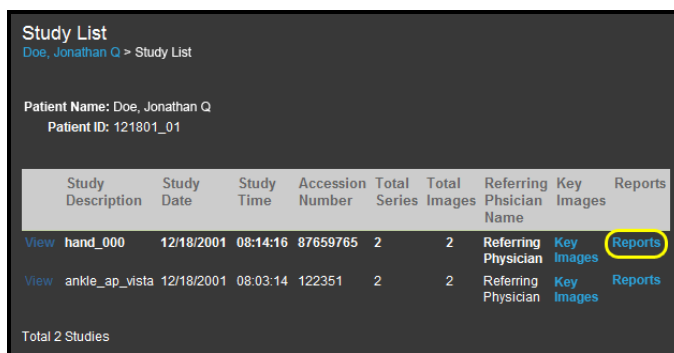


Key Images

Click on any key image to see a full-sized version of it.

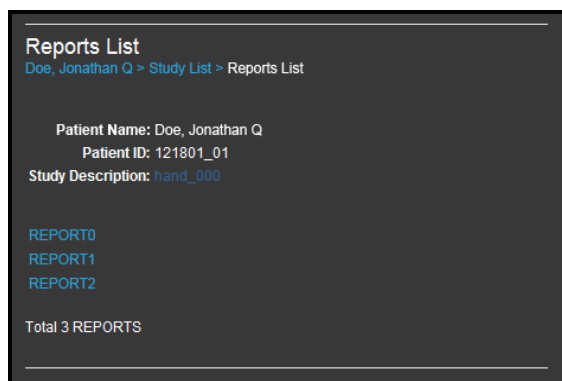
4.2. Viewing Reports

If there are any reports, you can click on the **Reports** link for the desired study on the **Study List** page, as in the following example:



Selecting Reports to View

A list of reports for the selected study will be displayed, as in the following example:



List of Reports

Click on the link to the desired report to view it.

You can also access the Reports List page for a study by clicking on the **Report icon** for that study at the main **CD Viewer** page, as in the following example:



The Report Icon

The Report Icon will only be active for a study if there are any reports for that study; otherwise, it will be grayed out.