

SMARTDent

User Manual

RUG-400-EN

Rev. 3.0

This user manual provides information for proper use of SMARTDent. Users should read this manual carefully before using the product.

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This manual is subject to change without prior notice.

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Program Introduction

1

1 Program Introduction

SMARTDent V3 provides the function to efficiently manage CT, panorama, cephalometric, intraoral sensor images and intraoral camera images acquired using X-ray imaging equipment of Ray Co., Ltd. and perform various image analysis according to the diagnostic purposes.

1.1 Program Highlight

- ✓ **Fast and Stable Network Environment**

Through the DBMS (Database Management System), you can check the image with SMARTDent from any PC in the dental clinic, and the high-speed TCP / IP transmission technology is applied to save and view the images faster than before.

- ✓ **Intuitive User Interface**

Designed based on the user experience, you can quickly select the desired function, and through the interface deployed from left to right and top to bottom, we have made it easy for anyone to learn and use the function.

- ✓ **Easy but Powerful Image Analysis**

It supports various multi-view formats to compare images before and after treatment efficiently. You can configure the image viewing screen any way you want, and you can set the image type of each screen in advance to check the image you want by selecting the multi-view without selecting the image. In addition, if you use the image comparison function and adjust one image, the comparison image is changed together so that you can compare images with minimal manipulation.

- ✓ **Various Convenient Function**

Various conveniences available in the new version, such as moving images between patients, modifying image information such as image type, location, and length information, viewing image profiles such as 3D software, memo function to check contents before checking images, and capture function Features. In addition, the implant simulation can be checked by selecting the desired size and color directly.

- ✓ **Improved Printing Function**

You can print with various multi-views of image view, and you can compose and print the image in the form you want. You can also add comments and use various image information display functions to organize the page and save it as a pdf or jpg file for use as a report.

✓ **Image Import/Export Improvement**

You can conveniently select functions according to your workflow, such as importing images by selecting a patient, exporting multiple images from a list of images, and exporting images you are viewing.

✓ **Easy and Convenient Install**

The new SMARTDent makes server installation very easy and allows you to link digital solutions without installing RAYDENT Connect. You can use both the acquisition and diagnostic functions by installing SMARTDent without having to install RIOView, RIOScan, and RIOSensor software, and you can conveniently view images using a web viewer

✓ **PACS Integration and DICOM 3.0 Compatibility**

In SMARTDent, you can search the acquisition request list (MWL, Modality Worklist) registered in PACS, select MWL, and then send the image to PACS (DICOM Storage SCU). DICOM files created by this software support DICOM 3.0.

✓ **Digital Solution Integration**

The process from Impression CT imaging to the production of digital imaging devices can be performed more conveniently with SMARTDent, and the outputs can be efficiently managed.

1.2 Operating Environment

The table below shows the minimum and recommended specifications for PC to operate SMARTDent.

Item	Minimum Requirement	Recommended Requirement
CPU	Intel Pentium 4 or greater	Intel i5 2.0GHz or greater
RAM	1GB or higher	2GB or higher
Resolution	1024 X 800	1920 X 1080
Video Card	256MB Video RAM	512MB RAM
Operating System	Windows 7 Home	Windows 10

1.3 System Configuration

SMARTDent and Ray Co. Ltd X-ray imaging equipment can be configured as follows.

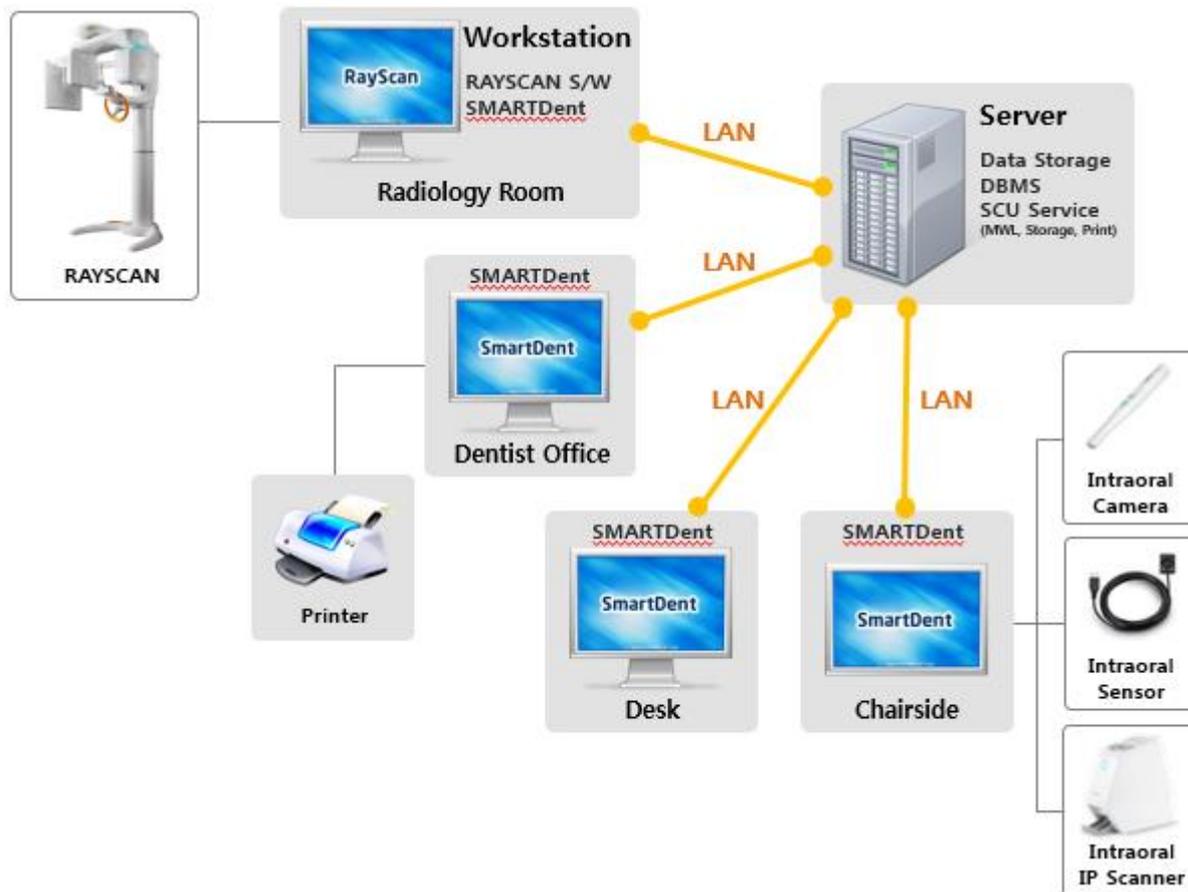


Fig 1 SMARTDent Software System Configuration

SMARTDent exchanges data using TCP / IP method with database and file server. Using RAYSCAN software, you can search acquired CT, panorama, and cephalometric images, and it supports the function of acquiring images from RIOScan, RIOSensor, USB intraoral camera, and imaging devices that support TWAIN, saving them to the server, and querying them.

Patient and image information can be searched and diagnosed / analyzed on all PCs with SMARTDent installed in the office network environment, and image analysis information entered using SMARTDent can be viewed on any PC.

Printing of images using a connected printer is possible, and PACS interworking is supported using the server's MWL, DICOM Storage, and DICOM Print SCU services.

In addition, you can use Impression CT image inquiry and STL conversion for interlocking ray digital solutions, software to make treatment devices, and 3rd party software.

1.4 Software Configuration

SMARTDent V3 is designed to provide users with a consistent user interface based on the user experience, making it easier and more intuitive to learn and use the software. The functions are deployed from left to right as a whole, the main selection functions, image view adjustment and option setting functions are displayed in the left tool menu, and other menus are displayed in the upper tool menu.

1.4.1 Starting Screen

When the SMARTDent software is launched, the [Patient] tab is displayed as shown below. From the far left, the screen is structured in the order of “function selection”, “patient search”, and “patient image”. When the program starts, the patient is automatically searched and displayed according to the last used patient search condition before the program ends.

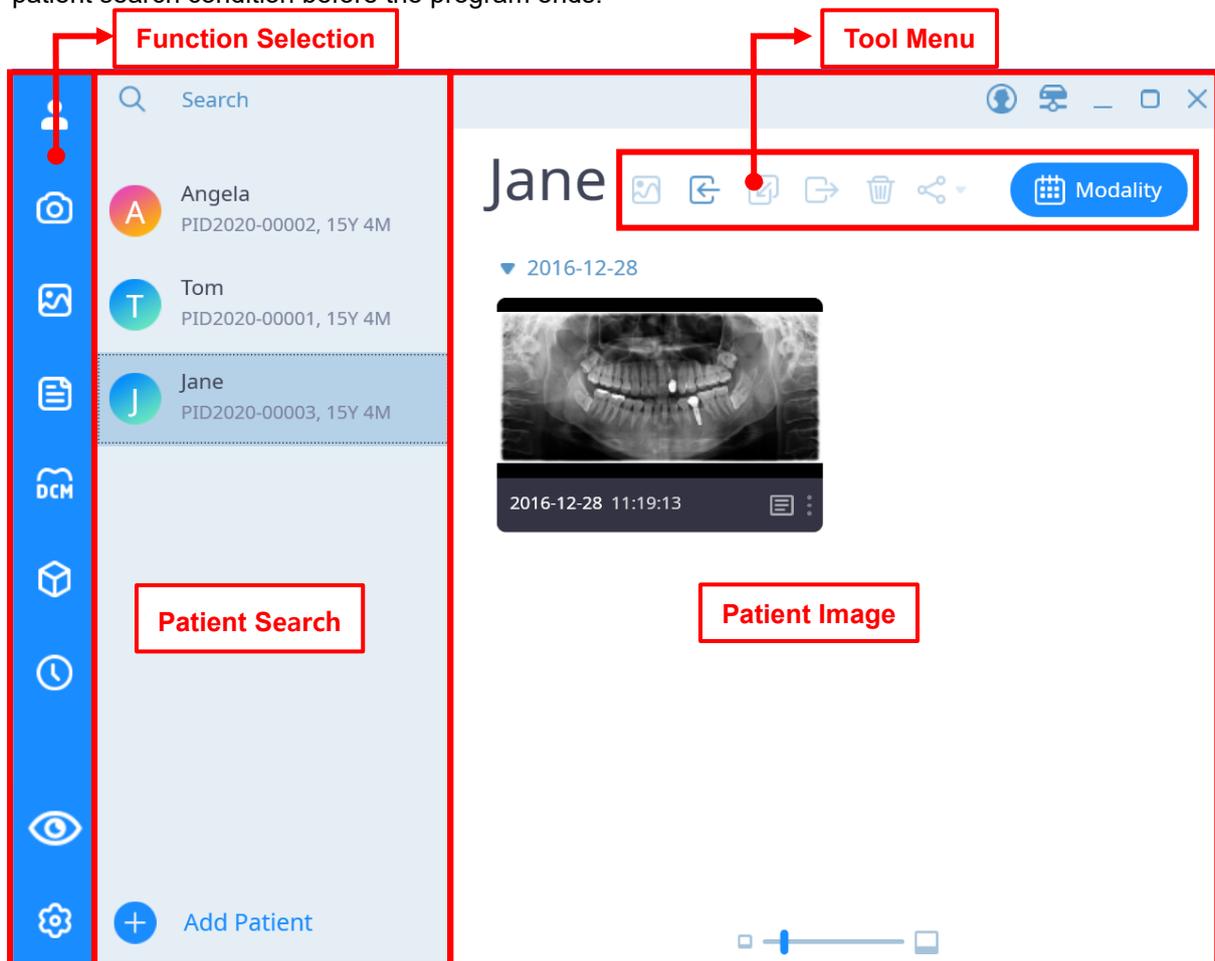


Fig 2 Starting Screen

The functions provided by the function selection are shown in the table below.

Icon	Item	Description
	Patient	This page is for managing patients and images.
	Acquisition	This is a page that acquires images of selected patients.
	Image	This is a page to diagnose / analyze the image of the selected patient.
	Report	It is a page that organizes pages and prints / saves / sends e-mails.
	DICOM	This is the page to search PACS acquisition list (MWL) and send video.
	Digital Solution	This page is for managing digital solution images.
	Statistics	Check the patient's acquisition list and statistics of modality-specific acquisition records.
	View Patient	Select Show/hide patient search list.
	Setting	Software settings page.

Notice SMARTDent provides the ability to show / hide the patient search list to prevent unnecessary exposure of personal information from the patient search list to others.

You can search for patients by selecting the patient search window and entering a name or chart number. If you select the patient search window, a window where you can set the detailed search condition is displayed as shown in the figure below, where you can search for the patient with the desired condition without entering a name or chart number.

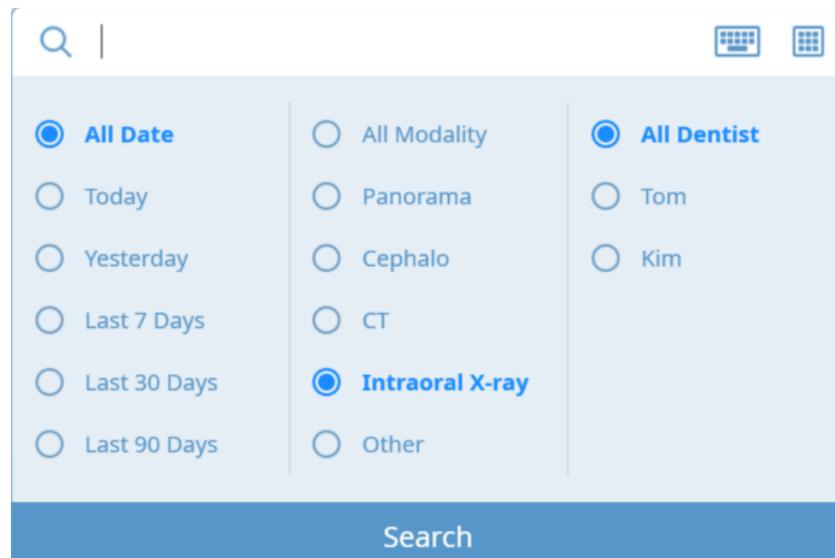


Fig 3 Detailed Patient Search Criteria

If a patient is selected after the patient list corresponding to the search condition is displayed, the image thumbnail of the patient is displayed on the right. Patient images can be checked by modality (image type such as panoramic or intraoral sensor) or by date.

You can import images using the tool menu function, or select one or multiple images using the mouse and use functions such as viewing images, moving images, exporting, deleting, and linking other programs.

1.4.2 Acquisition Screen

SMARTDent supports RAYSCAN integration to acquire CT / Panorama / Cephalometric images, Intraoral image acquisition with RIOScan, RIOSensor, intraoral USB camera image acquisition and TWAIN. In addition, you can request to acquire a CT / Panorama / Cephalometric image from the chair by using the registration method (MWL) on the DICOM page.

Notice On the DICOM screen in RAYSCAN Workstation, you can select the acquisition request list (MWL) registered in PACS to take a image, and in the chair, CT / panoramic / cephalo acquisition request list (MWL) so that you can select and acquire on the workstation where RAYSCAN is installed as well as registration. For more information, please refer to 8. DICOM.

The acquisition screen consists of a menu panel and a screen that displays the captured image, as shown below.

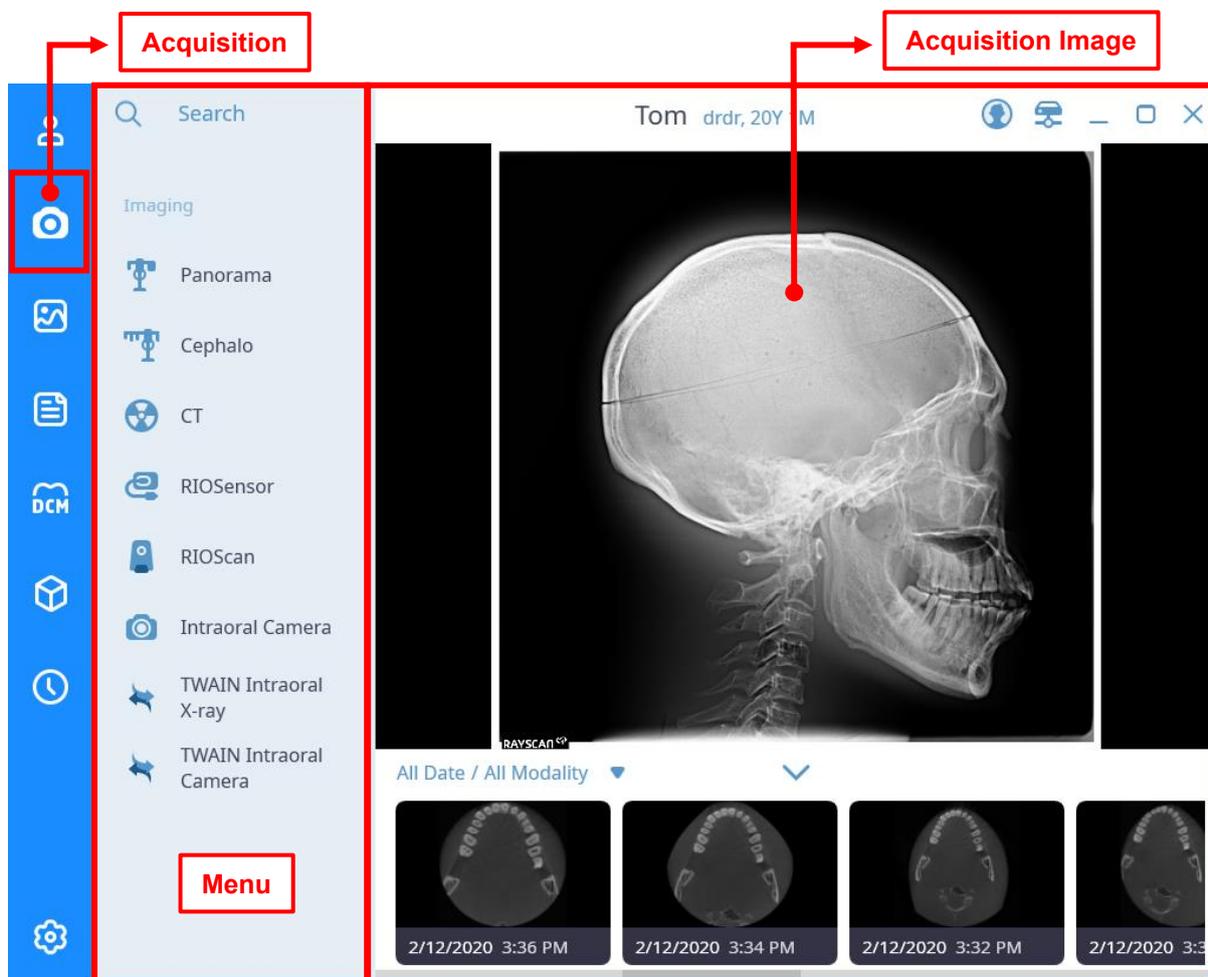


Fig 4 Acquisition Screen

In the menu panel on the left, for a PC with RAYSCAN scanner program is installed, the CT/Panorama/Cephalometric modality will be displayed automatically, and other modality will display the items selected in Settings.

After selecting the modality on the left, when the acquisition is completed, the saved image is displayed as the main screen and thumbnail image list of the acquired image as shown above.

If you select the RIOScan, RIOSensor, Intraoral Camera, TWAIN menu, the small device modality is displayed as shown below. Due to the difference in functions, the small device modality is displayed differently, and the RIOSensor acquisition screen is shown in the figure below.

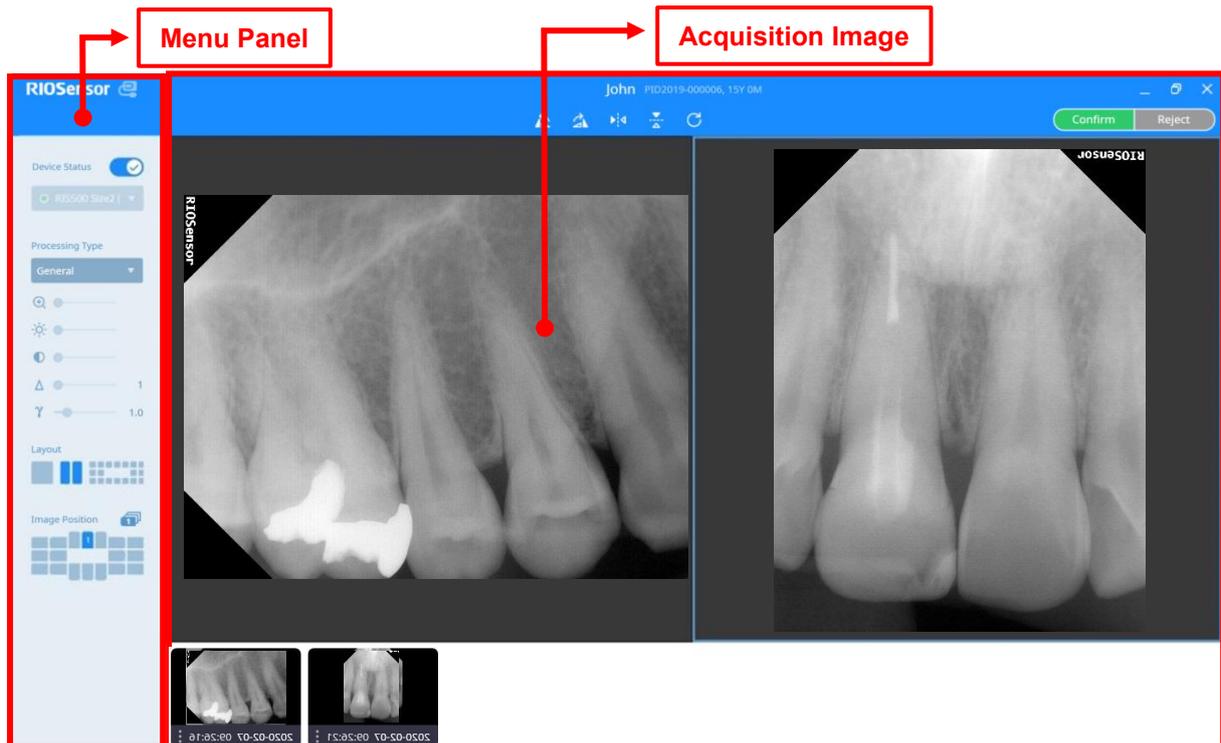


Fig 5 RIOSensor Acquisition Screen

At the top of the menu panel on the left is a menu that displays device status and allows you to change it. In addition, the menu for the image filter, image adjustment menu, layout, image position display, and acquisition order setting functions is displayed. SMARTDent provides FMX View for X-ray sensor image acquisition or single screen and two split screen for ease of use.

Notice If you use a single screen, you can check the saved image larger, and if you use the 2 split screen, you can conveniently compare the newly acquired image with the previous image.

Notice The new version has no default acquisition order, and supports the ability to create and select the desired acquisition order.

1.4.3 Image Viewer Screen

The image viewer screen consists of the menu panel on the left, the tool menu at the top of the patient image, the image screen, and a thumbnail list.

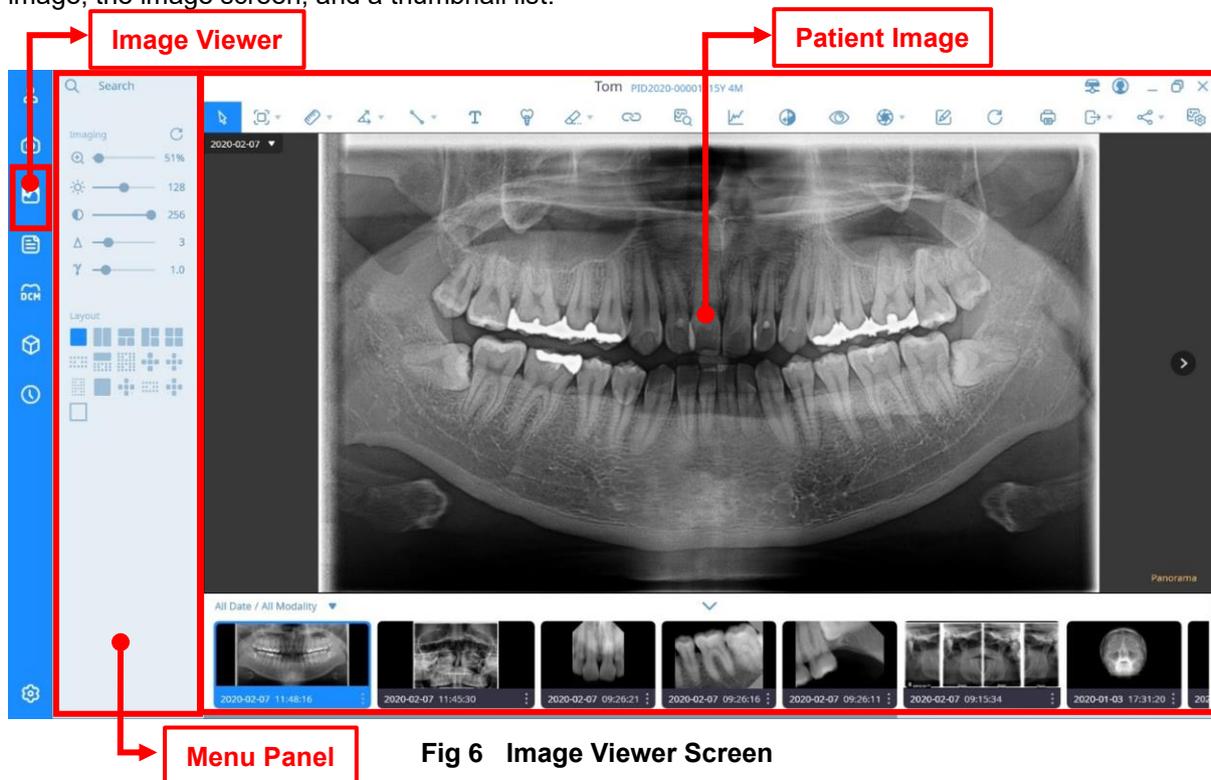


Fig 6 Image Viewer Screen

The menu panel consists of options for patient search, image adjustment (zoom, brightness, contrast, sharpness, gamma), layout selection, FMX position display, and tool menu functions.

On the image screen, you can change the image by selecting the date or left / right move buttons at the top left or double-clicking the thumbnail image at the bottom or doing drag & drop to check the video you want.

You can select the desired function by selecting the tool menu at the top of the patient image. If you select ▼ of the tool menu, you can change the tool menu to the desired function among the detailed functions. If you right-click while using the tool menu, the selected function is released and the “Select” function is selected.

The thumbnail list at the bottom of the patient image allows you to quickly find the desired image by selecting modality or date.

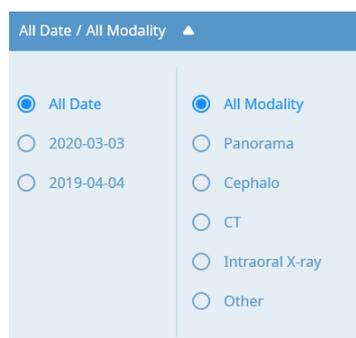


Fig 7 Detailed Image Search Condition

1.4.4 Report Screen

When viewing the image and selecting the print button or selecting “Report” from the leftmost function selection panel, the report screen is displayed as shown below. After organizing the page in the form you want, you can print it, save it as a pdf or excel file, and send an email by attaching the created page.

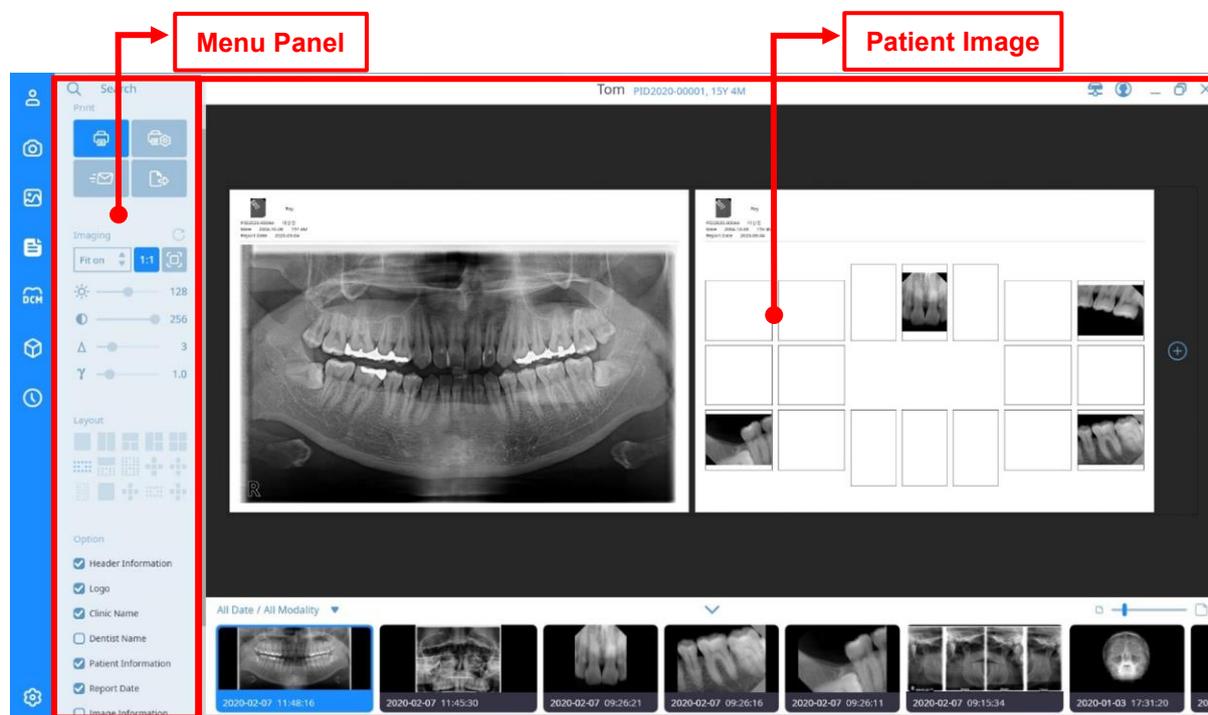


Fig 8 Report Screen

The menu panel consists of patient search, print configuration, print settings (magnification, image adjustment), layout, and print options.

You can compose the image in a desired form, select Comment to add diagnostic information about the image, and set options to display hospital information, patient information, and image information. You can organize multiple pages using Add Page, and when the page configuration is complete, you can perform any of the Print, Send Mail, and Export functions at the top of the menu panel.

Notice

If the brightness, contrast, sharpness, and gamma information in the report is modified, it is applied only to the report to print and save the created page, not to the original saved image.

Program Installation

2

2 Program Installation

After executing “Setup.exe” of the software installation package, if the screen below appears, select “Server” for the server PC and “Client” for the PC on which you want to install SMARTDent, and then select [Install] button.

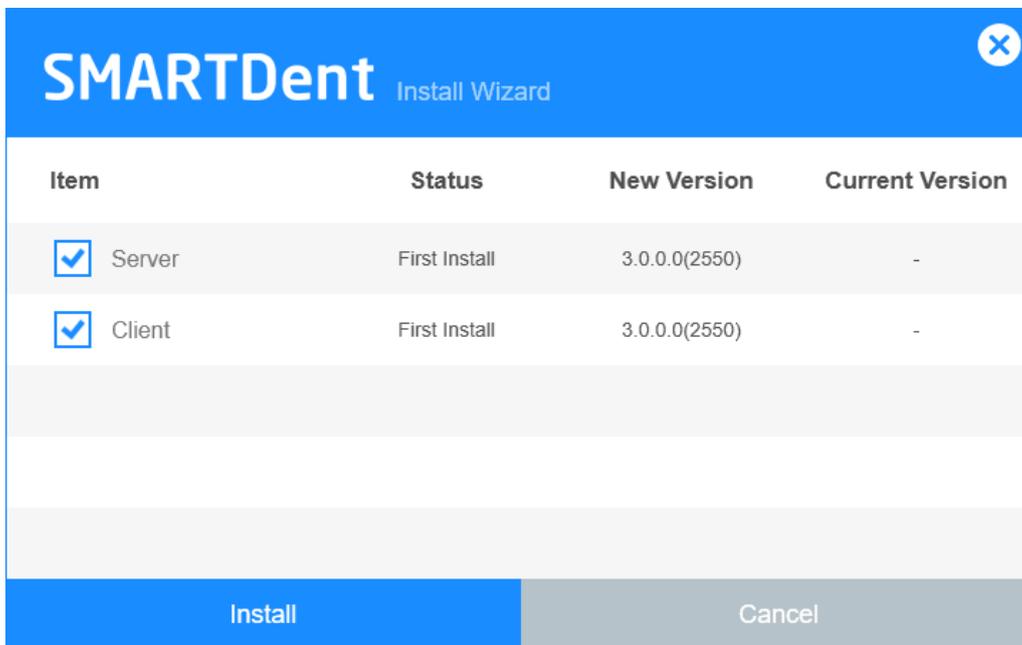


Fig 9 Program Installation Start Screen

Select the disk where the database file will be saved and select [Next] button.

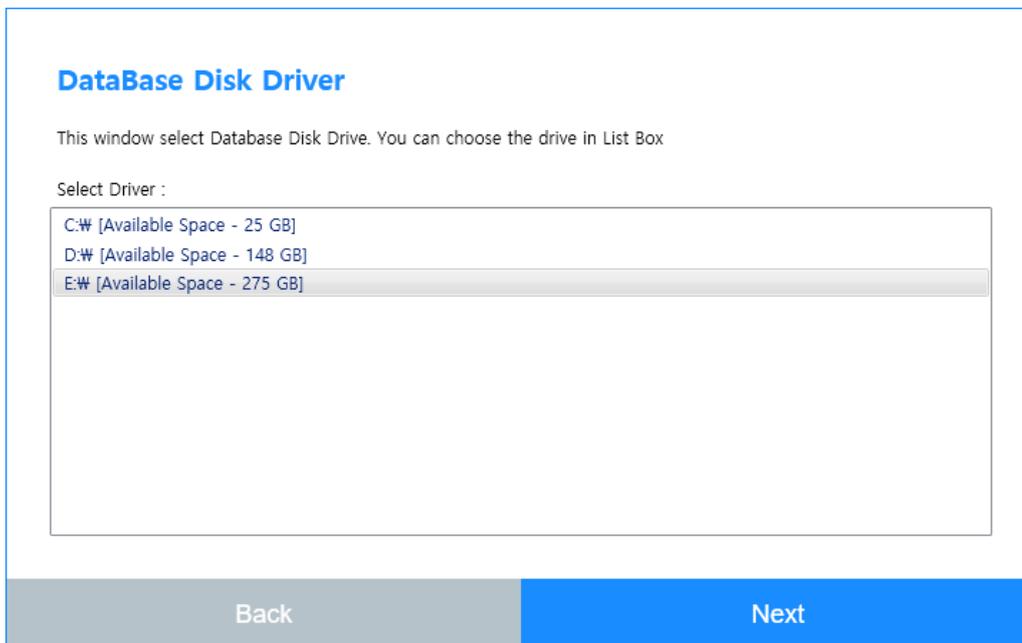


Fig 10 Select Database File Location

PostgreSQL, Visual C ++ Redistribution, etc. must be pre-installed to use SMARTDent. PostgreSQL takes a few minutes to install. Please wait a moment.

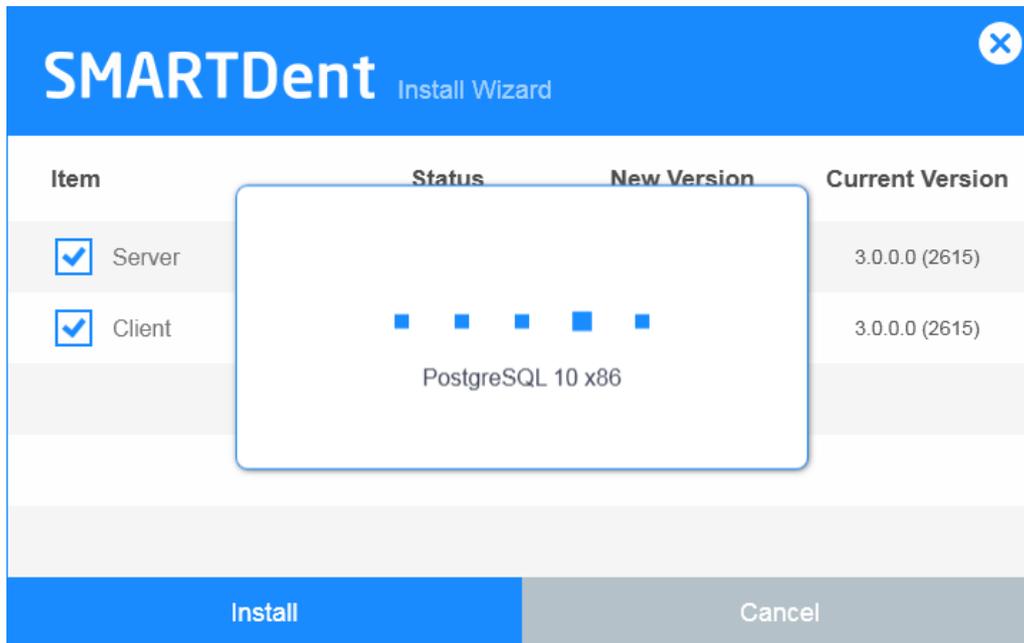


Fig 11 PostgreSQL Installation Screen

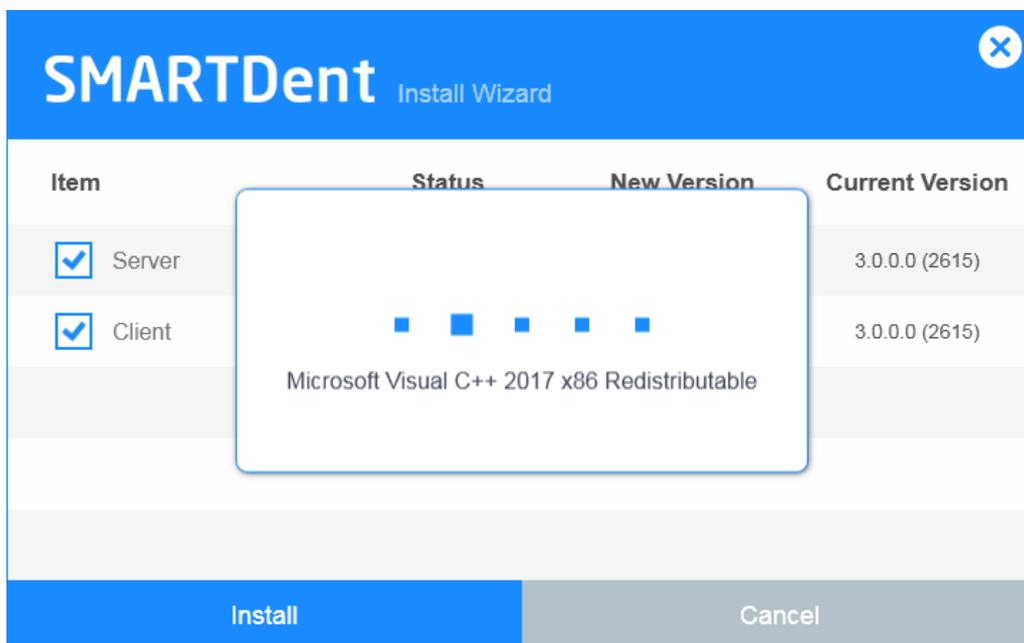


Fig 12 Visual C++ Redistributable Installation Screen

If SMARTDent V3 Server (RAYServer) is selected, the installation is automatically executed as shown below. Please wait a moment.

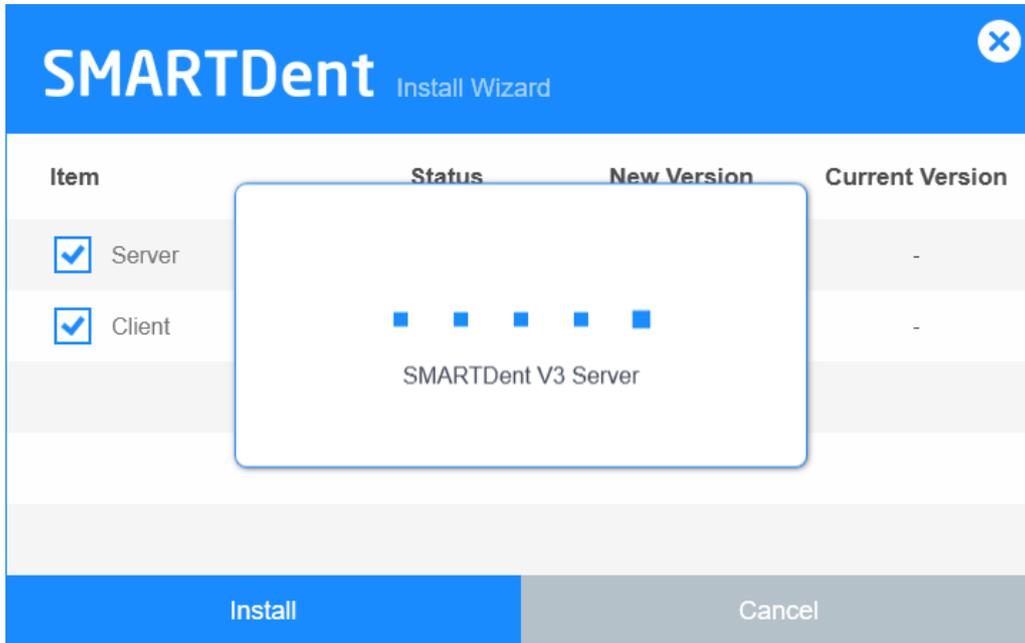


Fig 13 Server Installation Screen

If Client is selected, SMARTDent V3 is installed as shown below. Please wait a moment.

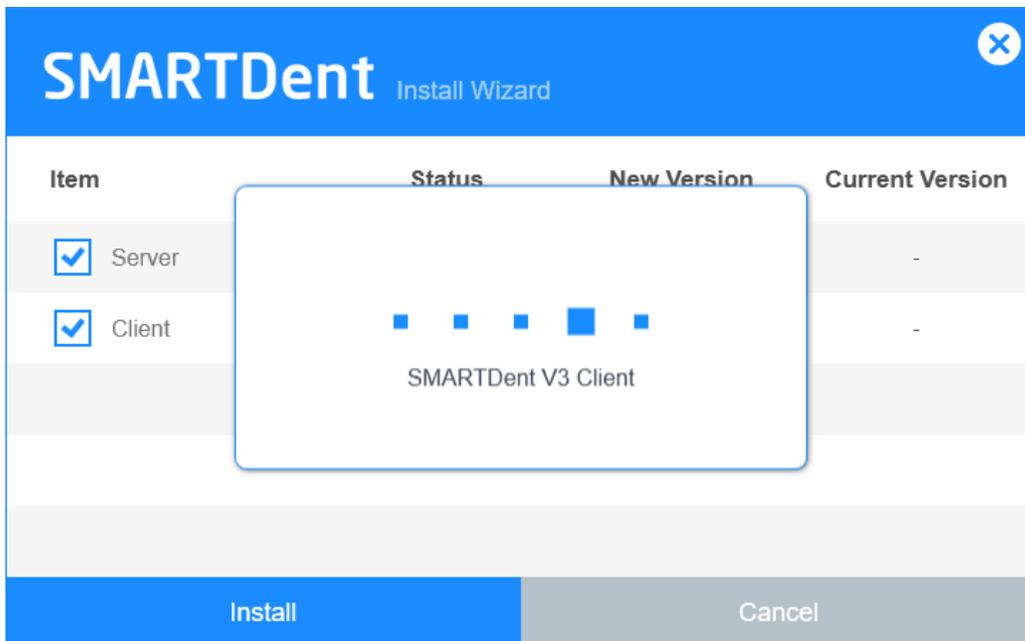


Fig 14 Client(SMARTDent) Installation Screen

Check if the program is installed normally.

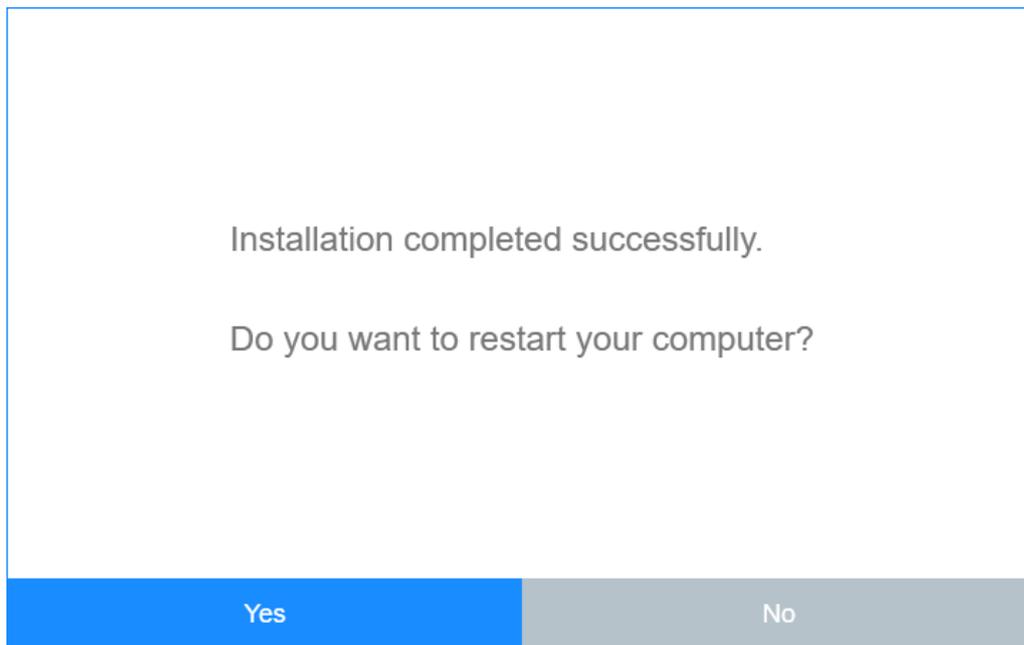


Fig 15 Completed Program Installation Screen

Notice

If Microsoft .Net Framework is installed during the installation process, select the [Yes] button on the screen above and reboot the PC to use SMARTDent.

Notice

When SMARTDent V3 is installed, RIOScan, RIOSensor, and TWAIN programs are installed together.

User Account Management

3

3 User Account Management

SMARTDent supports a log-in function and an automatic log-out function after a certain period of time has elapsed to prevent unauthorized users from using it. (Cybersecurity Requirements) After installation, you can use the program without a login procedure. If you check “Use Login” in the setting, a login window is displayed when the program starts. If you log in using an administrator account, you can add / modify / delete users, and the default administrator account and user account are as follows.

Account Type	ID	Password
Administrator Account	admin	admin
Guest Account	guest	guest

Notice When using the user account management function, be sure to change the password of the administrator account before use and be careful not to leak the administrator account to others.

3.1 Log In

If you select Use login function in the settings, the login window will be displayed when starting the program as shown below.

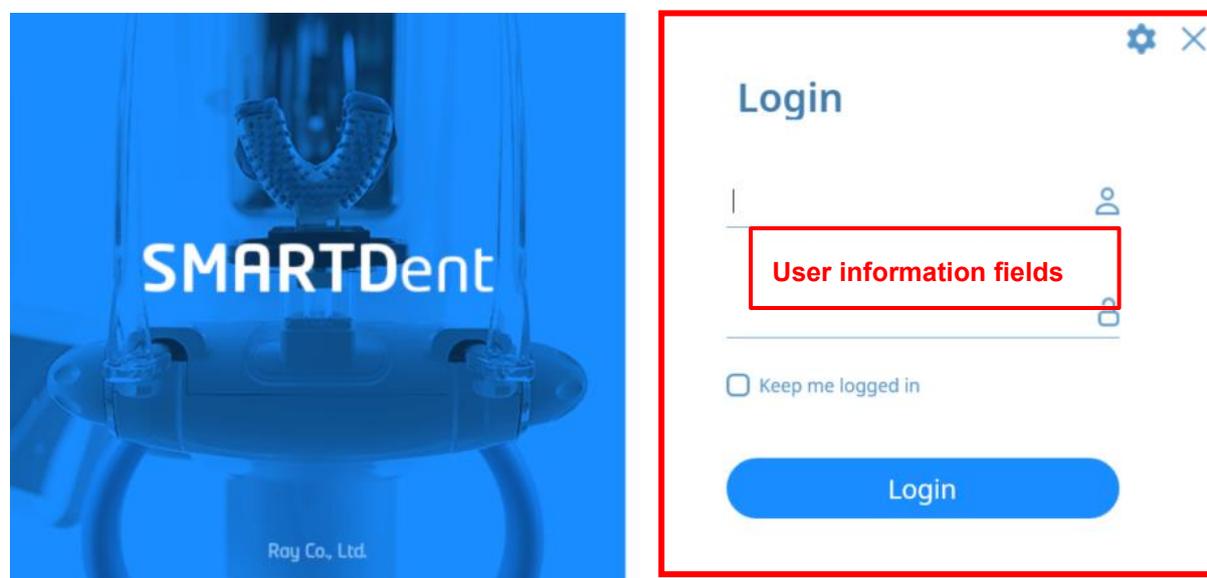
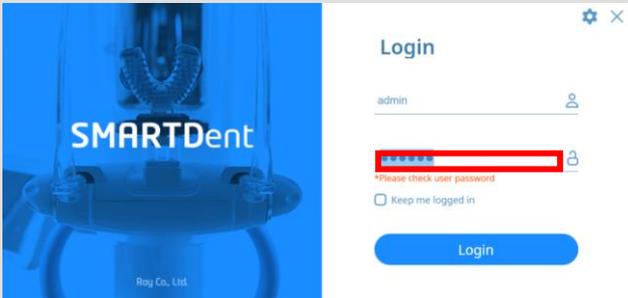
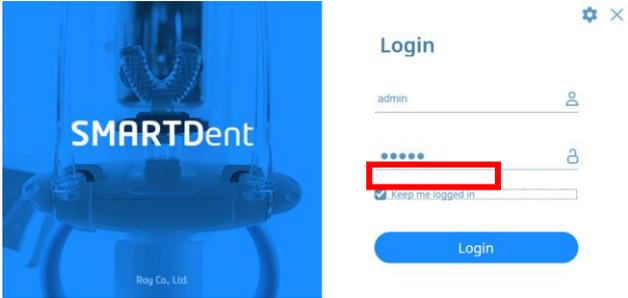


Fig 16 Login Screen

User information fields

Item	Description
 Server Settings	Set the IP of the server to connect
 End	End the SMARTDent program.
<input type="text"/> 	User ID Enter your user ID
<input type="password"/> 	User Password Enter the user password
<input type="checkbox"/> Keep me logged in	Choose whether to log in automatically. If you check here and log in, the next time you run the program, you will be logged in with the user account information you are currently logged into.
<input type="button" value="Login"/>	Login Log in using the above information

Login

No.	Figure	Description
1		If login fails, an error message appears at the bottom of the password.
2		If you check the "Auto Login" item, you are automatically logged in with the account you are currently logged in to.

Notice

- The administrator account does not support the automatic login function
- After automatic login, you can turn off automatic login in the user account menu.

Changing server settings

No.	Figure	Description
1		Click the [] button at the top of the login screen.
2		After entering the IP of the server you want to connect to, press the [Verify] button to confirm that it is connected to the server. If the connection is successful, click the [Apply] button at the bottom to change the server IP.

Notice

If the server connection is not normal, you cannot log in, so the login screen supports the server setting function and server connection test. If you cannot log in, check the server connection status.

3.2 User Account Management

When you log in with an administrator account, a screen to manage user account information is displayed. Account management supports the management of administrator account information along with the addition, modification, and deletion of user accounts.

The screen structure of the 'User Account Management' window and the contents of each item are as follows.

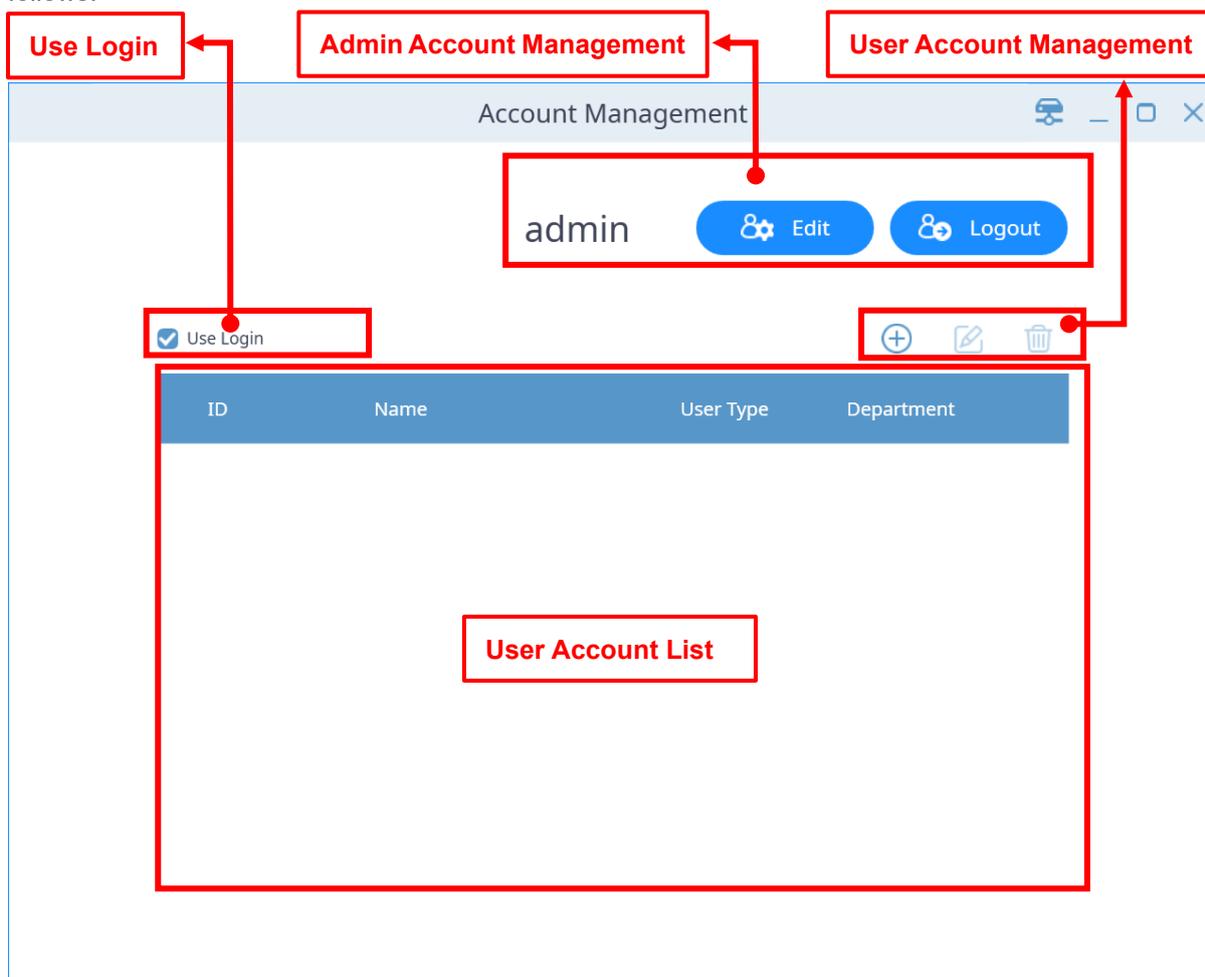


Fig 17 User Account Management screen

Admin account management

Item	Description
admin	Admin ID Indicates the ID of the currently logged-in administrator
 Edit	Change Admin Information Change the information of the currently logged in administrator account.
 Logout	Log Out To log into another account, log out of the current account and return to the login screen

User account management

	Item	Description
	New User Registration	Register a new user account.
	Change User Information	Edit the selected account's information.
	Delete User Information	Delete the information of the selected account.

User Account List

ID	Name	UserType	Department
Item	Description		
ID	Indicates the ID of the user account.		
Name	Indicates the name of the user account.		
UserType	Indicates the permissions of the user account. It consists of None, Admin, Dentist, Staff, and Guest, and user information set as None type does not appear in the list. Each permission has different access areas.		
Department	Represents the department of the user account. It consists of None, Coordination, Desk, Treatment, Shooting, Receipt.		
Notice	The account with UserType None and Admin does not appear in the user account list.		

Keep me logged in

Keep me logged in

Item	Description
Keep me logged in	Enable or disable automatic login. When checked, you will be automatically logged in.

3.3 New User Registration

The method of registering a new user in SMARTDent is as follows. When you click the [+] button on the user account management screen, the 'Account Information' window appears.

The screenshot shows a window titled "Account Information" with a close button (X) in the top right corner. At the top, there are two tabs: "ID" (which is highlighted in blue) and "E-mail". Below the tabs, the form contains the following fields:

- ID: A text input field.
- Name: A text input field.
- Password: A text input field.
- Confirm Password: A text input field.
- User Type: A dropdown menu currently showing "None".
- Department: A dropdown menu currently showing "None".

 At the bottom of the window, there are two buttons: "OK" (highlighted in blue) and "Cancel".

Fig 18 Account Information screen

Enter the required information such as ID, name, password, and confirm password.

To use the e-mail function, select [Account Information] button and enter the e-mail setting information in the window as shown below.

The screenshot shows the same "Account Information" window, but now the "E-mail" tab is selected and highlighted in blue. The form fields are:

- ID: A text input field followed by an "@" symbol, another text input field, and a dropdown menu.
- Password: A text input field.
- Confirm Password: A text input field.
- SMTP: A text input field.
- Port: A text input field with the value "0".
- Enable SSL: A checkbox that is currently unchecked.

 The "OK" and "Cancel" buttons are still present at the bottom.

Fig 19 Account Information screen - Email

3.4 Modify User Information

After user login, you can edit the account information or log in with the administrator account and select the user account to modify the information. You cannot change your ID, you can change your name, password, user type, department type, and email account information.

3.5 Delete User Information

After selecting the user information, select the delete function to delete the user information. When deleting the user account, a confirmation message is displayed. If you select "Yes", the information is deleted and cannot be checked again.

3.6 Modifying Admin Information

Administrator account information can be modified in the same way as user accounts. Please be careful not to leak the password for the administrator account information.

Notice Please be careful not to leak your admin account to others.

Patient Management

4

4 Patient Management

Using SMARTDent, you can use search for patients, register new patients, modify patient information, and delete functions.

You can search for the patient you want by entering the patient ID or name, and you can easily search for recently visited patients by using the search button for frequently used periods such as today, yesterday, and last 1 week. By specifying “Modality” (type of images), you can search only those patients who have taken the corresponding “Modality”, and designate your doctor to search only those patients in charge of that doctor. By setting the “Modality”, the duration, and the doctor in charge, you can search for patients who have taken a specific video by the doctor in the desired period.

Notice

Today's patient means the patient who visited the office the same day, the patient who acquired the image, and the patient who was viewed. If you query the patient who has been reserved or received from SMARTDent (Patient selection), it can be searched as a patient today on any PC in the dentist, so you can conveniently select a patient without entering a name or chart number.

The screen structure of the 'patient' page and the contents of each item are as follows.

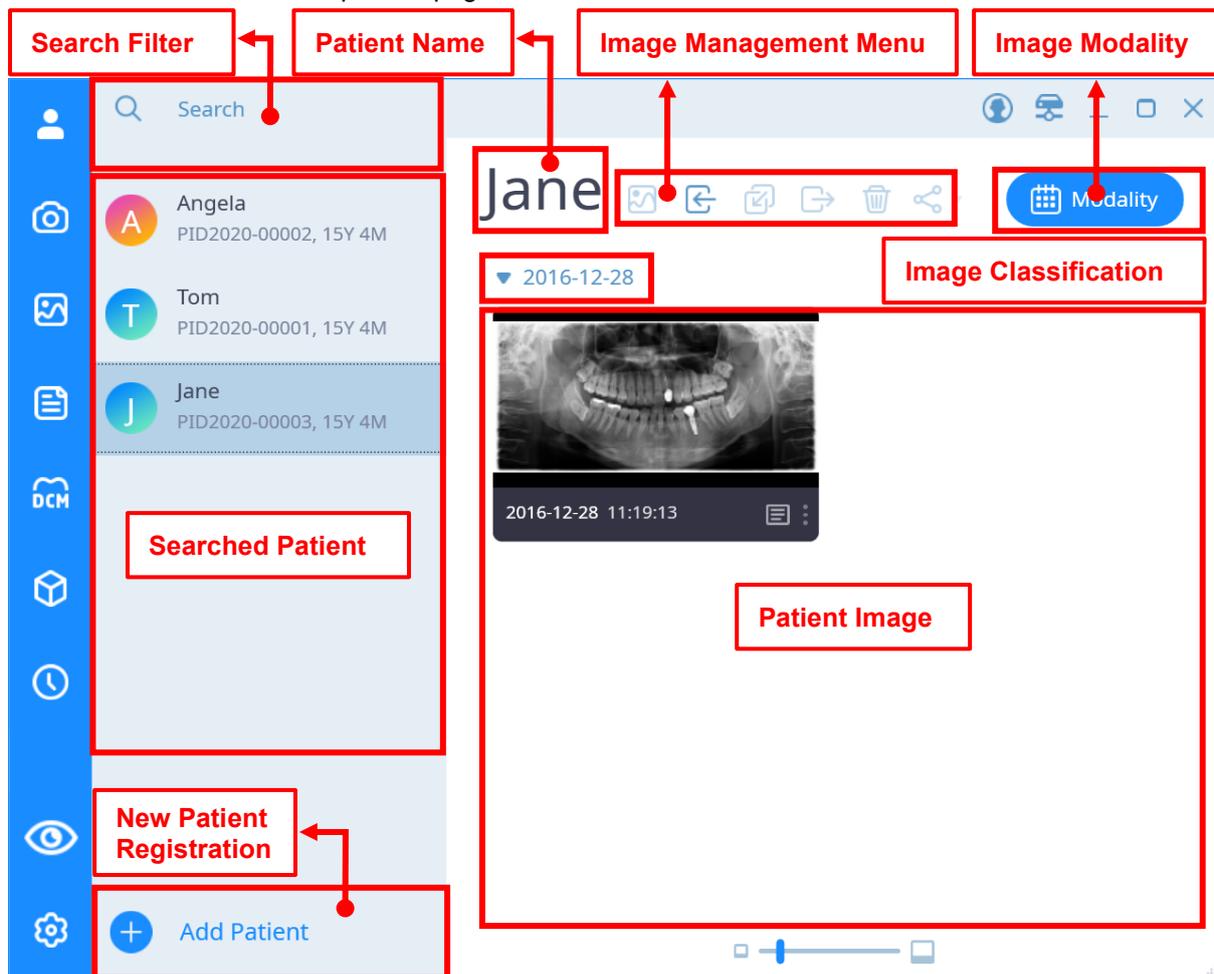


Fig 20 Patient Tab Screen

Search Filter

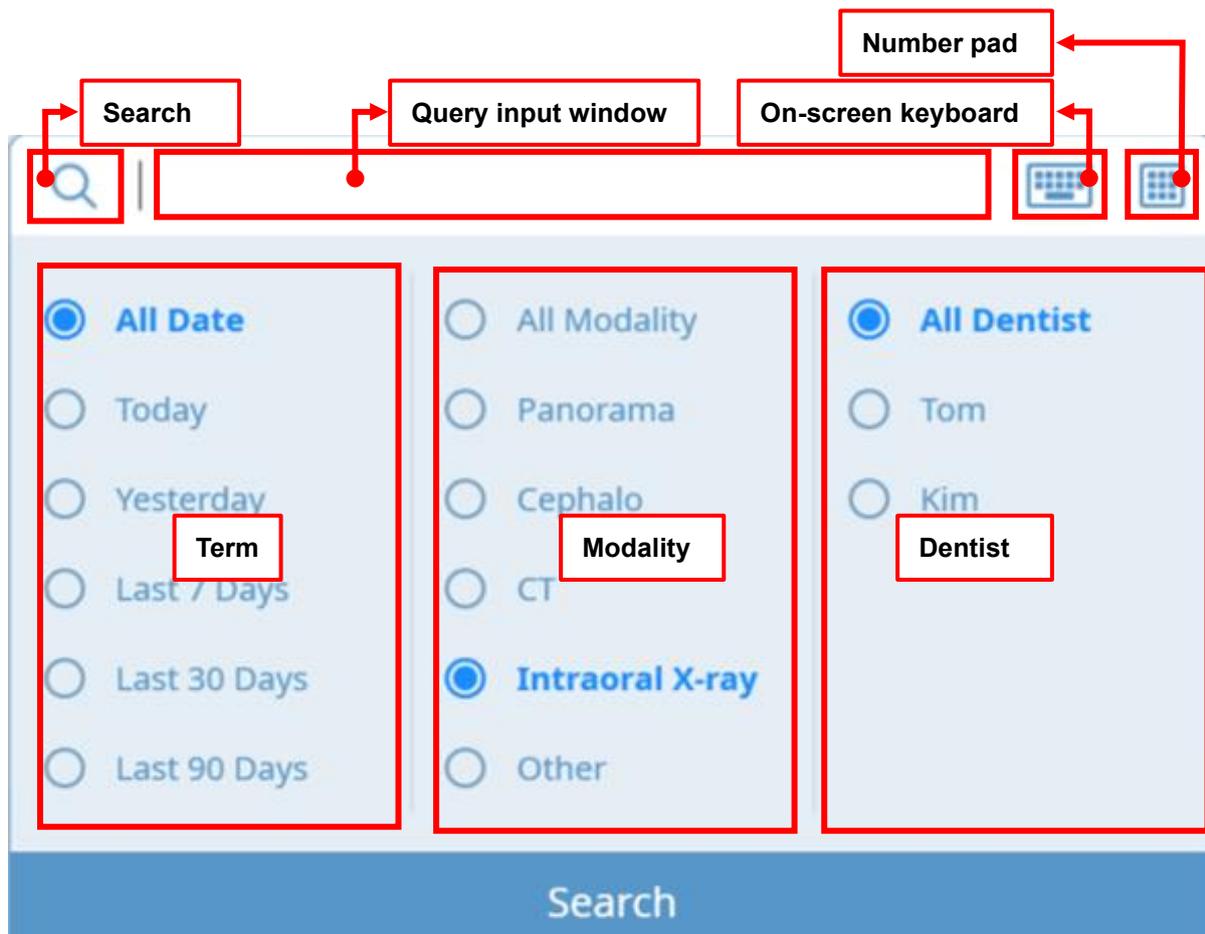


Fig 21 Search Filter

Item	Description
Search	Search for patients that meet the search criteria.
Query input window	Search for the patient's ID or name.
On-screen keyboard	Calls the on-screen keyboard used in environments where it is difficult to use ordinary keyboards such as chairs.
Number pad	Calls a keyboard that represents only numbers.
Term	Search for a list of patients who have been registered or who's images were taken within the period.
Modality	Search the list of patients who have images of the modality.
Dentist	Retrieve a list of patients the doctor is responsible for. The list of doctors consists of the name of the account whose user type is 'Dentist' in the user account.

Searched Patient List

	Item	Description
	Patient Name	Indicates the patient's name.
	Patient ID	Indicates the patient's ID.
	Patient Age	Indicates the patient's age.

New Patient Registration

	Item	Description
	Create new patient button	Open a window to create a new patient.

Image Management Menu

Basic



When selecting a patient, the Import button is activated as shown below.



When selecting an image, the button is activated as shown below.



	Item	Description
	Open Image	Open the selected image with the Image tab.
	Import Image	Add images to the selected patient.
	Moving Image	Move the selected image to another patient's image.
	Export Image	Export selected image to file.
	Delete Image	Delete the selected image. (It can be recovered later.)

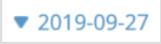
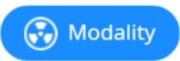


-  E-mail
-  DICOM Sending
-  FMX-Cut
-  Imagej

link

The selected image is sent by mail or connection program.

Image Classification Conditions

Item	Description
 	Sort by date Images are sorted and displayed based on their acquisition date
 	Sort by modality Images are sorted and displayed based on their modality

Patient Image

Item	Description
	Patient image thumbnail Thumbnail of the patient's image.
	Memo input button Enter a note on the image.
	Resize patient image thumbnails Adjust the size of the patient image thumbnail.

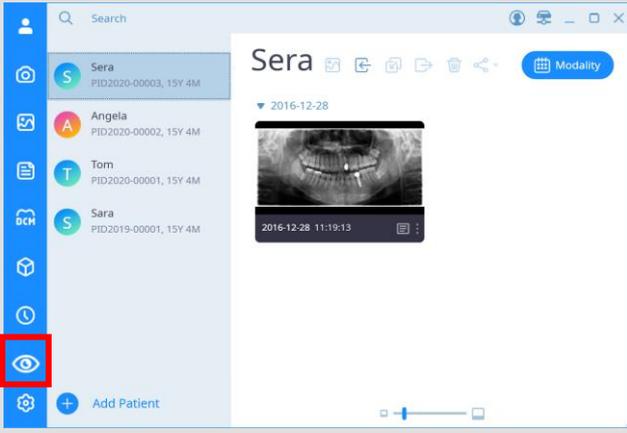
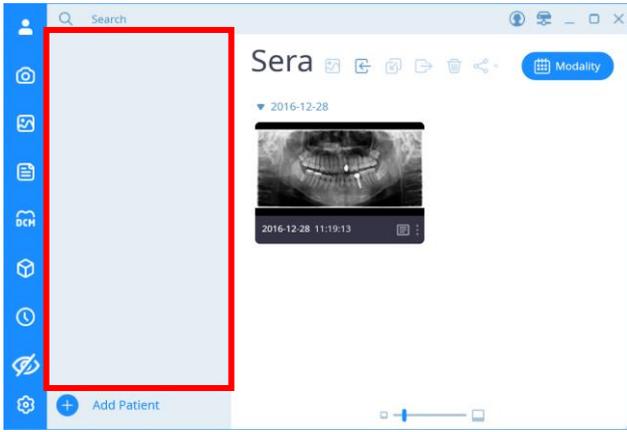
4.1 Patient Search

Patient searches are searched for a combination of the ID or name entered in the search field and the terms below, modality, and doctor's criteria. Enter a search condition or select an option and click the search button at the bottom to display a list of patients corresponding to the condition.

Notice If you select the on-screen keyboard and numeric keypad icons on the right side of the search term input window, you can enter a search term without a keyboard and search for patients.

Notice User account information with UseType 'Dentist' is displayed as a list of doctors who are search filters in the patient detail search window.

To protect patient information, you can select [Hide patient list] or [Show patient list] as shown below.

No.	Figure	Description
1		On the Patient tab, click the [Hide patient list] button.
2		Confirm that the patient list is not visible.

4.2 New Patient Registration

Click the [Add Patient] button at the bottom of the left patient search panel on the patient screen displayed for the first time after SMARTDent is executed, and the “New Patient” registration window is displayed as shown in the figure below.

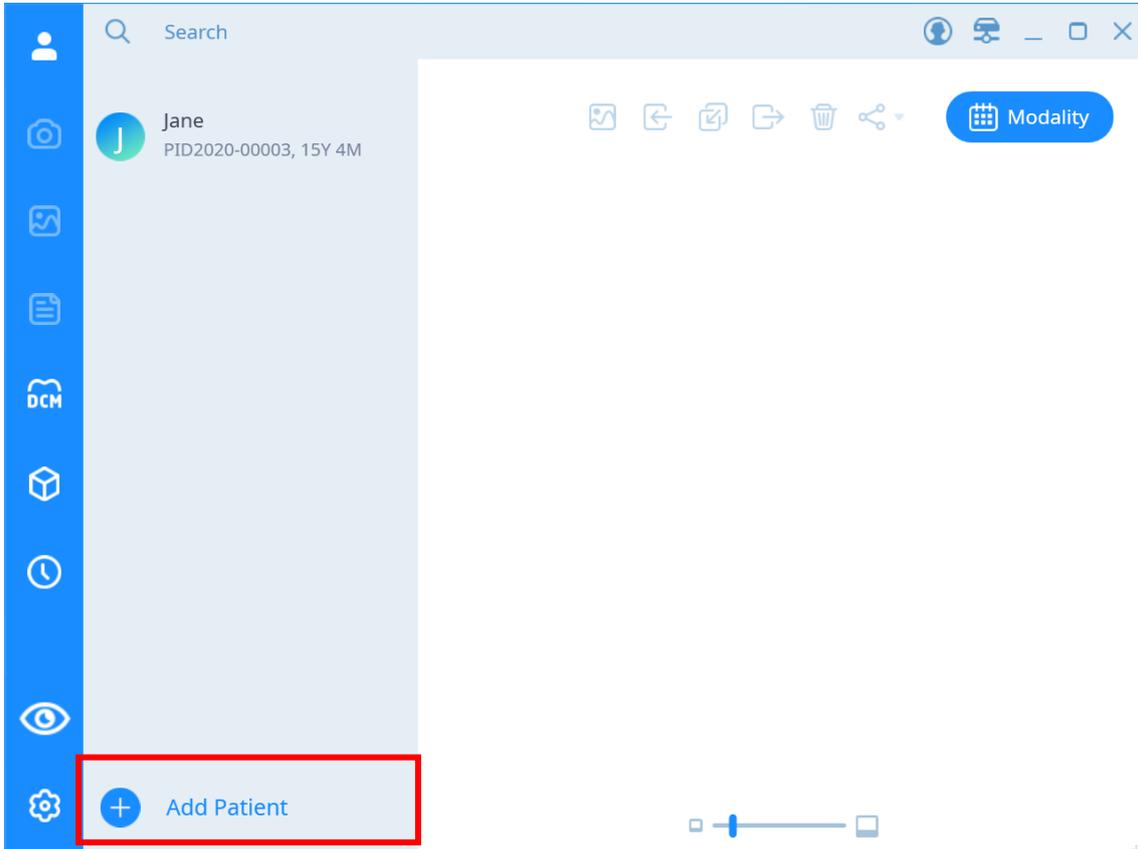


Fig 22 Patient Screen

A screenshot of the 'New Patient' registration window. The window has a title bar with 'New Patient' and a close button. The form contains several fields: '* Patient ID' with an 'Auto' button, '* Name', '* Date of Birth' with a calendar icon and the value '10-06-2004', '* Gender' with radio buttons for 'Male', 'Female', and 'Other', 'Social ID', and 'Dentist' with a dropdown menu showing 'rae'. A blue 'Apply' button is at the bottom. Three red boxes with labels are overlaid on the image: 'Top' points to the title bar, 'Description' points to the form fields, and 'Bottom' points to the 'Apply' button.

Fig 23 New Patient

The “Content” item in the “New Patient” window is as follows.

Item	Description
Patient ID	Patient ID
Automatic	Auto generate patient ID button
Name	Patient's name
Date of birth	Patient's date of birth
Calendar	Calendar display button
Gender	Patient's gender
Resident registration number	Patient's Social Security Number (Social Security Number)
Doctor in Charge	The name of the doctor in charge of the patient

Enter the patient ID, name, date of birth, gender information, etc. on the new patient registration screen and select the Apply button to register the patient.

Notice The patient ID is 20 characters or less, and only alphanumeric characters, kanji characters, Japanese / special characters, '-' (hyphen), '.' (Comma), ',' (comma), and blank characters can be entered.

Notice Patient names can be 50 characters or less, only alphanumeric characters, kanji characters, Japanese / special characters, '-' (hyphen), '.' (Comma), ',' (comma), and blank characters.

Notice The doctor in charge uses the name of the account whose user type is Dentist as a list.

4.3 Correct Patient Information

Patient information can be edited by right-clicking the patient whose information is to be edited in the patient list on the 'Search' tab or by selecting the patient menu and selecting 'Edit'.

After modifying patient information in the patient information edit window, select [Apply] button.

4.4 Delete Patient

Patient information can be deleted by right-clicking the patient whose information is to be deleted from the patient list on the 'Search' tab or selecting the patient menu and selecting the 'Delete' item.

When the message window to confirm the deletion of patient information is displayed, select [Yes] button.

4.5 Export Patient Image

You can export all images of a patient to a file by right-clicking on the patient to which you want to export the image from the patient list in the 'Search' tab or selecting the patient menu and selecting the 'Export Image' item.

Using SMARTDent, the registered patient's image can be saved by setting the desired image format and volume label of the storage folder.

If you right-click the patient on the 'Search' tab screen and select the [Export Image] item, the 'Export Image' window appears as shown below.

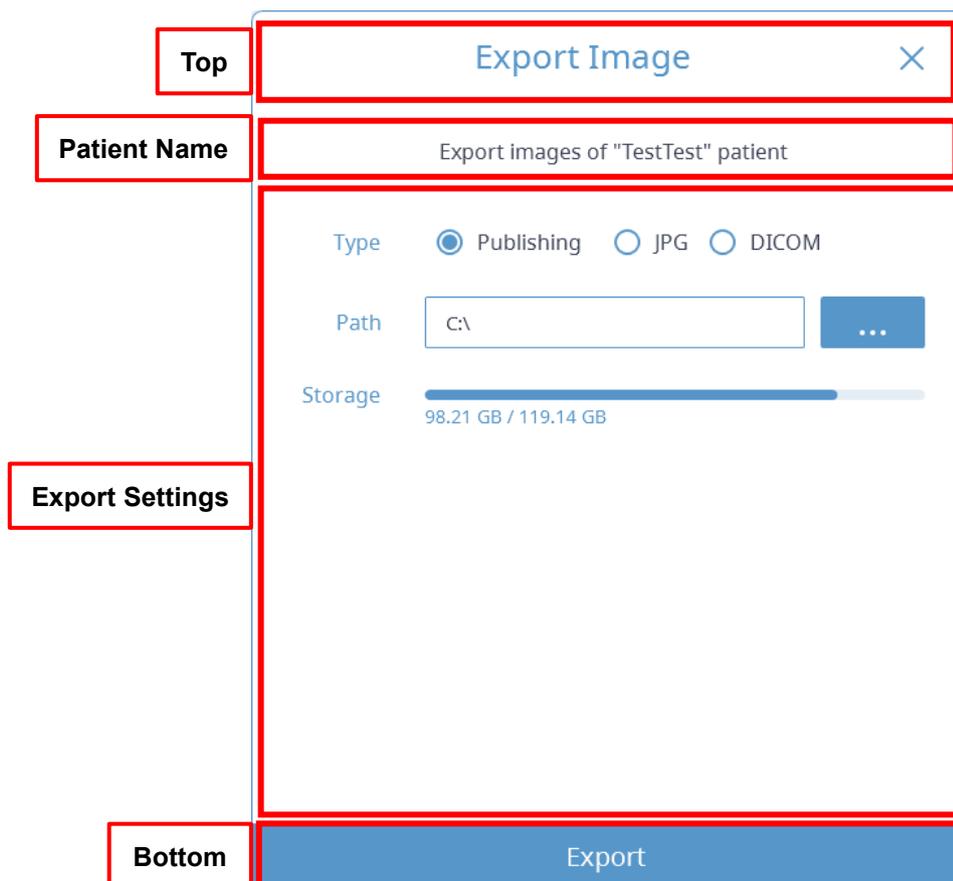


Fig 24 Exporting Image

Type Publishing JPG DICOM

Path

C:\



Create Patient Folder

Item	Description
Types	Publishing: Export image and viewer together. JPG: Export as a JPG image. DICOM: Export as DICOM image.
Route	Set the storage path.
Storage	Display the available / total capacity of the storage medium. Choose whether to export overlays, shooting information, project files, and more.
Notice	In the case of exporting JPG and DICOM, if you select the “Create Patient Folder” option, a folder of “Patient ID_Patient name” is created in the file path.

4.6 Importing Patient Images

You can register the selected image by right-clicking on the patient to which you want to import the image from the patient list on the 'Search' tab or selecting the patient menu and selecting the 'Import' item.

The image format supports general Windows image formats such as JPG / BMP and DICOM format.

If you right-click the patient on the 'Search' tab screen and select the [Import] item, the 'Import patient image' window appears as shown below.

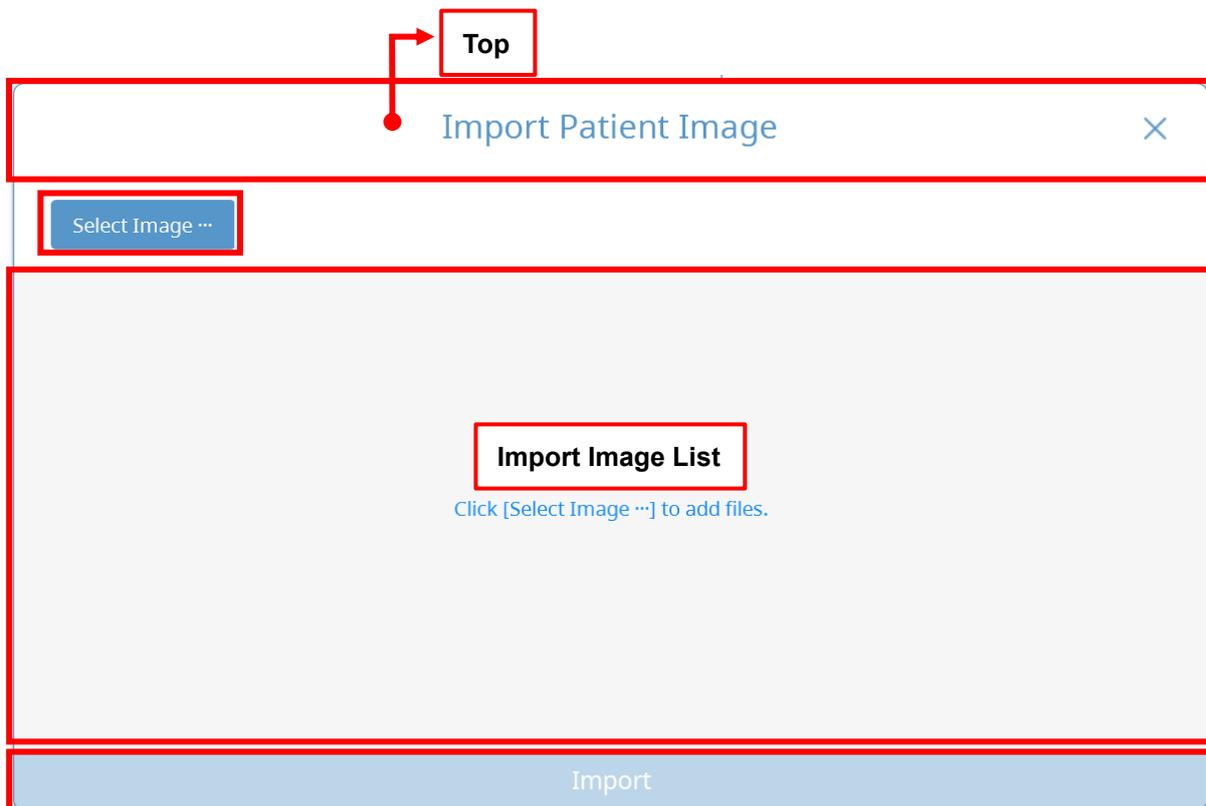


Fig 25 Importing Patient Image

After clicking the [Select Image...] button, when the Windows Explorer is displayed, select the image to be imported. When the image is displayed, select modality and then select [Import] button at the bottom. When a DICOM image of a patient whose information is different from the currently selected patient is imported, a window to select the patient to add the image to is displayed as shown on the left. Select [Import] button above to import the current patient information, or select the [Import] button below to add a new patient.

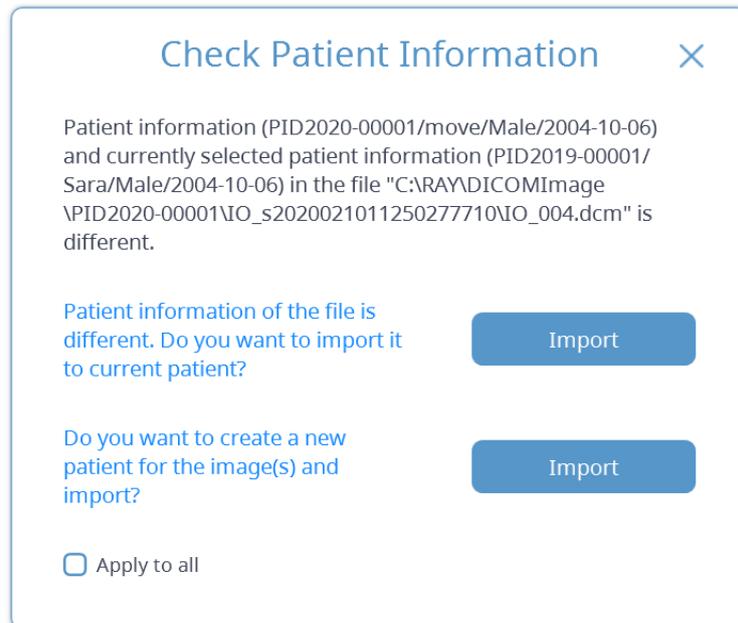


Fig 26 Check Patient Information

In the case of CT images, selecting one image from all images will import all images.

4.7 View and Export Patient Information

You can check the patient information by right-clicking the patient whose information you want to check in the patient list on the 'Search' tab or by selecting the patient menu and selecting the 'Information' item.

If you right-click the patient on the 'Search' tab screen and select the [Information] item, the 'Patient Information' window appears as shown below.



Fig 27 Basic Patient Information

Category

Item	Description
Patient	Check patient information.
Acquisition	Check the patient's imaging information.

Content

Item	Description
Patient ID	Patient ID
Patient name	Patient's name
Date of Birth	Patient's date of birth
Age	Patient's age
Gender	Patient's gender
Social ID	Patient's Social Security Number (Social Security Number)
Dentist	The name of the doctor in charge of the patient

If you select [Acquisition] button, the image acquisition screen will appear as shown below.



Fig 28 Patient Image Information

Patient image information content

Item	Description
CT	Number of images with modality CT among patients' images
PX	Number of images with modality panorama among the images the patient has
DX	The number of images the patient has is modality Cephalometric
IO	Number of images with modality Intra Oral among patients' images
OT	Number of images with modality other among the images the patient has
Export to Excel	Export patient basic information and image information list to Excel file
Export to PDF	Export patient basic information and image information list to PDF file
Date	Date the image was taken
Modality	Image modality
Protocol	Image protocol
Number	Number of images (number of instances per series)

The acquisition image information can be exported as an Excel or PDF file.

Image Acquisition

5

5 Image Acquisition

For using RAYSCAN, CT, Panoramic and Cephalo images can be acquired, and images obtained using RIOScan, RIOSensor, intraoral USB cameras and intraoral sensors and intraoral camera images through TWAIN are supported. The image information acquired by RAYSCAN is automatically updated to all running SMARTDent programs, and image acquisition of small devices is integrated into the viewer so that after the image is acquired, the image acquired by SMARTDent can be diagnosed faster. The list of acquisition equipment shows the item selected in Settings, and the Panorama / Cephalometric / CT menu is automatically displayed for workstations using RAYSCAN.

Notice

In the chairside computer without RAYSCAN software, you can register a request to acquire images acquired with RAYSCAN, such as CT, Panorama, and Cephalometric, on the DICOM tab. For more information, please refer to “8. DICOM”.

The Acquisition tab consists of:

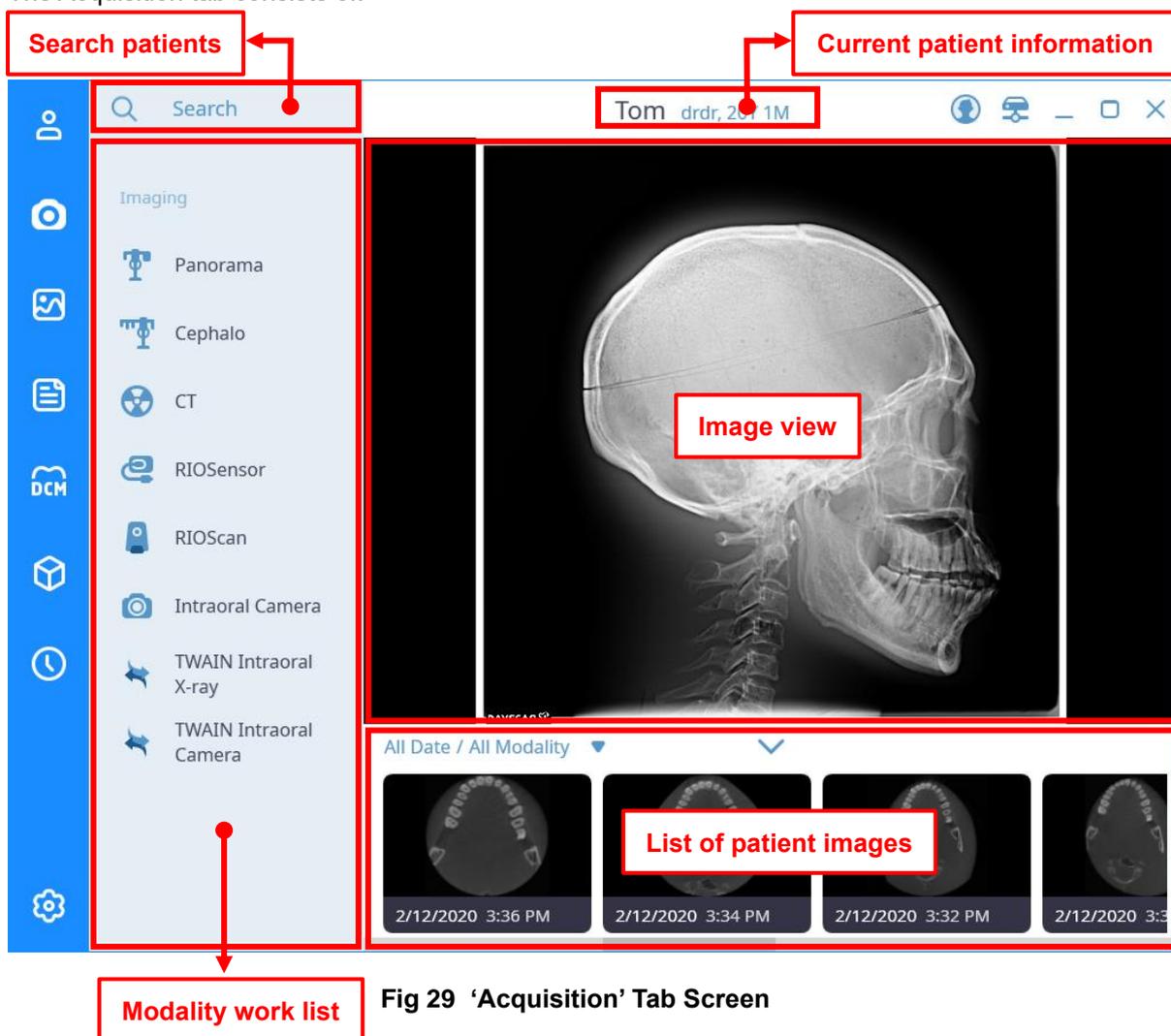


Fig 29 'Acquisition' Tab Screen

Search Patients

The screenshot displays the 'Search Patients' interface. At the top, there is a search bar with a magnifying glass icon and a keyboard icon. Below the search bar, there are three columns of filter options, each with a radio button. The first column contains 'All Date', 'Today' (selected), 'Yesterday', 'Last 7 Days', 'Last 30 Days', and 'Last 90 Days'. The second column contains 'All Modality' (selected), 'Panorama', 'Cephalo', 'CT', 'Intraoral X-ray', and 'Other'. The third column contains 'All Doctor' (selected), 'Tom', and 'Kim'. A red box labeled 'Search Filter' highlights the filter options. Below the filters is a blue bar with the word 'Search'. Underneath, a list of search results is shown, each with a circular profile picture, a name, and a patient ID with age and gender. The results are: 'John PID2019-000006, 15Y 0M', 'Alpha-OCS PID2016-00011, 3Y 3M', and 'Jey PID2019-000005, 26Y 3M'. A red box labeled 'Search Result List' highlights the list of results.

Search Filter

Please note '4. Patient Management'.

Search Results

A list of patients matching the search criteria appears. If you double-click the searched patient, the current patient is changed to the selected patient.

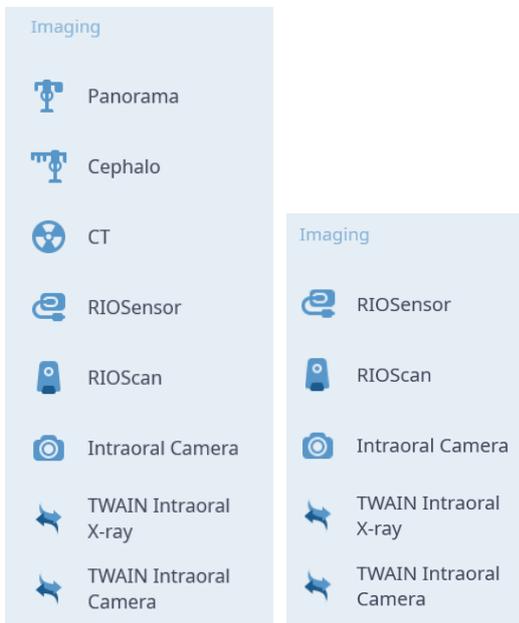
Current Patient Information

Jey PID2019-000005, 26Y 3M  

Displays the information of the currently selected patient in the form of [Name ID, Age].

Modality Work List

A list of available large and small equipment is displayed. If the RAYSCAN program is not installed on the PC, the Panorama, Cephalometric, and CT lists are not displayed, and only the small equipment list that has been set is displayed.



Item	Description
Panorama	Panorama image acquisition RAYSCAN program is launched.
Cephalometric	Cephalometric RAYSCAN program will be launched.
CT	CT imaging RAYSCAN program is launched.
RIOScan	The RIOScan acquisition window opens
RIOSensor	The intraoral sensor imaging window opens.
Intraoral Camera	The intraoral photography window opens.
Intraoral X-ray TWAIN	The TWAIN Small Equipment acquisition window opens.
Intraoral Camera TWAIN	The TWAIN intraoral camera acquisition window opens.

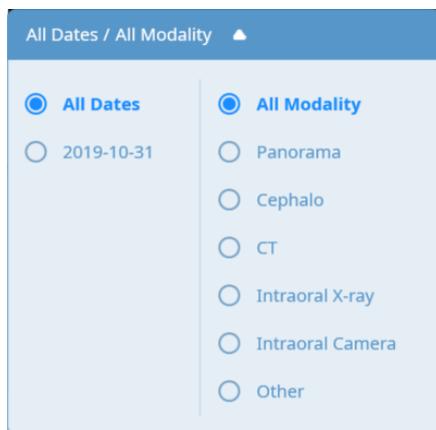
Image view

Display the patient's image.

List of patient Images



Image Filters



You can select an image date or modality so that only the images that meet the conditions are displayed in the image list.

Hide / Expand Images



You can hide or expand the image list.

5.1 RIOScan Acquisition

When you click the RIO Scan button in the list of small devices to acquire, the RIOScan acquisition window will open. RIOScan acquisition screen composition and contents of each item are as follows.

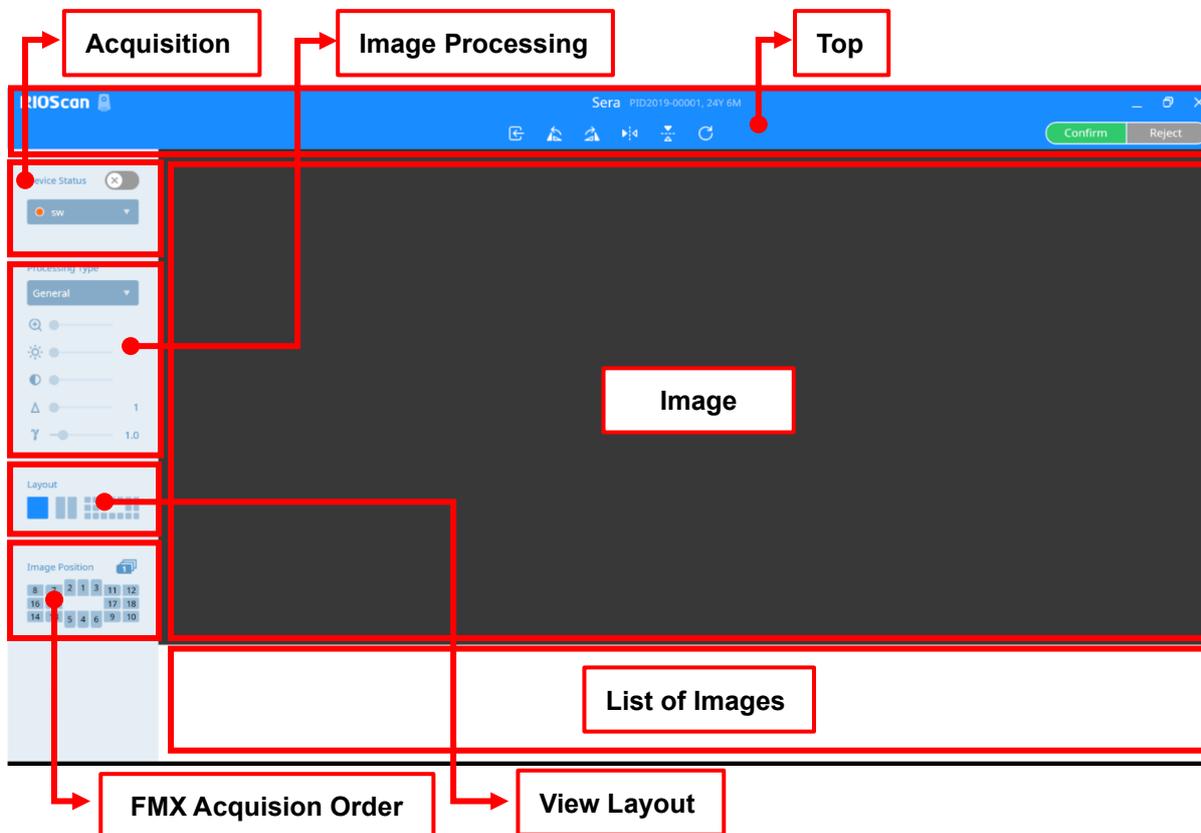


Fig 30 RIOScan Acquisition screen

Top

	Item	Description
	Logo	Logo of acquisition product.
	Patient	Name, ID, and age of current patient.
	Browse	Browse a list of images stored in RIOScan.
	Rotate Left	Rotate image 90 degrees to the left.
	Rotate Right	Rotate image 90 degrees to the right.
	Horizontal Flip	Flip image horizontally.
	Vertical Flip	Flip image vertically.

	Initialize	Initialize image rotation.
	Save	Save images.
	Cancel	Exit RIOSensor acquisition.

Acquisition

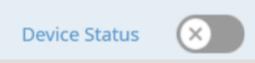
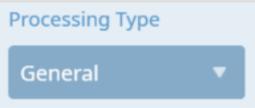
Item	Description
	Device Status Change device status to [Ready] or [Disconnect]
	Devices Show available RIOScan devices to connect.

Image Processing

Item	Description
	Filter type Image processing filter type.
	Initialize image Initialize image processing.
	Zoom in/ out Zoom in or out the Image.
	Brightness Adjust Brightness Value.
	Contrast Adjust Contrast Value.
	Sharpeness Adjust Sharpeness Value.
	Gamma Adjust Gamma Value.

View Layout

Item	Description
	Single View Displays captured images in one view.
	Two View Displays the captured image on two screens for comparison with the previous captured image.
	FMX View Displays the captured image in FMX view.

FMX Acquisition Order

	Item	Description
	Order of Acquisition	A window is displayed where you can add and select the FMX acquisition sequence.
	Selected Image location	Indicates the FMX position of the selected image.

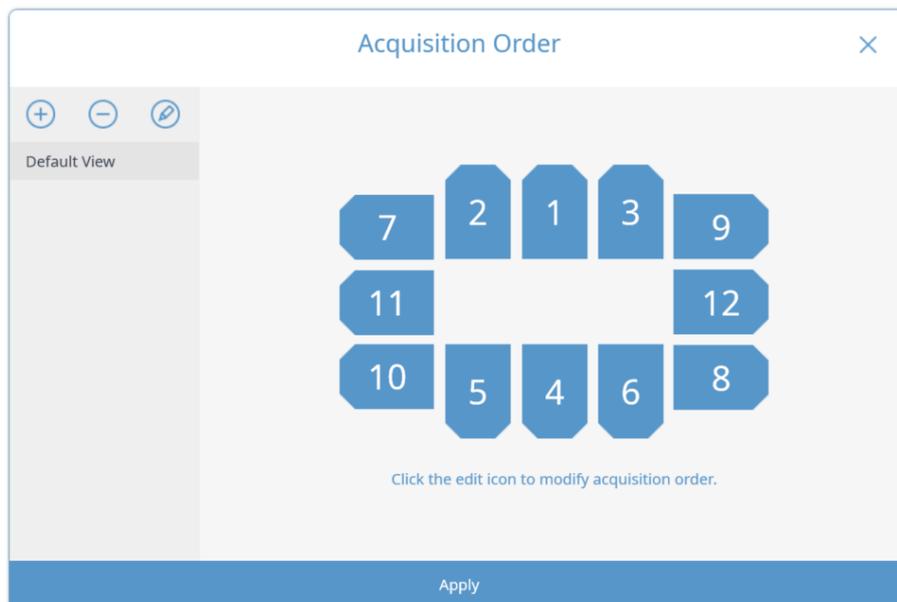
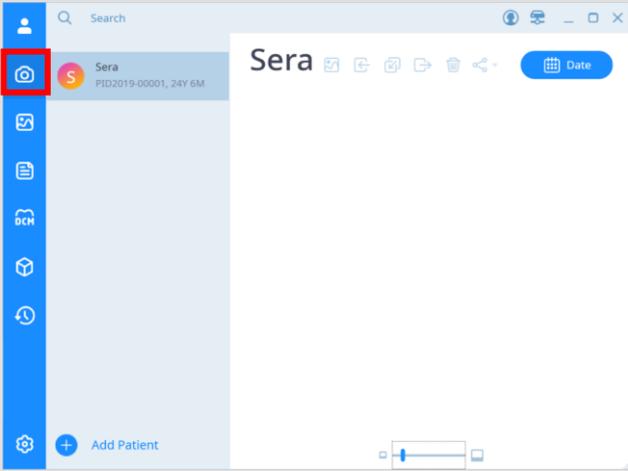
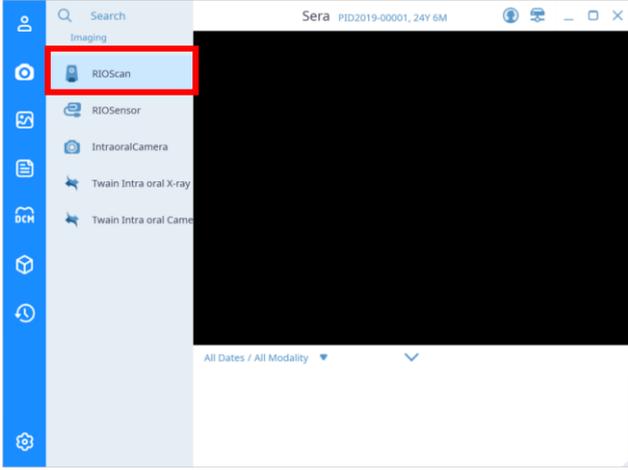
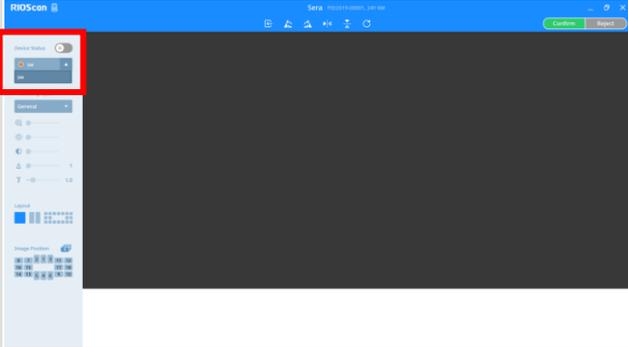
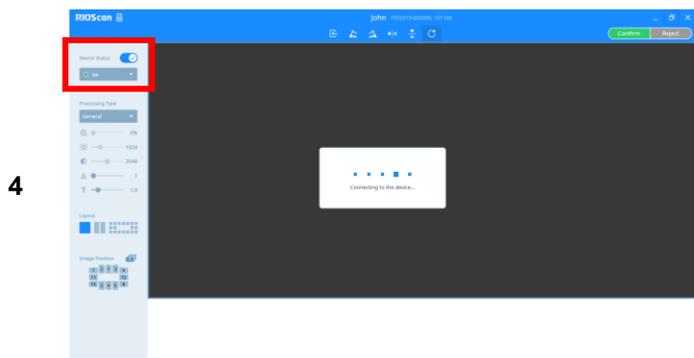


Fig 31 'Acquisition Order'

5.1.1 Acquisition Images with Scan Button

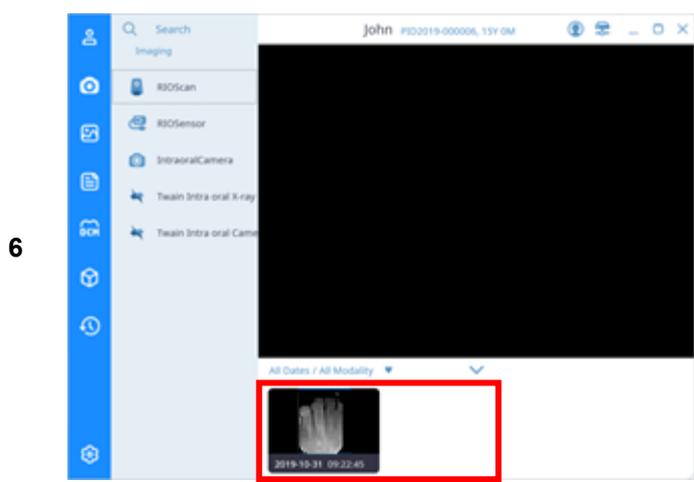
No.	Figure	Description
1		<p>Select the patient to be taken and click the [Acquisition] button on the left menu.</p>
2		<p>Click the 'RIOScan' button</p>
3		<p>Select the RIOScan to scan from the device list and change the device status to [Ready] button.</p>



Perform a scan on the RIOScan device.

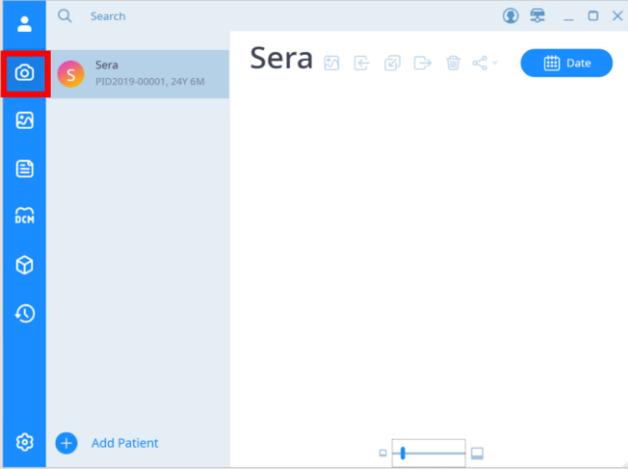
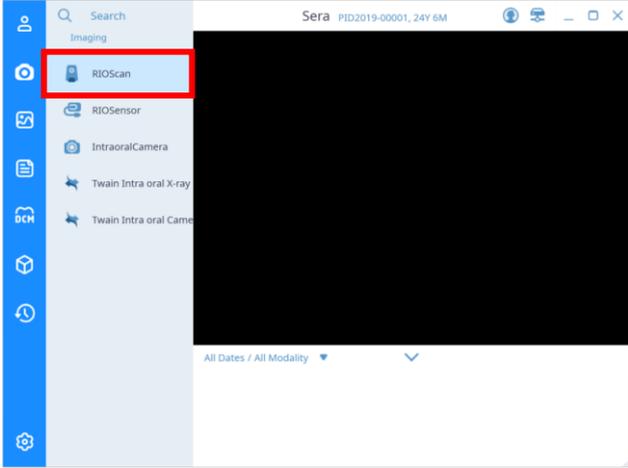
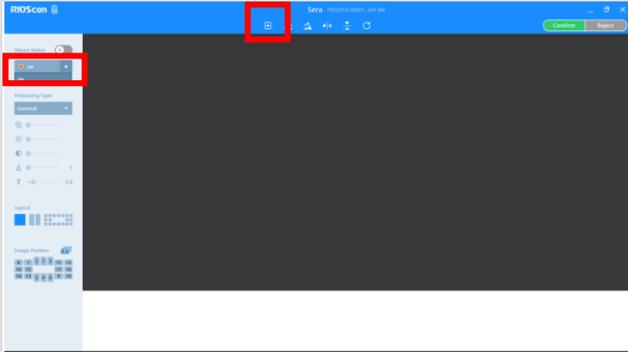


When the scanned image appears on the image screen, click the [Save] button to save the image.

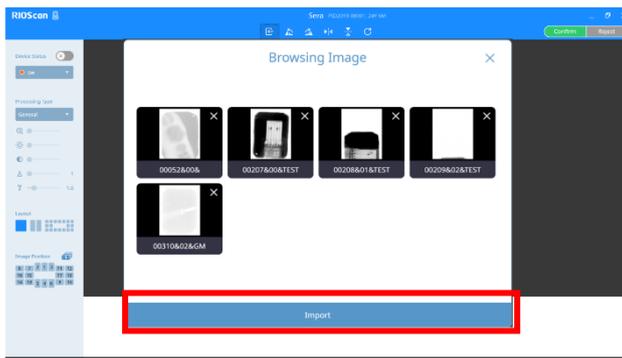


You can check the images in the list on the 'Acquisition' Tab.

5.1.2 Browse Images

No.	Figure	Description
1		<p>Select the patient to be taken and click the [Imaging] button on the left menu.</p>
2		<p>Click the 'RIOScan' button</p>
3		<p>Select the RIOScan to scan from the device list and click the [Import] button.</p>

4



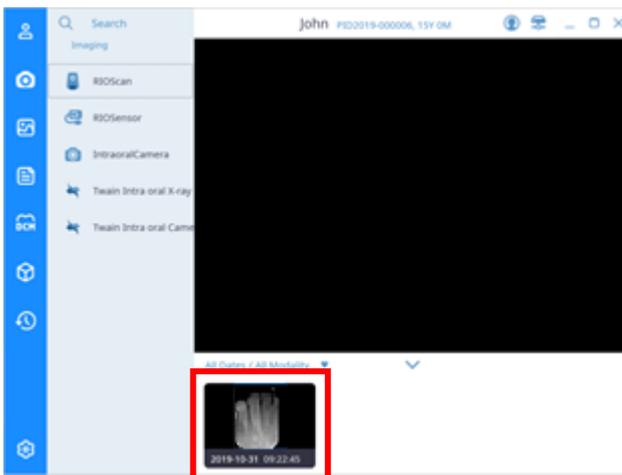
When the 'Import Image' window opens, select the Image to import and click the [Import] button.

5



When the imported image appears on the screen, click the [Save] button to save the image.

6



You can check the images in the list on the 'Acquisition' Tab.

5.2 RIOSensor Acquisition

Click the [RIOSensor] button to display the intraoral sensor acquisition window. The composition of the intraoral sensor acquisition screen and the contents of each item are as follows.

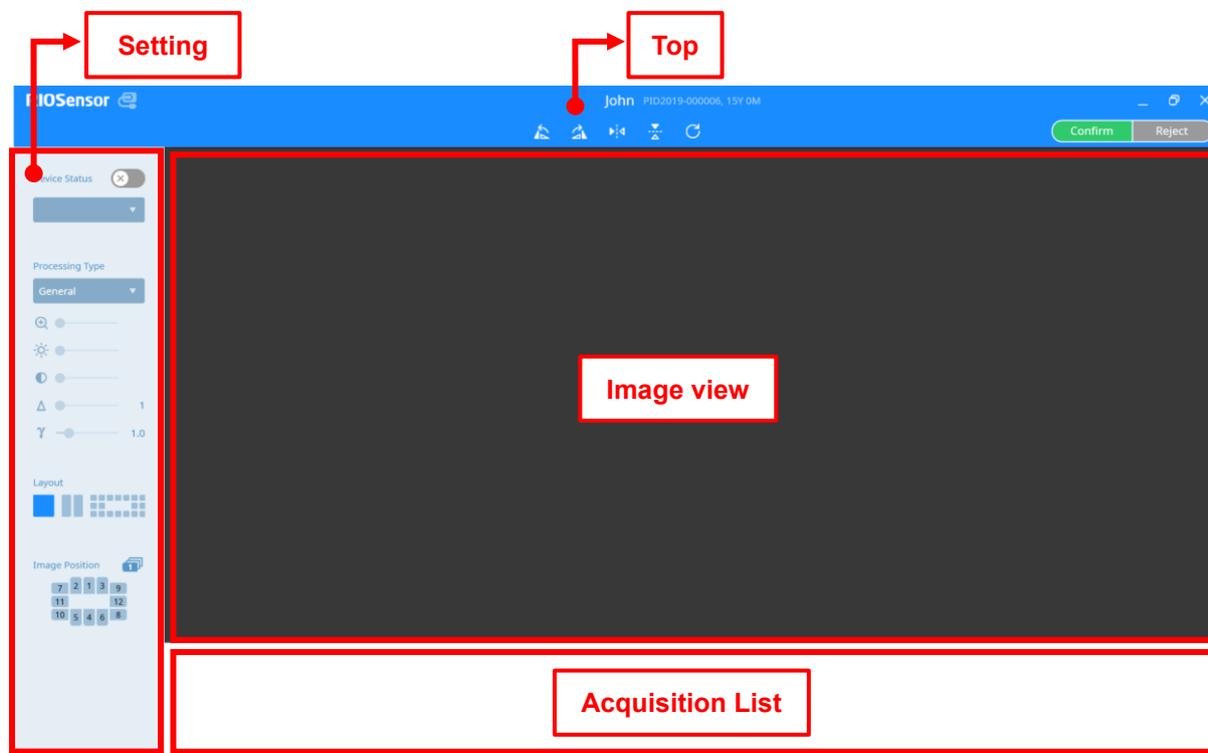
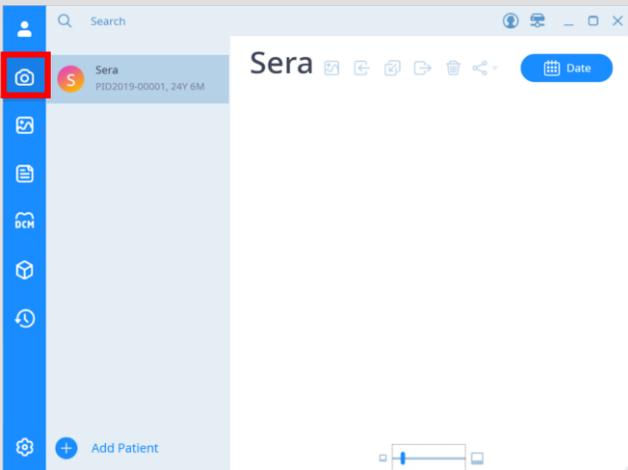
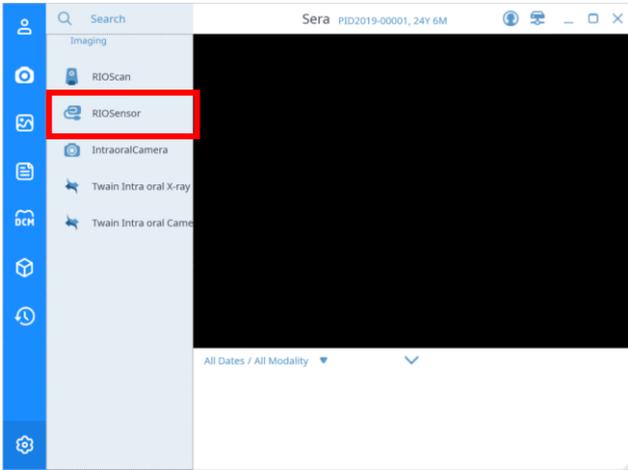
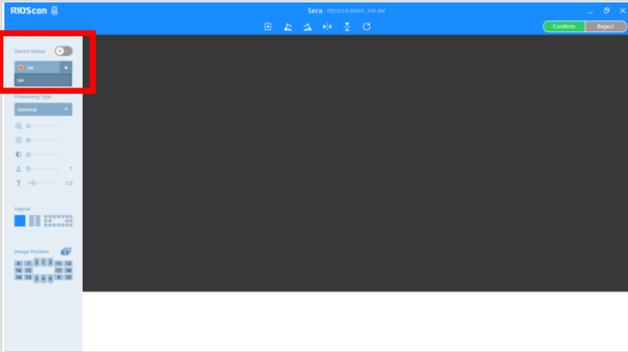


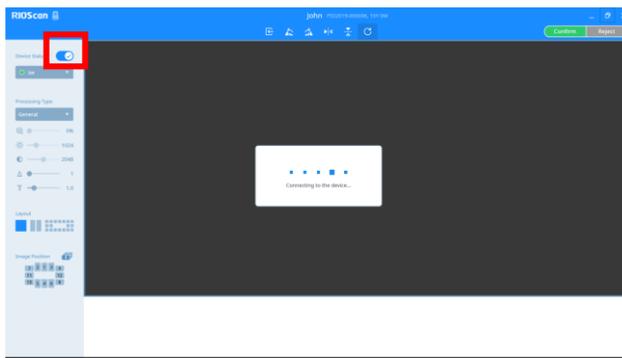
Fig 32 Intraoral Sensor Acquisition Screen

The menu of the setting panel is the same as RIOScan. Please refer to “5.1 RIOScan Acquisition”.

RIOSensor Acquisition

No.	Figure	Description
1		<p>Select the patient and click the 'Imaging' button on the left menu.</p>
2		<p>Click the [RIOSensor] button</p>
3		<p>Select the sensor to acquire from the device list and change the device status to [Ready] button.</p>

4



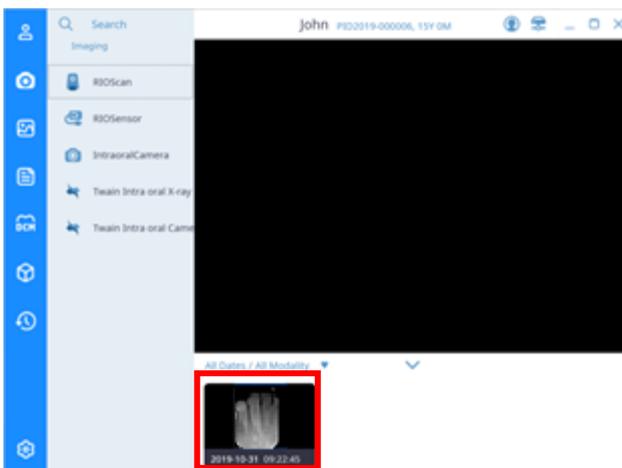
Take acquisition using the Sensor.

5



Click the [Save] button to save the image.

6



You can check the images in the list on the 'Acquisition' Tab.

5.3 Intraoral Acquisition

Click the [Intraoral Camera] button to open intraoral camera acquisition window. The composition of the intraoral image screen and the contents of each item are as follows.

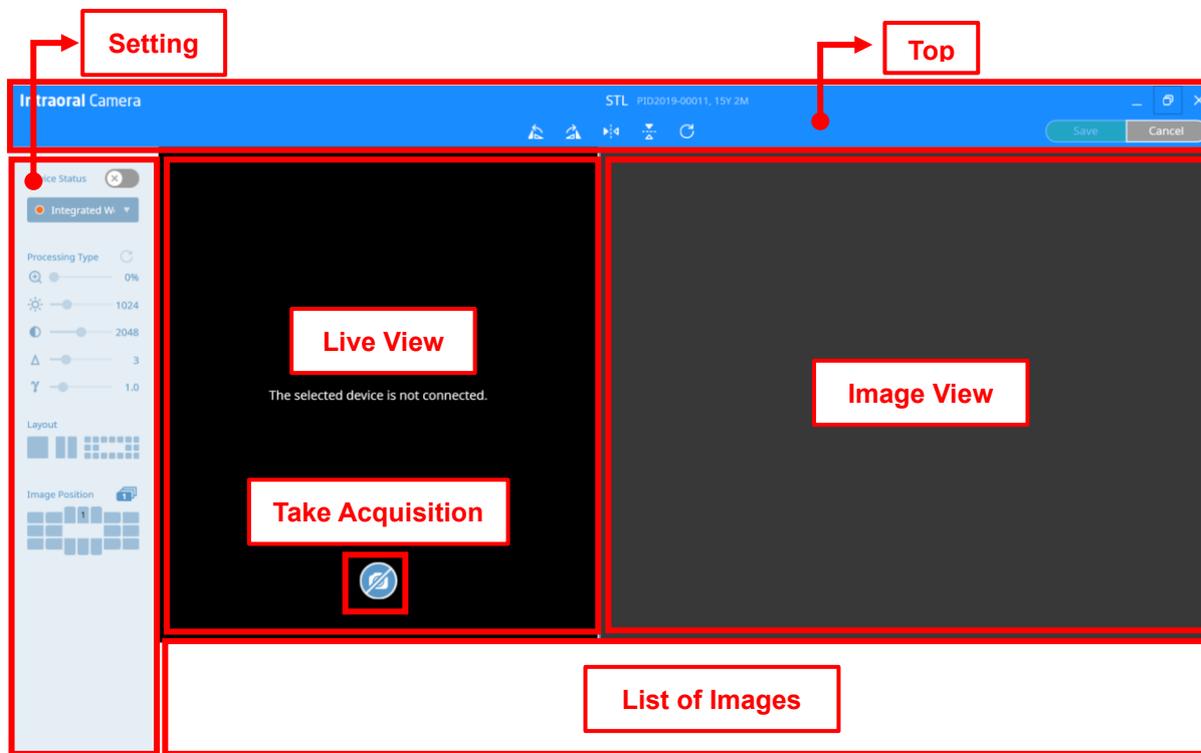
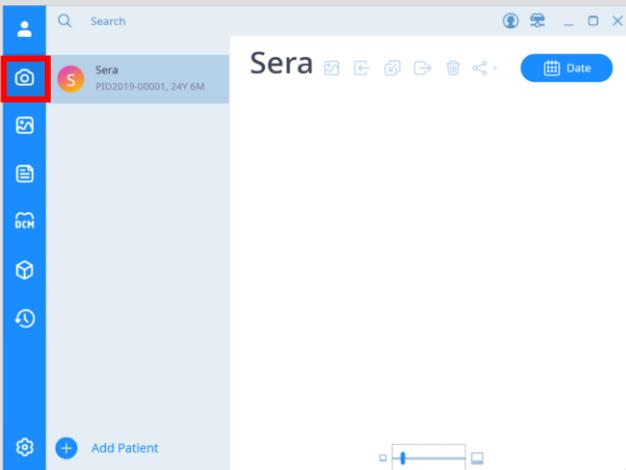
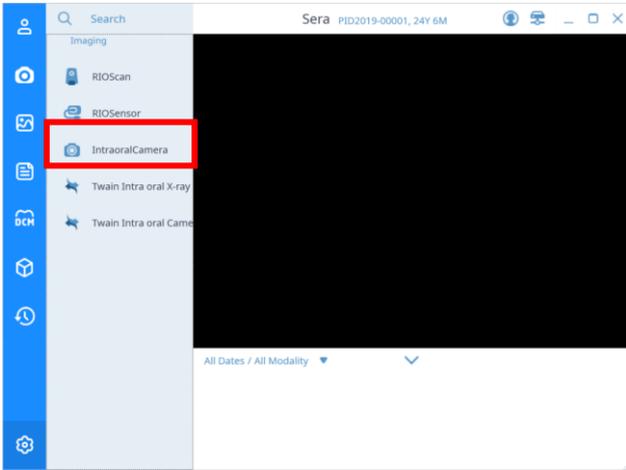
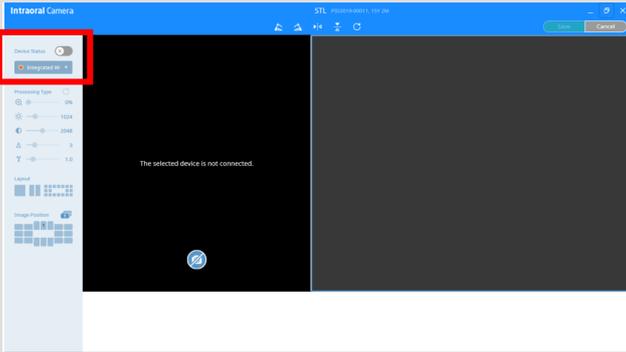


Fig 33 Intraoral Acquisition Screen

The menu of the setting panel is the same as RIOScan. Please refer to “5.1 RIOScan Acquisition”.

Notice Intraoral photo acquisition does not support the image processing filter function, and the image adjustment menu (enlarge/brightness/contrast/sharpness/gamma) can be activated and used by selecting the captured image.

Intraoral Acquisition

No.	Figure	Description
1		Select the patient and click the [Imaging] button on the left menu.
2		Click the 'Intraoral Camera' Button
3		Select a camera to take acquisition from the device list and change the device status to [Ready] button.

4



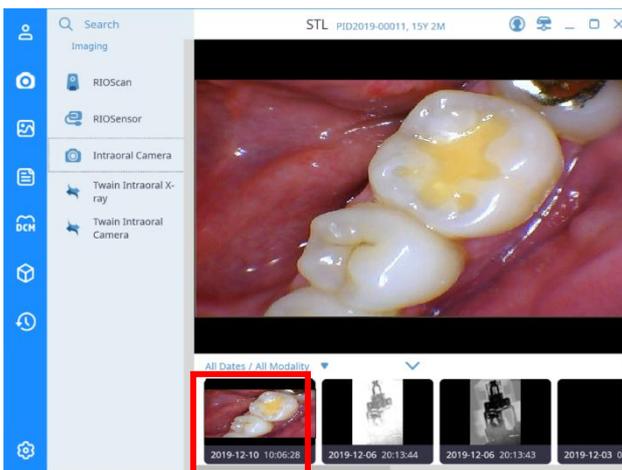
Check the screen of the intraoral camera in Live View and click the [Imaging] button or use Space, Enter, user registration capture key, etc. to take acquisition.

5



When taking acquisition is complete, click the [Save] button to save the image.

6



You can check the images on the 'Acquisition' tab.

5.4 TWAIN Acquisition

Click the [Intraoral X-ray TWAIN] button to display the TWAIN Intraoral ✕ ray acquisition screen as shown below, and the shooting window of the selected TWAIN device will open. This manual explains the acquisition procedure when selecting a RIOScan or RIOSensor as a TWAIN device for the user's understanding.

The composition of the TWAIN acquisition screen and the contents of each item are as follows.

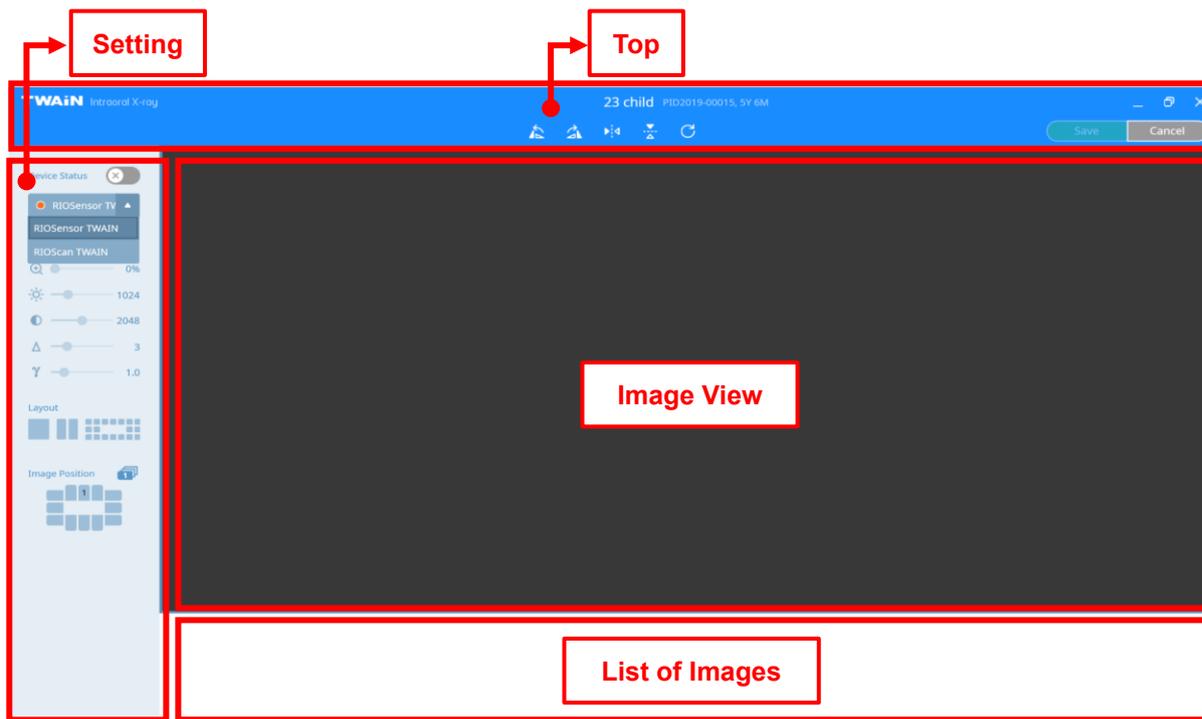


Fig 34 Twain Acquisition Screen

The menu of the setting panel is the same as RIOScan. Please refer to "5.1 RIOScan Acquisition".

Selecting a TWAIN device launches the TWAIN software for that device.

For how to acquire images using TWAIN software, refer to the manual of the product.

Notice TWAIN shooting does not support the image processing filter function, and the image adjustment menu (enlarge/brightness/contrast/sharpness/gamma) can be activated and used by selecting the captured image.

Image Management

6

6 Managing the Image

SMARTDent provides the centralized management of all images used in dentistry.

You can optimize and read panoramic, cephalometric, and intraoral sensor x-ray images for diagnostic purposes, and analyze images and plan treatment using length measurement, angle measurement, and implant simulation functions.

Various multi-view functions can be used to compare and analyze before and after treatment of the same image. You can conduct consultations with patients more efficiently by using the functions of organizing various types of images on one screen, inserting text, and drawing lines.

It can be conveniently used from diagnosis, orthodontic analysis, CT image analysis and simulation functions using panorama, cephalometric, intraoral sensor, and intraoral camera images by supporting integration with orthodontic analysis and simulation programs, 3D viewers that support CT image diagnosis and simulation. There is the screen structure of the 'Image' tab and the contents of each item are as follows.

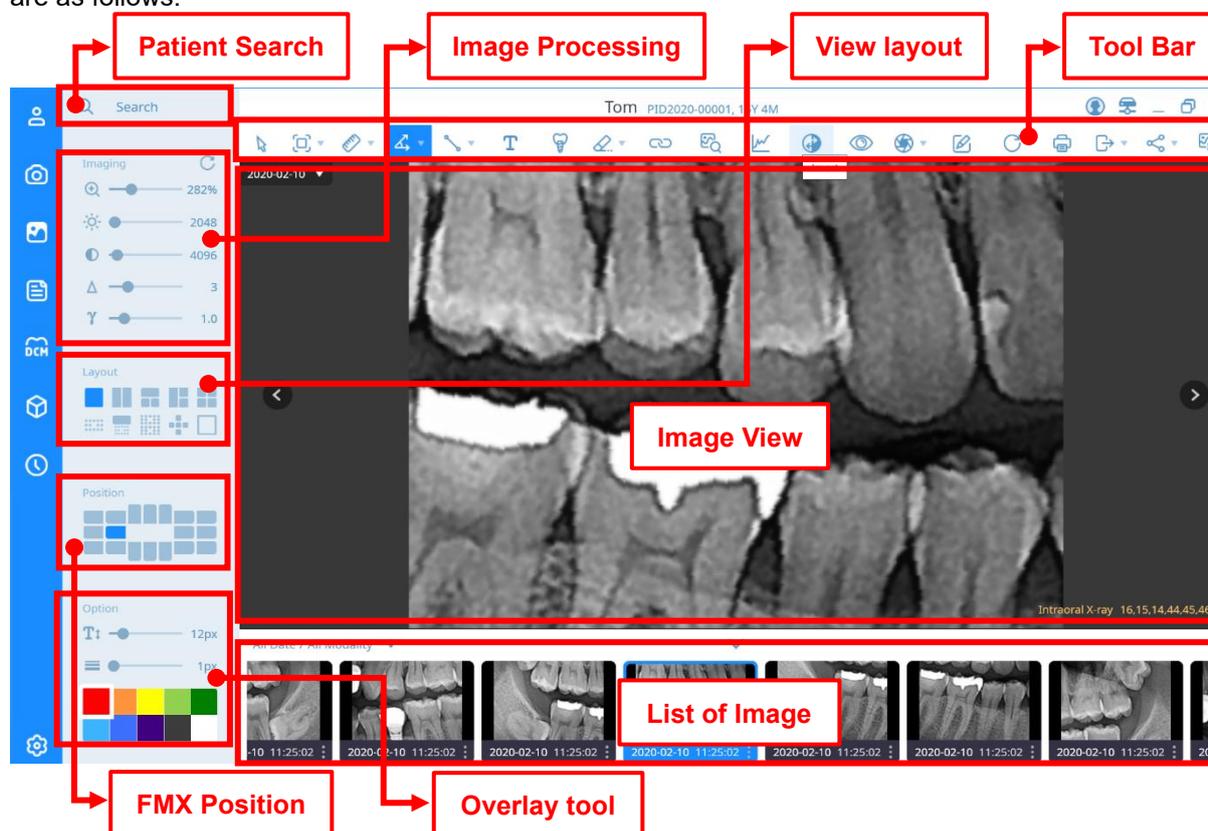


Fig 35 'Image' Tab Screen

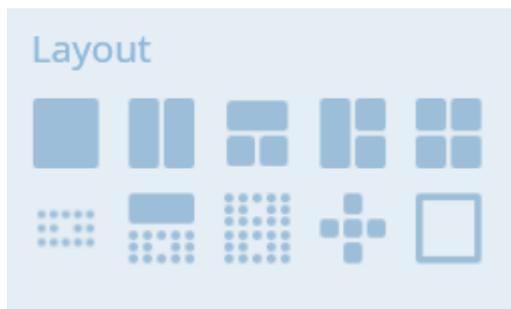
Patient Search

Please refer to “5. Image Acquisition - Patient Search”.

Image Processing

Please refer to “5.1 RIOScan Acquisition – Image processing”.

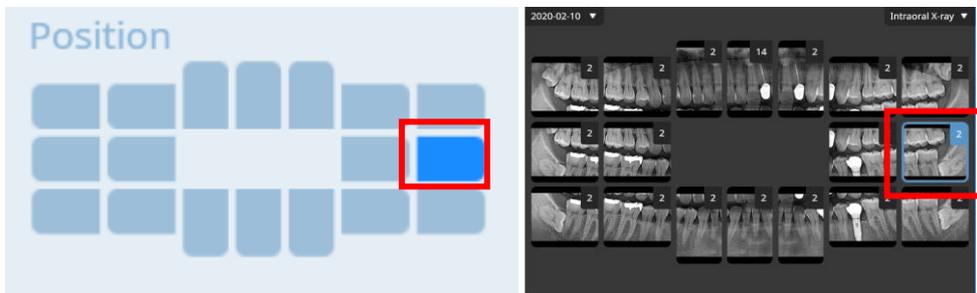
View layout



	Item	Description
	Basic View	Displays image on one screen
	Horizontal split view	The image is displayed on two horizontally divided screens.
	Vertical three-part view	Displays the image on the vertical 3-split screen.
	Landscape split view	Displays the image on the horizontal 3 division screen.
	4-split view	The image is displayed on the 4-split screen.
	FMX view	Display the image on the FMX screen.
	Panoramic and FMX views	Displays one panoramic image and FMX screen.
	2-split FMX view	Display images on two FMX screens.
	OT5	Intraoral photos are displayed on a 5-split screen according to their location.
	Scatter View	Each images are displayed in a popup window.

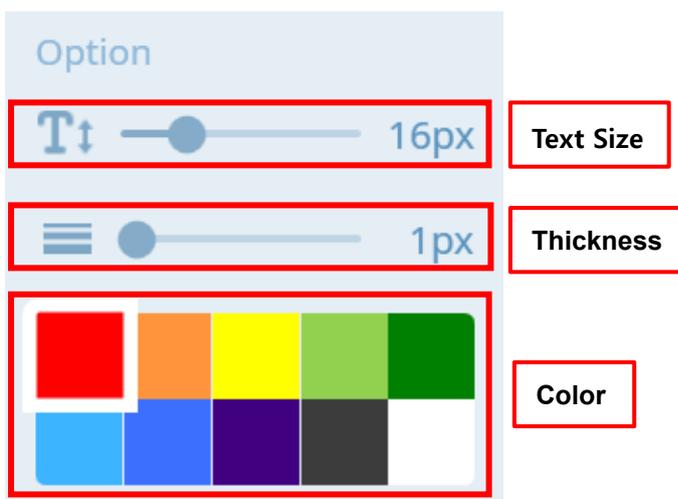
FMX Position

After selecting the image view to change the FMX position, click the Position button of the desired position or drag and drop the image to move to the desired position.



Notice Right-click on the FMX window to rotate the image.

Overlay Tool



Item	Description
Text Size	Sets the text size of the text overlay.
Thickness	Sets the pen thickness of the overlay item.
Color	Sets the pen color for overlay items.

Toolbar

Item	Description
	Select This mode selects image, measurement, and annotation as the default state.
	Image alignment Change the image magnification to the screen size.
<div data-bbox="220 595 525 860">  FitOn  FullScreen  1:1 RealSize </div>	Full screen Displays the selected imagea in full screen. 1:1 Actual size Displays on the screen in the actual size of the image.
	Length measurement Measure the distance between two entered points.
<div data-bbox="220 954 525 1124">  Length  Multi Length </div>	Continuous length measurement Measure the distance between two points continuously.
	Angle measurement Measure the three-point cabinet.
<div data-bbox="220 1223 525 1393">  Angle  Cobbs Angle </div>	Cobbs angle measurement Measure the inner angles of the two segments of the 1/2, 3 / 4th of the line segments.
	Straight Displays a straight line.
<div data-bbox="220 1491 525 1993">  Line  Multiline  Draw  Arrow  Rectangle  Ellipse </div>	Multiline Displays multiple straight lines. Drawing This function draws a curve on the image. Arrow Enter the arrow above the image. Rectangle Enter a rectangle over the image. Ellipse Enter a circle on the image.

	Text	Add a text box over the image.
	Implant	This function displays the implant on the image.
	Delete	Delete the selected overlay.
 Delete  Delete All	Delete All	Delete all overlays displayed on the screen.
	Magnifying Glass	The image around the mouse cursor is enlarged and displayed.
	Profile	Displays profile information between two points.
	Reverse	Invert the color of the video.
	Show / Hide overlay	Hide or show the overlay.
	Partial capture	Capture a specific part of the image.
 Region Capture  View Capture  Screen Capture  Append to DB	View capture	Capture the selected image view.
	Screen capture	Capture the entire image view.
	Add to DB	Register the selected image as a new image.
	Memo	Add a note to the Image
	Reset	Initialize the overlay.
	Print	Go to the 'Report' tab to create a report from the image on the screen.
	Export	Export the image as a file
	E-mail	Send an email with the image attached as an attachment.

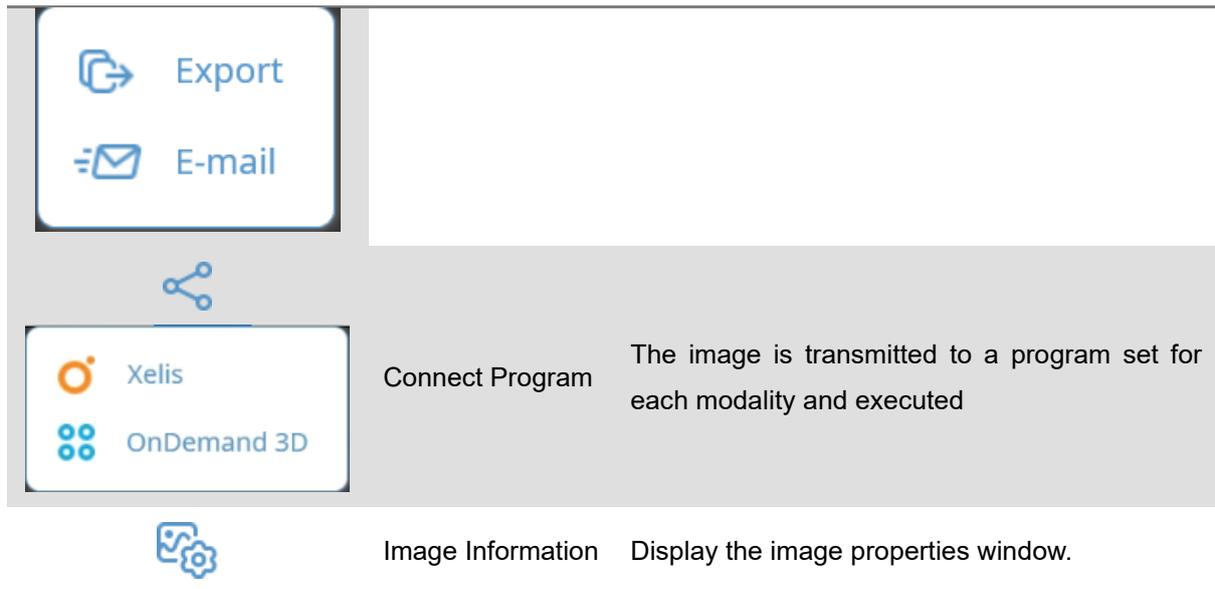


Image View and Patient Image List

Image Acquisition-Please refer to the image view and patient image list.

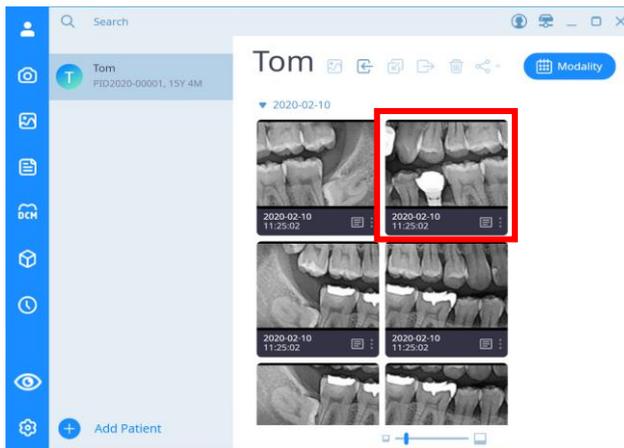
6.1 View Image

On the 'patient' screen, double-click 'Patient List' or right-click and select the [Open] item to automatically switch to the 'Image' screen. If multiple images are not selected, the most recently taken image is displayed on a single screen, and all images from the selected patient are displayed as thumbnails in the 'Patient Image List'. Double-click the thumbnail of the desired Image in the 'Patient Image List' or drag and drop it onto the image view to display the image.

6 Ways to Go to the Image Tab

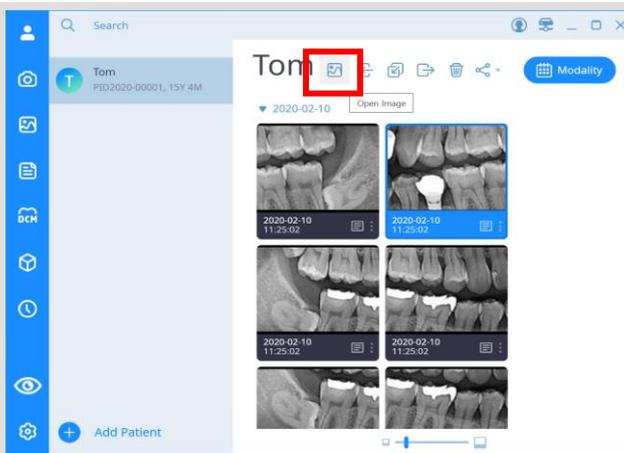
No.	Figure	Description
1		<p>Search for a patient in the patient list and double-click.</p>
2		<p>Select a patient from the patient list and select [Image] button on the left tab.</p>
3		<p>Select a patient from the patient list, right-click and select [Open] button.</p>

4



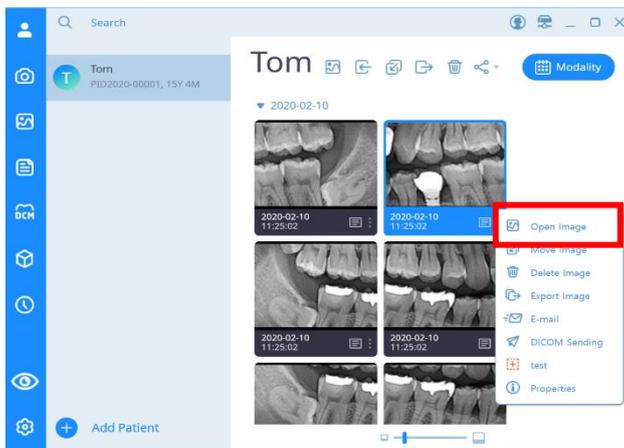
Double-click the desired image in the patient image list.

5



Select the desired image from the patient image list, and the [Open Image] button at the top is activated and click this button.

6



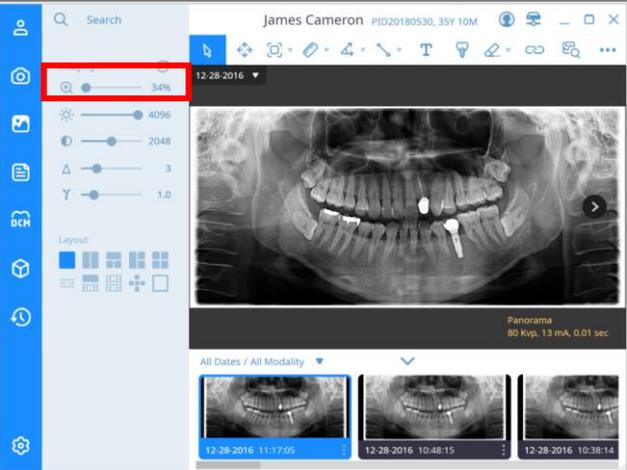
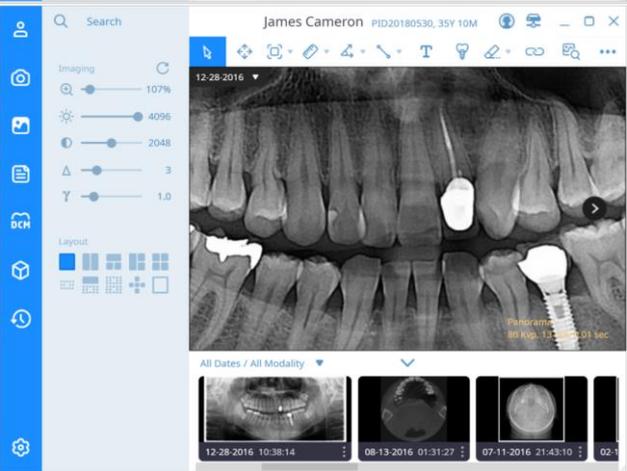
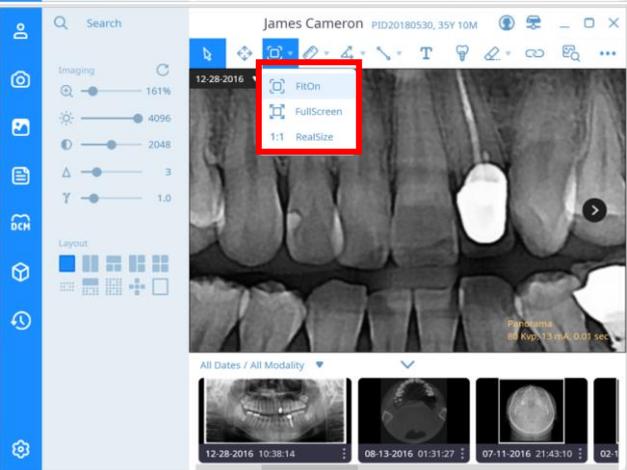
Right-click on the desired image in the patient image list and select [Open Image] button.

Notice

If you click the selection button on the upper right of the screen when the mouse is placed on the thumbnail image, and then select the additional image you want to select, you can easily select multiple images using only the mouse.

6.2 Zooming In/Out the Image

You can adjust the magnification of the image according to the purpose of diagnosis by using the 'image zoom' function.

No.	Figure	Description
1		<p>In the 'Image' tab of the 'Image' tab, move the slide that adjusts the [Zoom] value to change the magnification of the image.</p>
2		<p>You can zoom in / out using the mouse wheel on the Image view.</p>
3		<p>Click the [Fit] button to return to the initial size of the image.</p>

Notice When double-clicking the mouse, the image is enlarged around the selected area, and double-clicking again changes the screen to fit-on.

6.3 Adjust the Image

For accurate image diagnosis, you can use the slide controls on the left to adjust the Windowing Center, Windowing Width, Sharpness, and Gamma values. Changes are saved in the image and can be checked in the same way. If you select the reset button at the top of image processing, the image is initialized.

Windowing adjustment can also be adjusted by dragging the right mouse button up / down (brightness) or left / right (contrast) regardless of the currently selected mode.

6.4 Measuring Length

You can measure the distance between two points or a continuous point, and after measuring the length, you can move the position of the entered point to modify the length information or change the position where the result of the length measurement is displayed.

The color and thickness of the line, font size and color setting function of the result are displayed on the bottom left.

6.5 Measuring the Angle

'Angle' is a function to measure the internal angle (external) of two segments of three points, and 'Cops angle' is a function to measure the internal angle (external) of two segments of four points. After measuring the angle, you can measure the exact angle by moving the position of each point, and you can move the display position of the result.

The color and thickness of the line, font size and color setting function of the result are displayed on the bottom left.

6.6 Drawing Shapes

Diagnostic information can be recorded on the image using the 'Shape' function, and can be used for effective consultation with patients. Types include straight, multi-line, free-form, arrow, square, and circular.

6.7 Insert Text

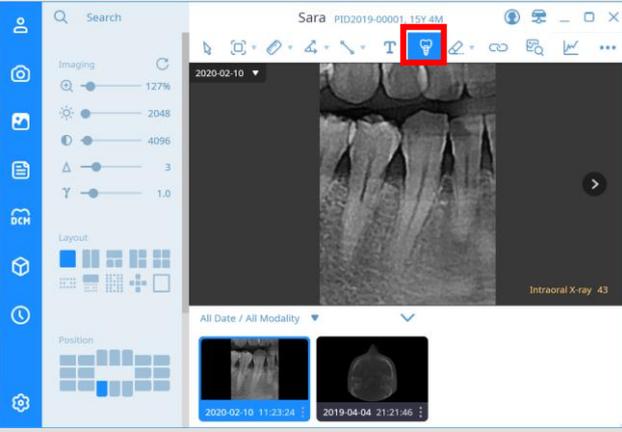
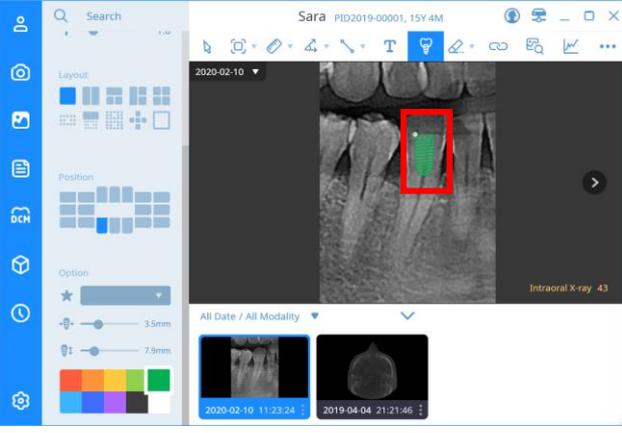
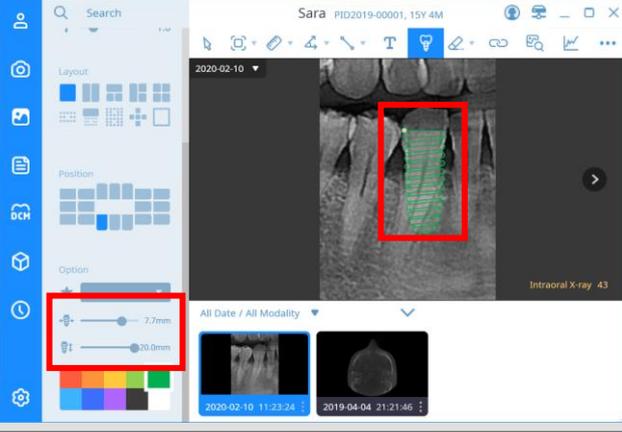
Using the 'Letter' function, you can record the diagnostic information of the image or the patient's requirements in letters. Click the location where you want to insert the text to display the text window. After entering the text, you can change the location, size, and color.

6.8 Implant Insert

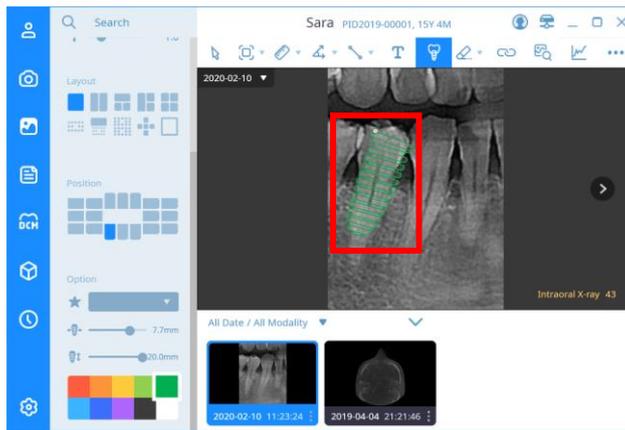
The 'Implant' function is a simulation function that allows the implant image to be superimposed on an X-ray image to select the optimal implant size for implant surgery.

SMARTDent supports an image-based implant simulation function to more effectively consult with patients.

Inserting the Implant

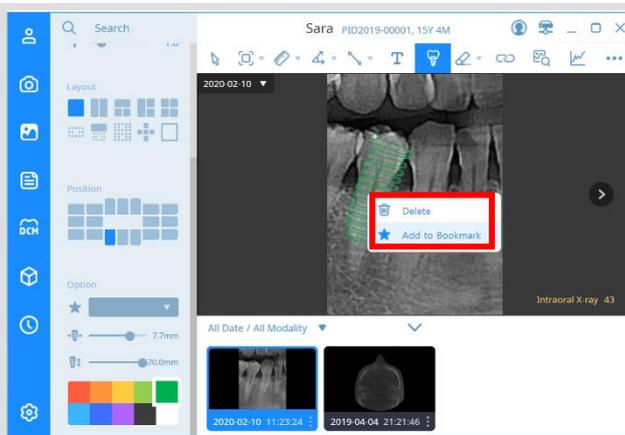
No.	Figure	Description
1		Click the [Implant] button in the 'Toolbar'.
2		Click the left mouse button at the position where you want to insert the implant, and the implant is displayed on the image.
3		Set the desired length and diameter.

4



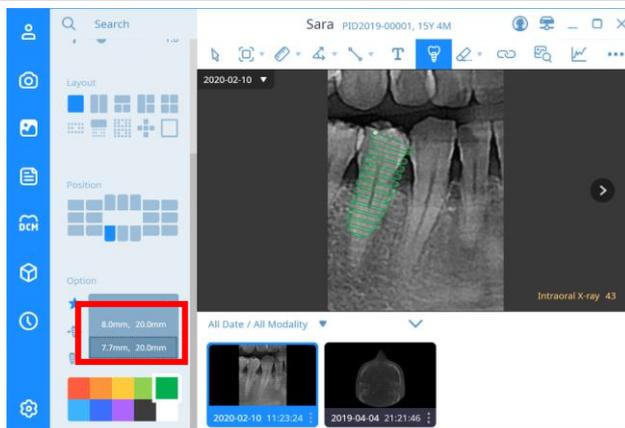
Adjust the angle using the starting point of the implant.

5



You can right-click the implant you want to save and select [Add to Bookmark] button.

6



You can see that the implant size information has been added to the bookmark list.

6.9 Delete Overlay

'Overlay' refers to items that are additionally entered into the image, such as length, angle measurement information, implants, shapes, and text.

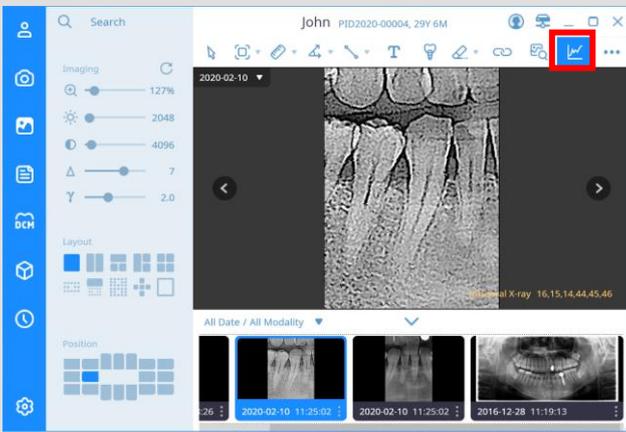
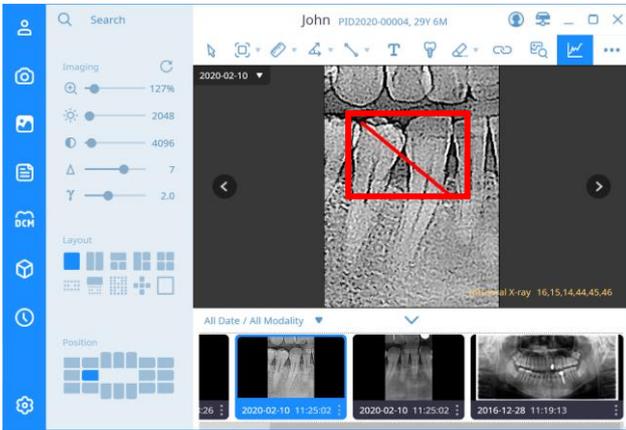
After selecting 'Overlay', click [Delete] button to delete them one by one, or click [Delete All] button to delete all input information at once.

6.10 Using a Magnifying Glass

You can use the 'magnifying glass' function to zoom in on a part of the image for precise analysis. After selecting the magnifier function and hovering the mouse over the image, the image around the cursor is enlarged and the contrast is improved to be displayed in a separate window. When you move the mouse, the image around the cursor is updated in real time.

6.11 Profile View

You can check the profile information between two points as a graph and check the length adjusted by the Y axis according to the value.

No.	Figure	Description
1		Select the [Profile] button in the 'Toolbar'.
2		If you click the start point and end point of the area you want to measure on the image in order, it is displayed as a straight line and the 'Profile' window is displayed.

3

Image Profile ✕

MIN 0 MAX 65535 AVERAGE 38837.84

OK

In the 'Profile' window, you can see the Image level between the two points.

4

Hovering the mouse over the graph displays the location on the image.

5

You can move the start and end points of the profile by dragging the left mouse button.

6.12 Capture the Image

In SMARTDent, capture such as [Partial Capture] to capture the selected blind area, [Image Capture] to capture the selected window, [Screen Capture] to capture the entire view area, [Add to DB] to register the selected image as a new image, etc. Features.

When you capture an image, Windows Explorer is displayed to save the file. The captured file name is automatically created in the form of [Patient ID_Patient Name_Modality_Date], and can be changed by the user.

6.13 Memo

You can register a memo on the image, and an icon is displayed on the thumbnail of the [Patient] screen for a image with a memo, so you can select the image and check the content through the memo before displaying it on the screen.

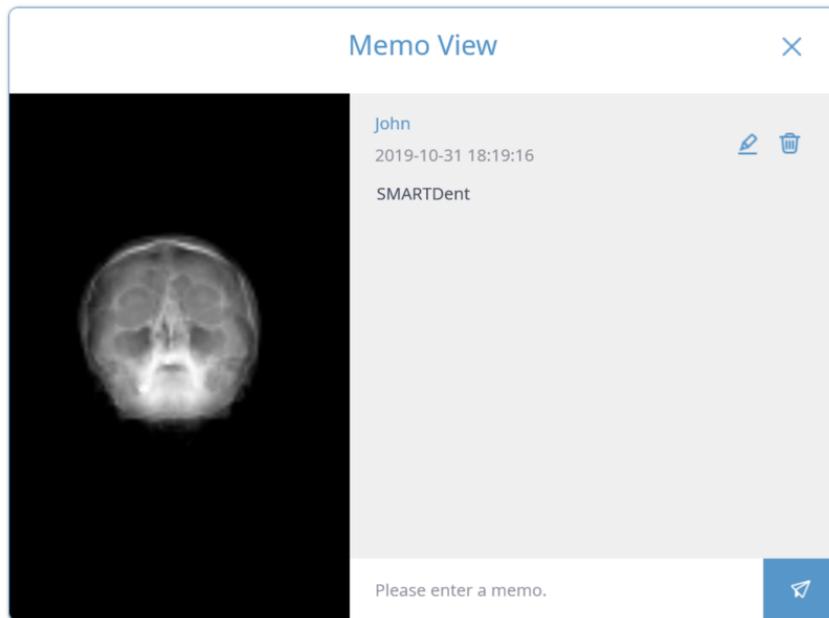


Fig 36 Memo View

Memo Menu

Item	Description
	Edit memo.
	Delete memo
	Add memo

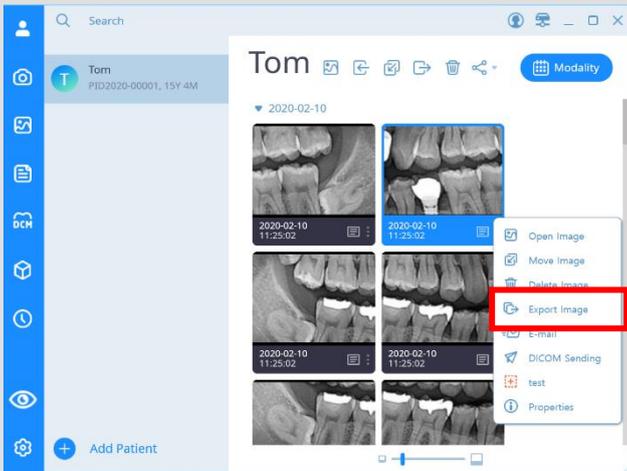
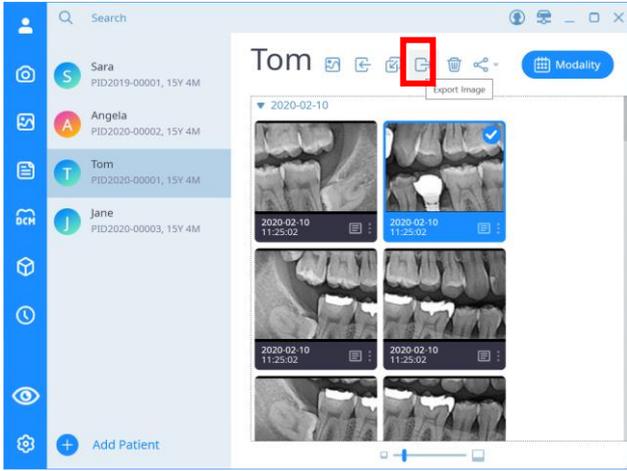
6.14 Export

SMARTDent allows you to export the image as a file or email.

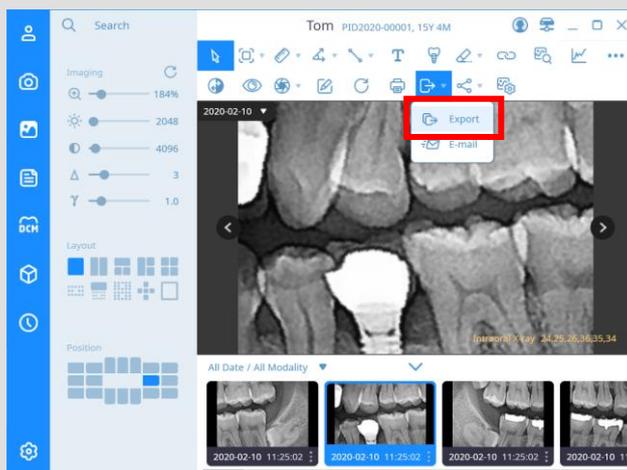
Exporting to a file is the same as “4.5 Export Patient Image” and the selected image is saved in the path set in the explorer.

Image export can be done in several places as shown below.

4 Ways to Export Images

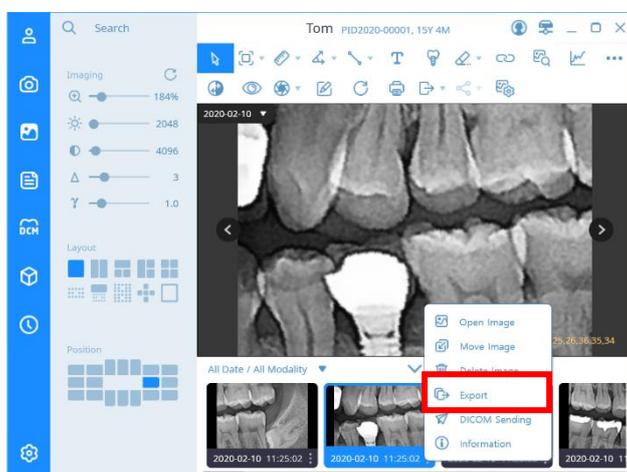
No.	Figure	Description
1		Right-click on the image you want to export as a file and select [Export Image] button.
2		Select the image to export as a file and click the [Export] button at the top.

3



Select [Export] button from the 'Image' screen toolbar.

4



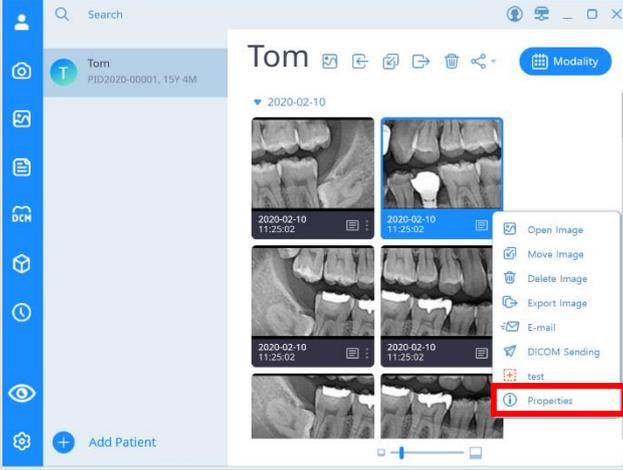
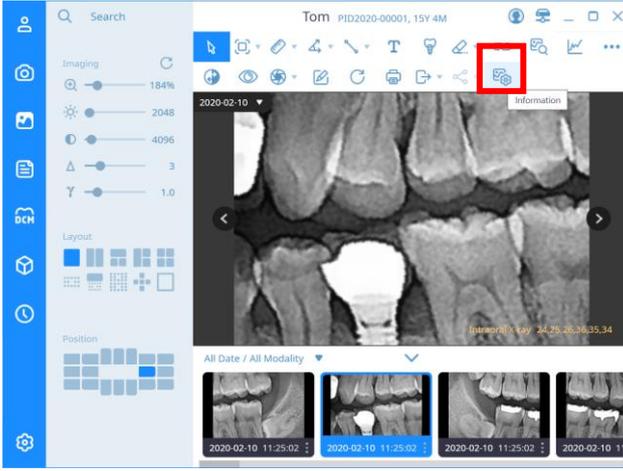
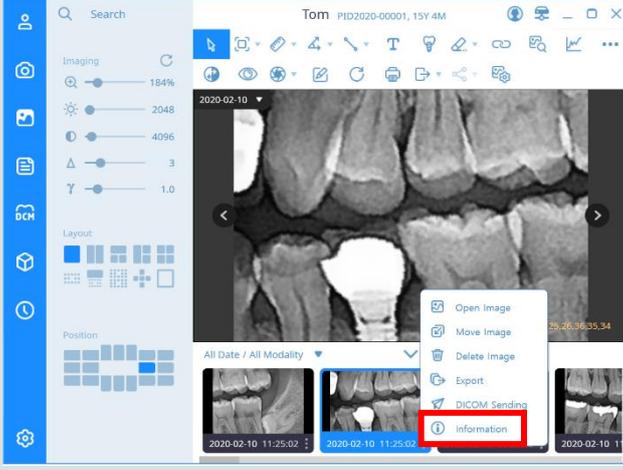
Right-click on the image to export from the 'Patient Image List' and select [Export] button.

Notice

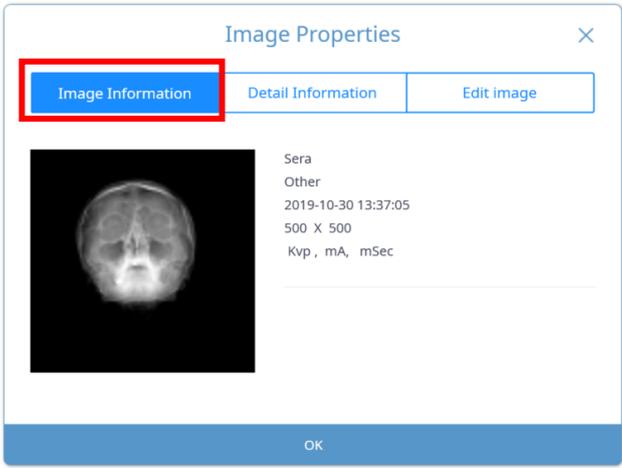
If you click the selection button on the upper right of the screen when the mouse is placed on the thumbnail image, and then select the additional image you want to select, you can easily select multiple images using only the mouse.

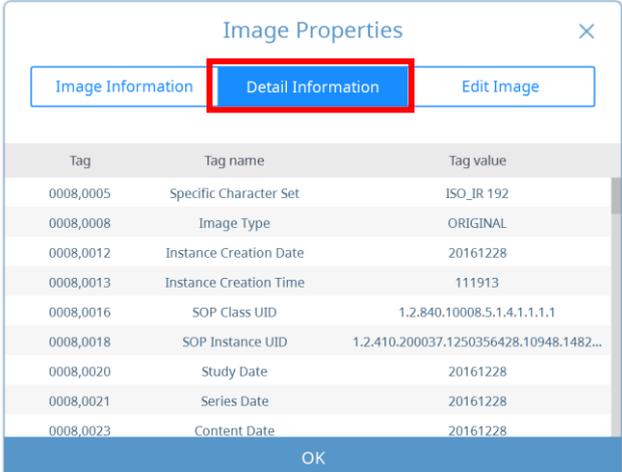
6.15 Checking/Modifying Image Information

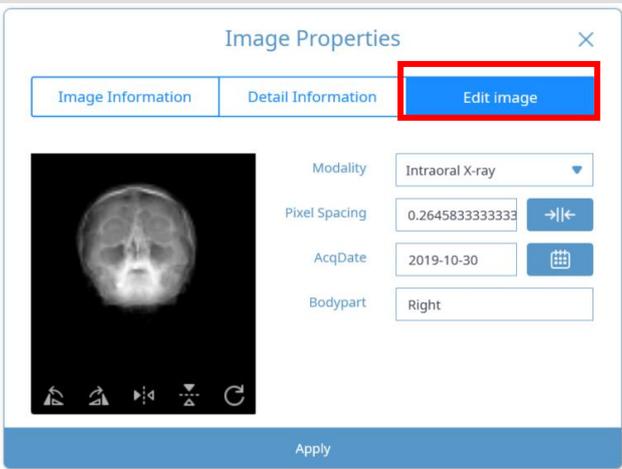
3 Ways to Check Image Information.

No.	Figure	Description
1		<p>Right-click on the image to check the properties and select [Properties] button.</p>
2		<p>When you click the [About] button on the image tab 'Toolbar', the 'Image Properties' window opens.</p>
3		<p>Right-click on the image to check in the thumbnail of the image tab and select [About] button to display the "Image Properties" window.</p>

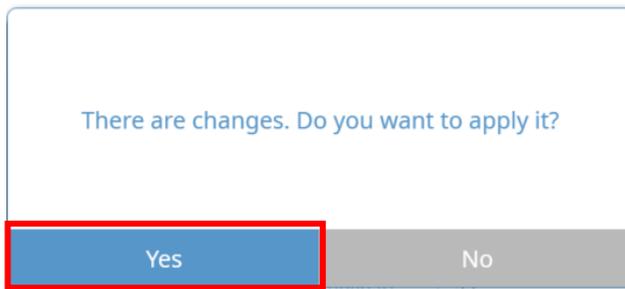
You can check the image information and modify the modality, protocol, length information and rotation information of the image.

No.	Figure	Description
1		Select [Image Information] button to check the basic information of the image.

2	 <table border="1"> <thead> <tr> <th>Tag</th> <th>Tag name</th> <th>Tag value</th> </tr> </thead> <tbody> <tr> <td>0008,0005</td> <td>Specific Character Set</td> <td>ISO_IR 192</td> </tr> <tr> <td>0008,0008</td> <td>Image Type</td> <td>ORIGINAL</td> </tr> <tr> <td>0008,0012</td> <td>Instance Creation Date</td> <td>20161228</td> </tr> <tr> <td>0008,0013</td> <td>Instance Creation Time</td> <td>111913</td> </tr> <tr> <td>0008,0016</td> <td>SOP Class UID</td> <td>1.2.840.10008.5.1.4.1.1.1.1</td> </tr> <tr> <td>0008,0018</td> <td>SOP Instance UID</td> <td>1.2.410.200037.1250356428.10948.1482...</td> </tr> <tr> <td>0008,0020</td> <td>Study Date</td> <td>20161228</td> </tr> <tr> <td>0008,0021</td> <td>Series Date</td> <td>20161228</td> </tr> <tr> <td>0008,0023</td> <td>Content Date</td> <td>20161228</td> </tr> </tbody> </table>	Tag	Tag name	Tag value	0008,0005	Specific Character Set	ISO_IR 192	0008,0008	Image Type	ORIGINAL	0008,0012	Instance Creation Date	20161228	0008,0013	Instance Creation Time	111913	0008,0016	SOP Class UID	1.2.840.10008.5.1.4.1.1.1.1	0008,0018	SOP Instance UID	1.2.410.200037.1250356428.10948.1482...	0008,0020	Study Date	20161228	0008,0021	Series Date	20161228	0008,0023	Content Date	20161228	Select [Detail Information] button to view DICOM header information.
Tag	Tag name	Tag value																														
0008,0005	Specific Character Set	ISO_IR 192																														
0008,0008	Image Type	ORIGINAL																														
0008,0012	Instance Creation Date	20161228																														
0008,0013	Instance Creation Time	111913																														
0008,0016	SOP Class UID	1.2.840.10008.5.1.4.1.1.1.1																														
0008,0018	SOP Instance UID	1.2.410.200037.1250356428.10948.1482...																														
0008,0020	Study Date	20161228																														
0008,0021	Series Date	20161228																														
0008,0023	Content Date	20161228																														

3		Select [Edit Image] button to modify the rotation and image information of the image.
---	---	---

4



After changing the image information, click the [Yes] button when the 'Change Image' window appears.

6.16 Calibrating Length

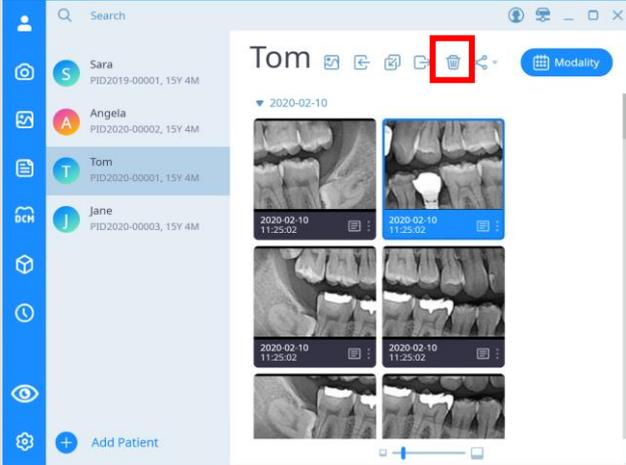
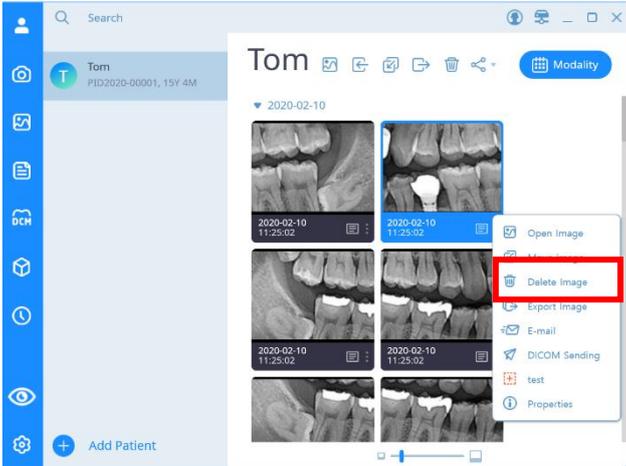
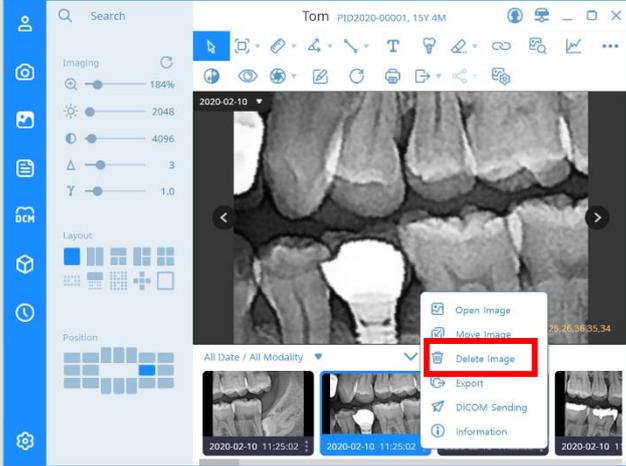
If the length information of the image is entered incorrectly, the length of the image can be corrected using the calibration function.

No.	Figure	Description
1		<p>In the 'Image Properties' window, select the [Edit Image] button and click the [Length Correction] button in the [Pixel Spacing] item.</p>
2		<p>The length calibration setting window appears. After measuring the length of the area you want to measure on the image, enter the actual length to set the calibration value.</p>

6.17 Delete the Image

'Delete' function to delete the image.

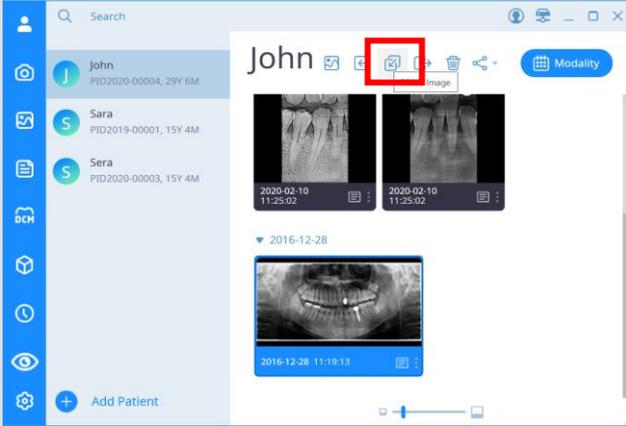
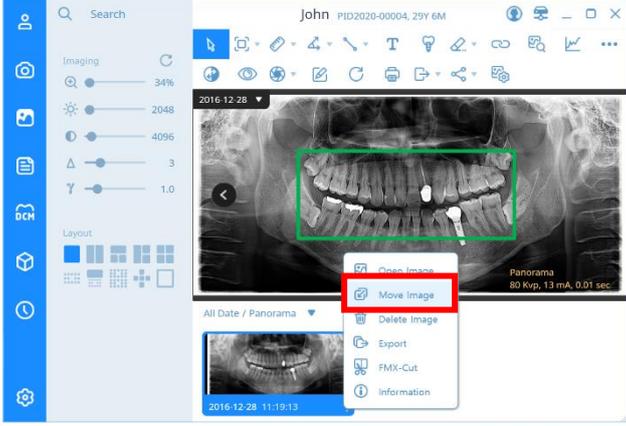
The 'Delete' function prevents the corresponding image from being searched by SMARTDent. It does not delete the image from the server and can be restored again.

No.	Figure	Description
1		<p>If you select an image to delete from the patient image list, the 'Delete Image' button at the top is activated. Click the [Delete Image] button.</p>
2		<p>Right-click the image to delete from the patient image list and select [Delete Image] button.</p>
3		<p>Right-click on the image you want to delete from the 'Patient Image List' in the 'Image' tab and click [Delete Image] button.</p>

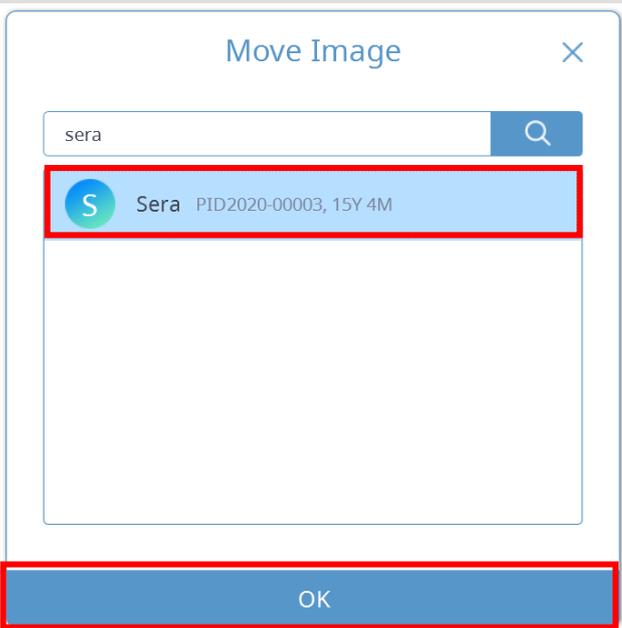
Notice If you click the selection button on the upper right of the screen when the mouse is placed on the thumbnail image, and then select the additional image you want to select, you can easily select multiple images using only the mouse.

6.18 Move Images to Another Patient

SMARTDent provides the ability to move selected images to other patients.

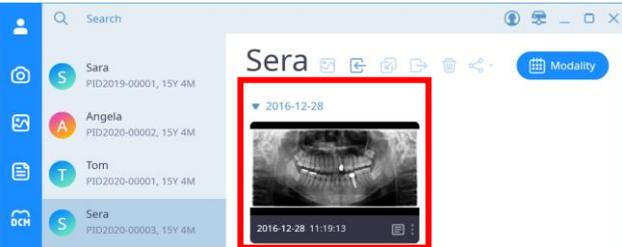
No.	Figure	Description
1-1		<p>Select an Image to move from the image list (multiple selections possible) and select [Move image] button at the top.</p>
1-2		<p>Right-click on the image to move in the 'Patient Image List' and select [Move Image] button.</p>

2



In the 'Move Image' window, search for the patient to be moved, select it, and click the [OK] button at the bottom.

3



Confirm that the image has moved

Notice If you click the selection button on the upper right of the screen when the mouse is placed on the thumbnail image, and then select the additional image you want to select, you can easily select multiple images using only the mouse.

Report

7

7 Report

Reports is a new printing feature of SMARTDent. Various pages can be configured in the form desired by the user, and various functions such as image adjustment, text insertion, and patient and image information display settings are supported.

If you select the [Print] button in the image view, the image displayed in the view area is displayed on the report page, and all images of the patient are displayed as a thumbnail list at the bottom.

The report screen is shown in the figure below.

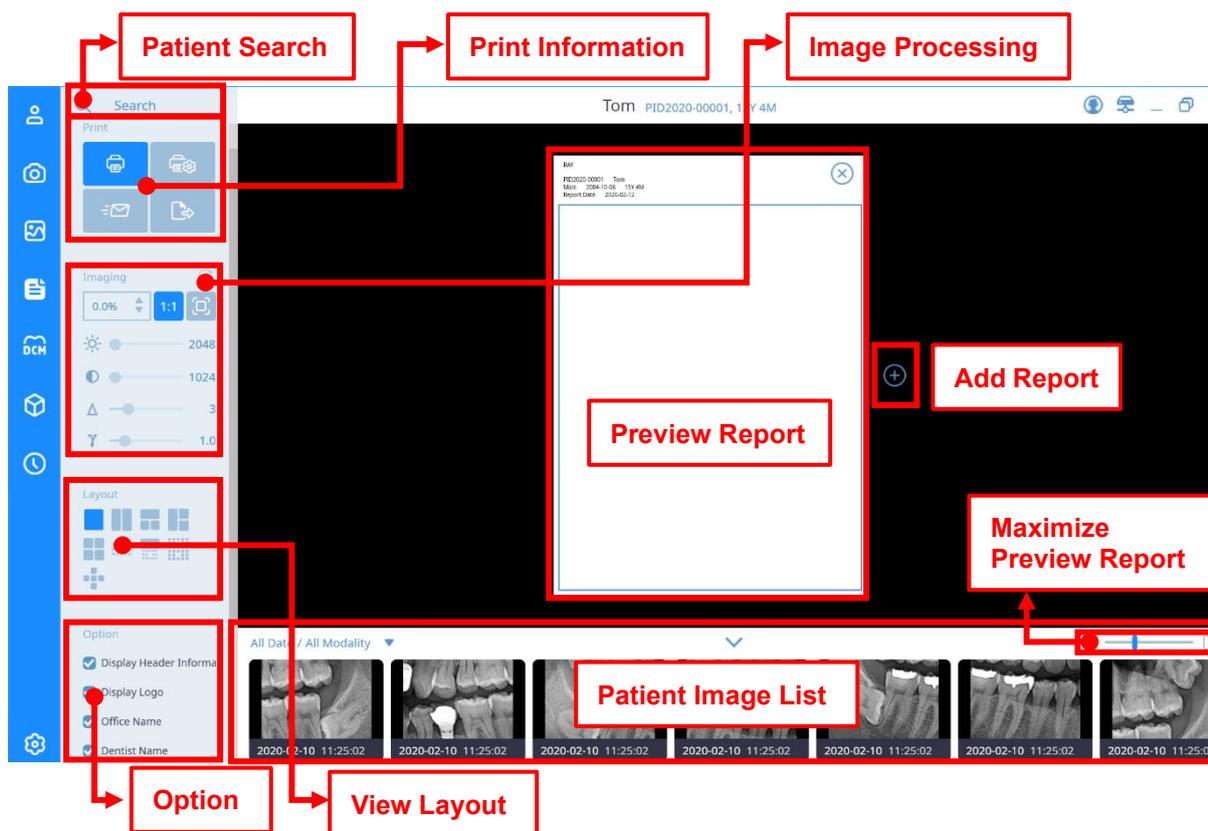


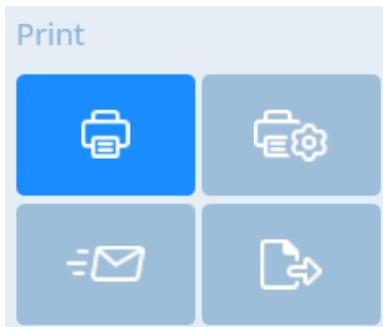
Fig 37 'Report' Tab Screen

Patient search

Please refer to "5. Image Acquisition - Patient Search".

Notice Using patient search, you can select a patient without going to the [Patients] screen from the [Report] screen.

Print



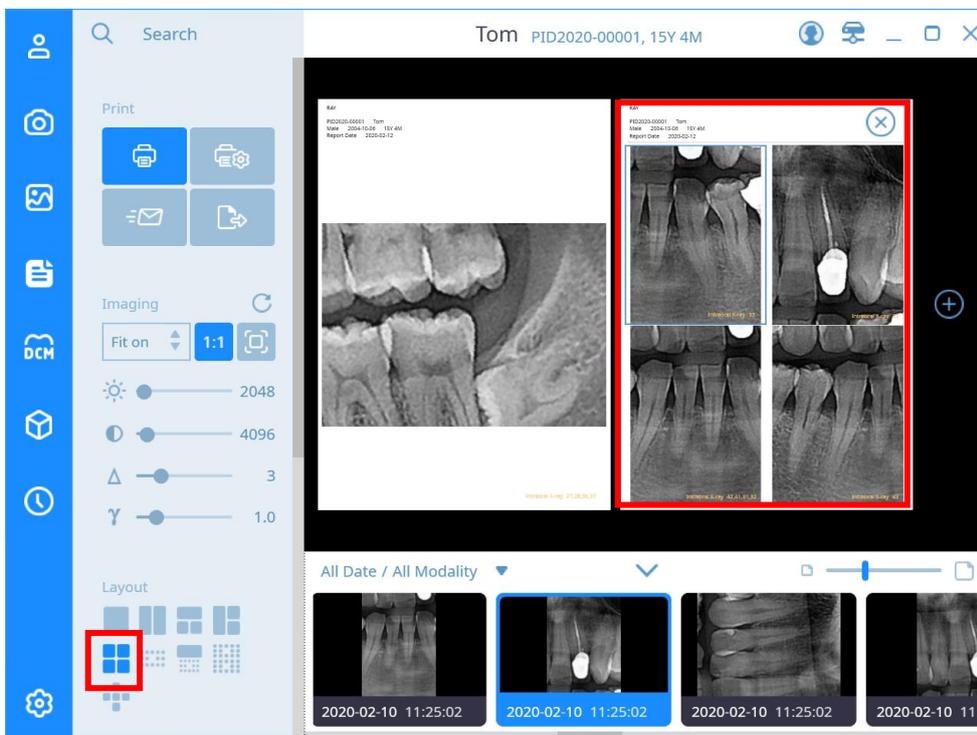
Item	Description
Print	Print the current report.
Print settings	Open the printer settings window.
Email	Email the current report.
Export to file	Save the current report as a file.

Image Processing

Please refer to 5.1 RIOScan Acquisition – Image Processing.

View Layout

Select the layout of the image to be displayed in the report.



Option

Select what you want to appear on the report.

Item	Description
Header Information	Set whether to use the following information on the report page.
Logo	Set whether to display hospital logo.
Clinic Name	Sets whether to display the hospital name.
Dentist Name	Sets whether or not to show the doctor in charge.
Patient Information	Sets whether to display patient information.
Report Date	Set whether to display the print date as a report.
Image Information	Set whether to display image information.
Image Overlay	Set whether to include image overlay.
Guide Ruler	Set whether or not to show the guide ruler.
R Mark	Set whether to display the 'R' mark at the bottom left of the report.
Comment	Set whether to enter a comment.

Report Preview

The report page that will be printed last.

Add Report

Add a report page.

List of Patient Images

5. Image Acquisition-Please refer to the list of patient images.
Please refer to 5.1 RIOScan Acquisition – list of patient images.

Report Preview Size

Adjust the size of the report preview screen.

You can print a report page with a print connected to a PC or a DICOM Printer. Click the 'Print Settings' button to display the 'Print Settings' window where you can set the printer type, page size and page orientation.

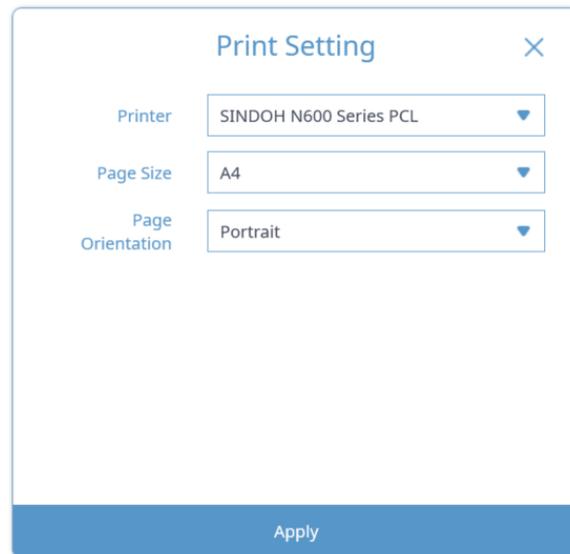


Fig 38 Print Setting Screen

After selecting the layout, select the desired image and click the [Print] button to print the image. You can adjust the magnification of the image on the report screen by scrolling the left control or mouse wheel and adjust the image quality using the image processing function.

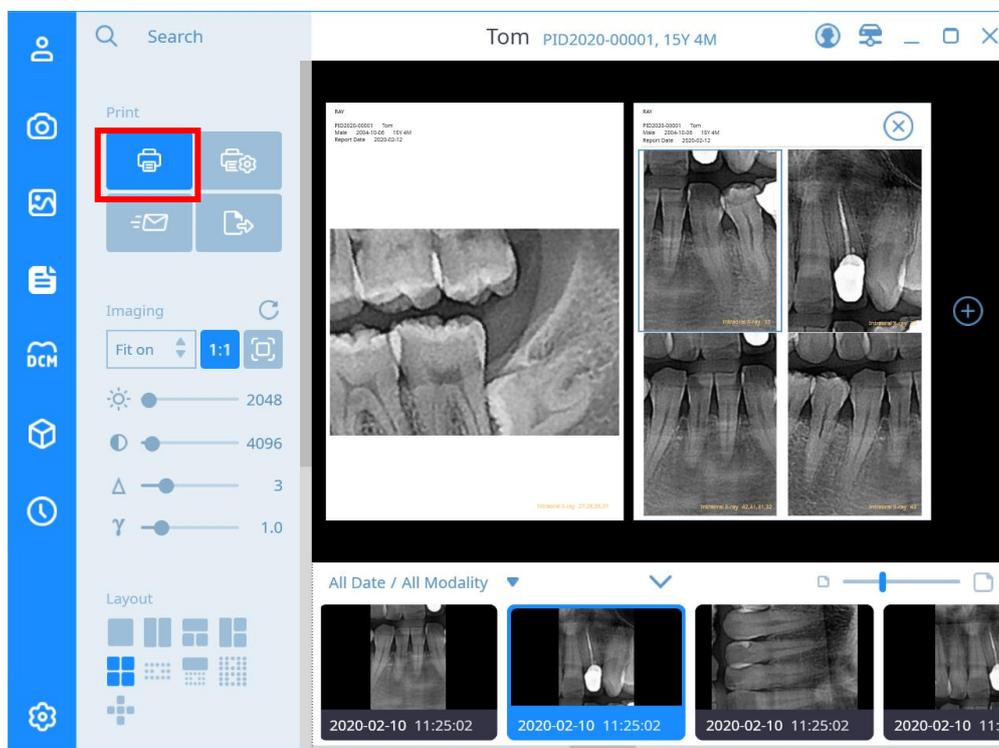


Fig 39 Print Report

DICOM

8

8 DICOM

PACS provides the function to inquire the acquisition request list (MWL, Modality Work List) created by PACS, the function to send the captured image to the set PACS server (DICOM Storage SCU), and to register the acquisition request from the chair end PC. .

In the menu tab on the left, you can select the acquisition list inquiry or acquisition image transmission function. On the right, it consists of the patient information, menu, and inquiry list window from the top. DICOM screen “The composition of the “Modality List” screen is shown below.

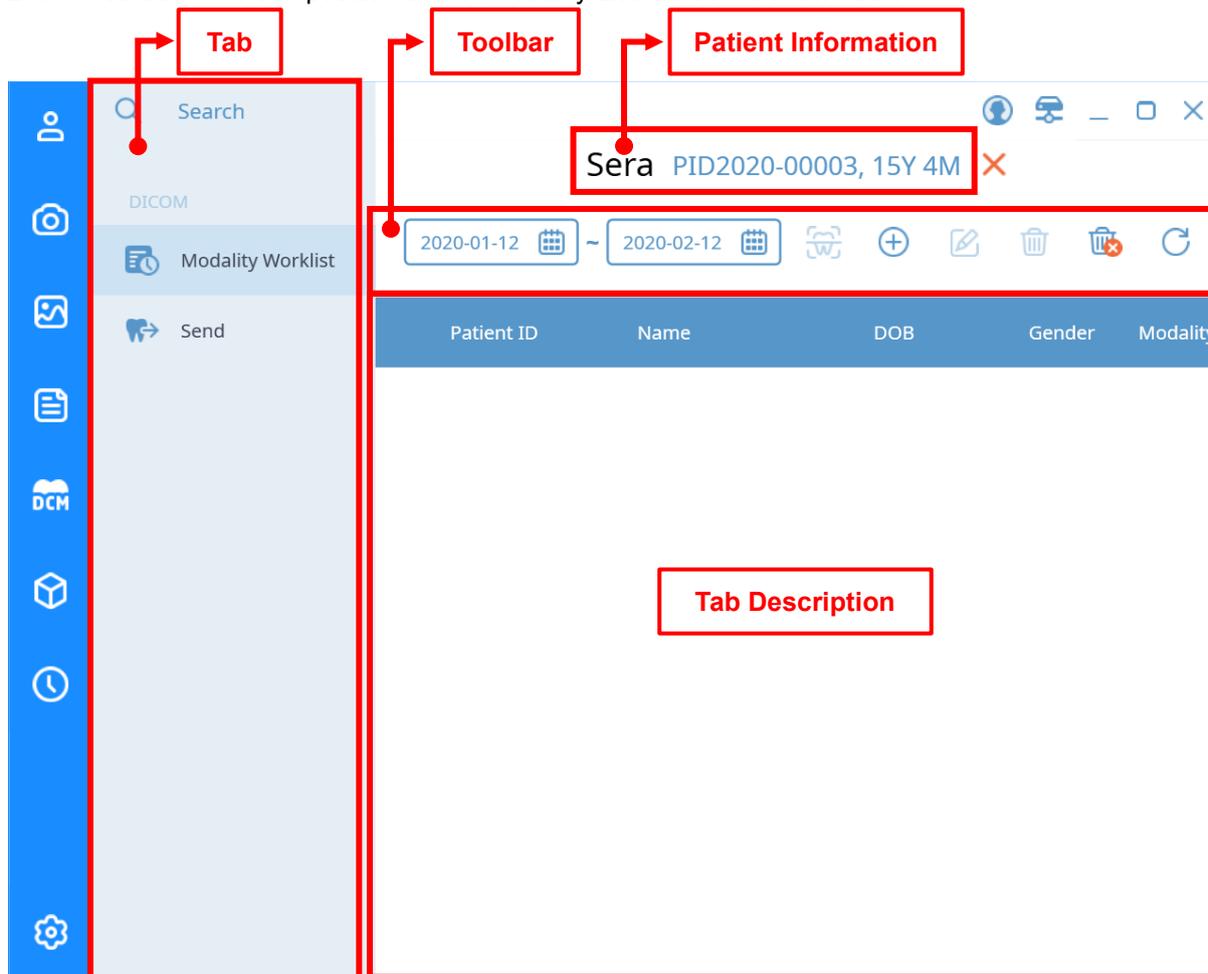


Fig 40 ‘DICOM’ Tab MWL Screen

Notice CT, Panorama, and Cephalometries are not available for chairs where RAYSCAN is not directly connected. After registering an acquisition request in the chair group DICOM acquisition list, select the acquisition request on the workstation to which RAYSCAN is connected and proceed with the acquisition.

Notice SMARTDent displays image transmission status. If the transmitted image is in the failed transmission state, send the image again.

DICOM screen “Transfer” is shown in the figure below.

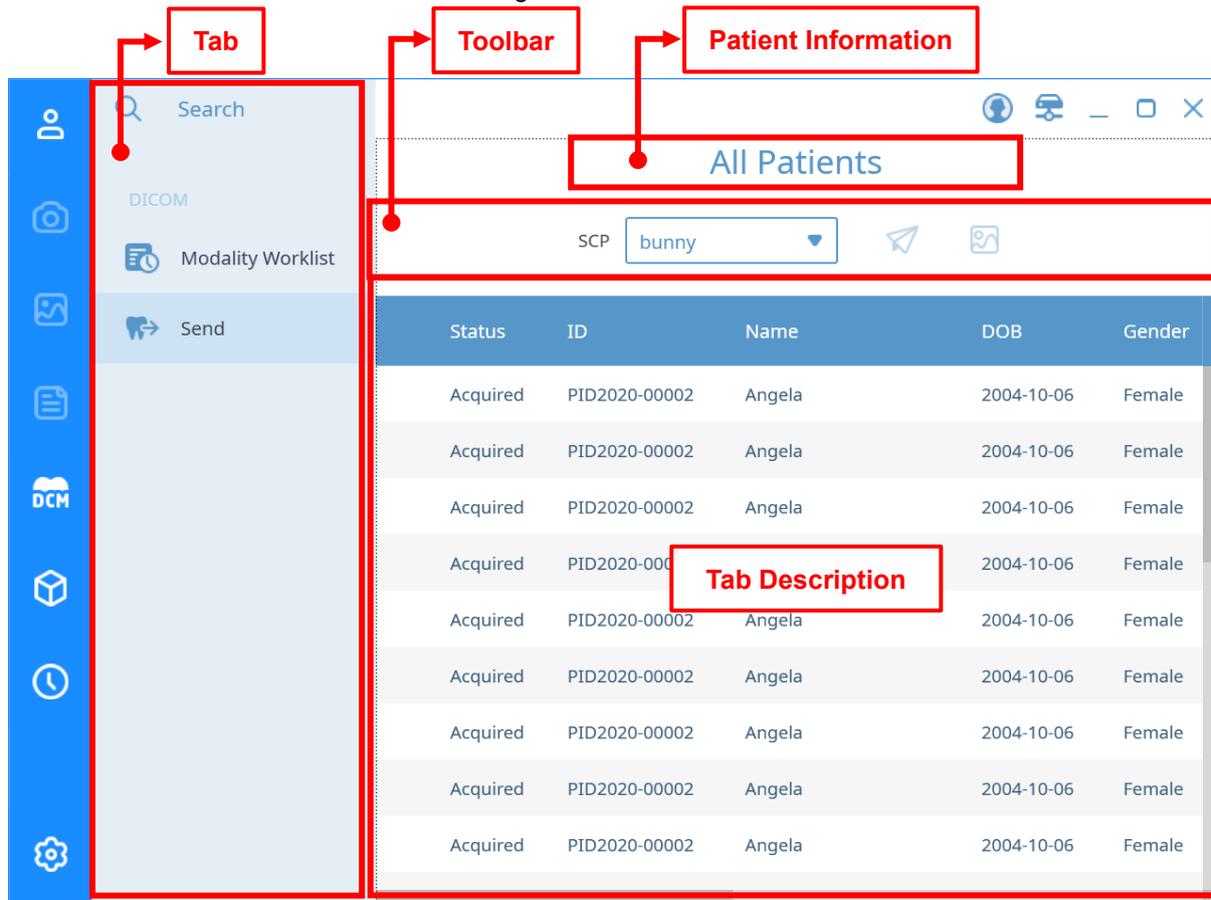


Fig 41 ‘DICOM’ Tab Send Screen

Patient Information

	Description
All Patients	No patient selected

Sera PID2020-00003, 15Y 4M ✕

If there is a patient selected, the patient name, ID, and age are displayed, and you can click the X button to return to the case where no patient is selected.

MWL Toolbal

	Item	Description
	Period setting	Set the search period for the acquisition list.
	RAYSCAN	Open the RAYSCAN program
	Add	Add an acquisition list.
	Edit	Edit the selected acquisition list.
	Delete	Delete the selected acquisition list.
	Delete All	Delete all acquisition lists.
	Refresh	The acquisition list is updated.

Send Toolbar

	Item	Description
	Storage	Select the SCP server to send.
	Send	Send image to the selected SCP server.
	Watch video	Check the selected image on the image tab.

Digital Solution

9

9 Digital Solution

The digital solution provides a function to search a list of 3D images stored, select one or more images, and link with 3D design software. Select an item in the image category, and then select the image to work with in the image list. When you select the image list, the related images of the selected patient are displayed in the patient image list. After selecting the files to be linked, select the program or task to be linked from the toolbar.

The screen composition of the digital solution is as follows.

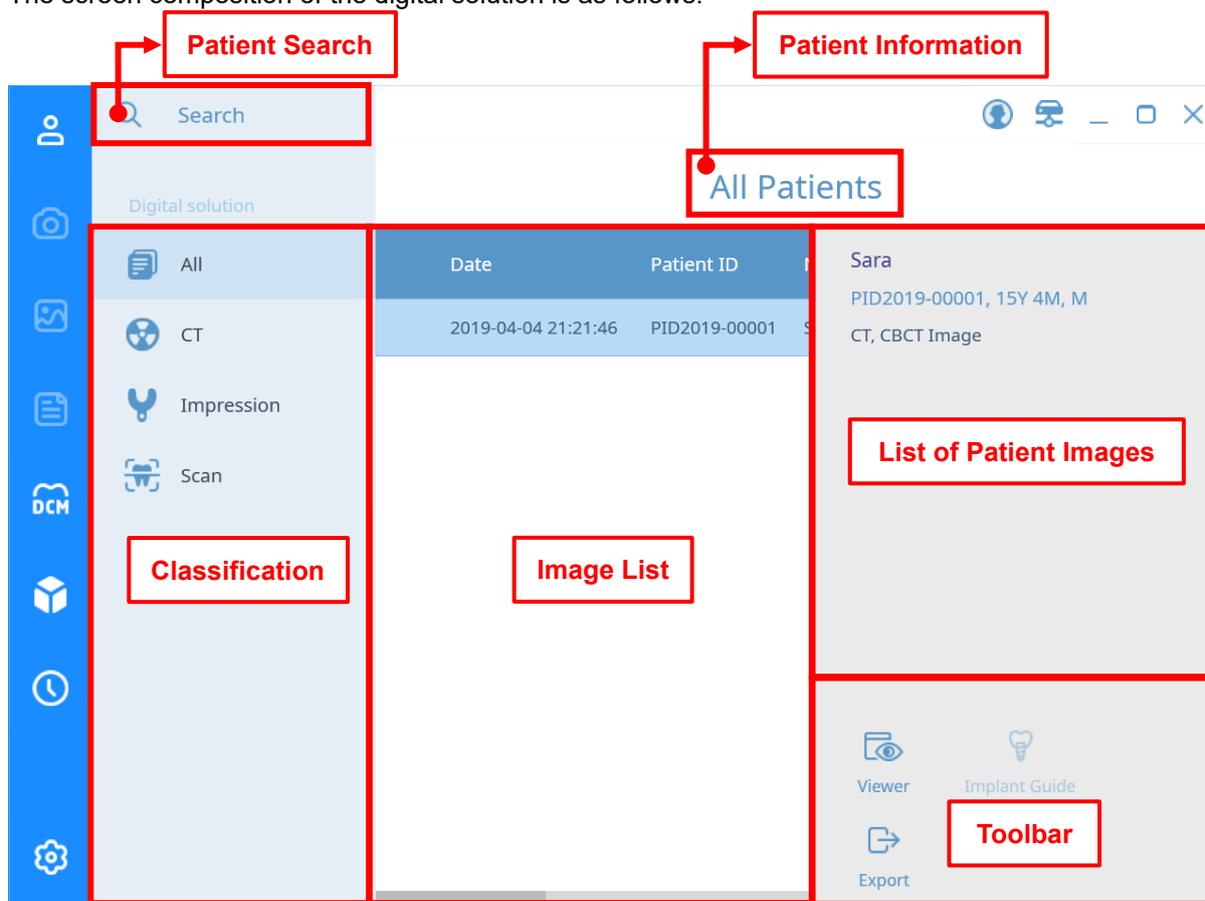


Fig 42 'Digital Solution' Tab Screen

Patient Search

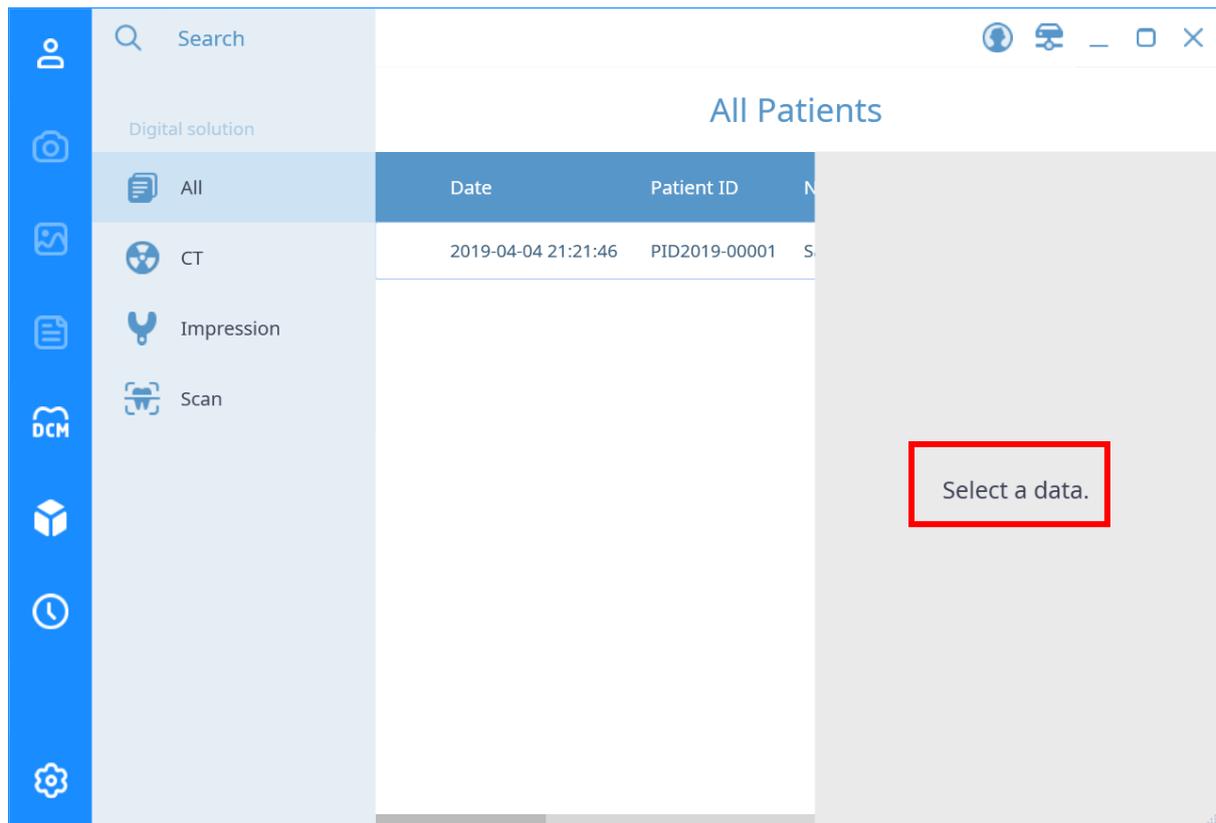
Please refer to "5. Image Acquisition - Patient Search".

Item	Description
Classification	CT, Impression, Scan, Etc. Select the image type.
Patient information	The selected patient information is displayed.
List of patient images	The image list of the selected patient is displayed.

Toolbar

Item	Description
 Viewer	
<div style="border: 1px solid gray; padding: 5px; display: inline-block;">  R2Gate  Xelis  OnDemand </div>	Connection viewer program A list of viewer programs that can be linked is displayed.
 Implant Guide	Implant guide
 Export	Export the image as a DICOM file.

If no image is selected, a guide message is displayed on the right screen.



History

10

10 History

Check acquisition statistics by modality in a certain period and the acquisition list of the modality selected in a certain period, print and export files

10.1 Statistics

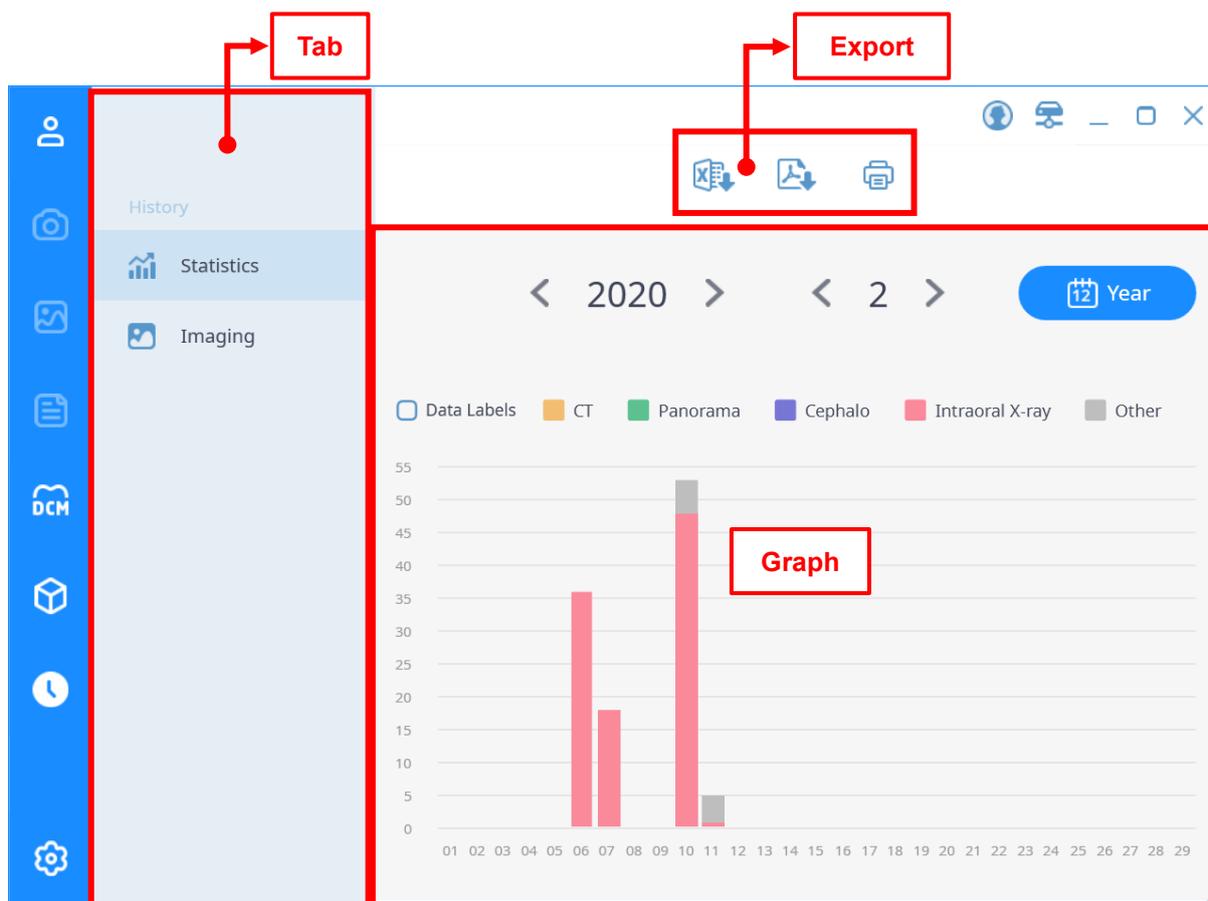


Fig 43 'History' Statistic Screen

Export function supports Excel, PDF, output, etc.

Item	Description
Export to Excel	Export the graph to an Excel file.
Export to PDF	Export the graph as a PDF file.
Print	Print the graph.

The graph supports the following functions.

Item	Description
Select year	Select the year for the statistical date.
Month selection	Select the month of the statistical date.
Date unit change button	Change the unit of date. (Year, month)
Data label	The number of images is displayed on the graph.
Graph	Divide the image by date and modality to graph.

Compare before and after applying data labels



[Before application]

[After application]

Export Graph

See 4.7 View and Export Patient Information – Export to Patient Information File.

10.2 Image History

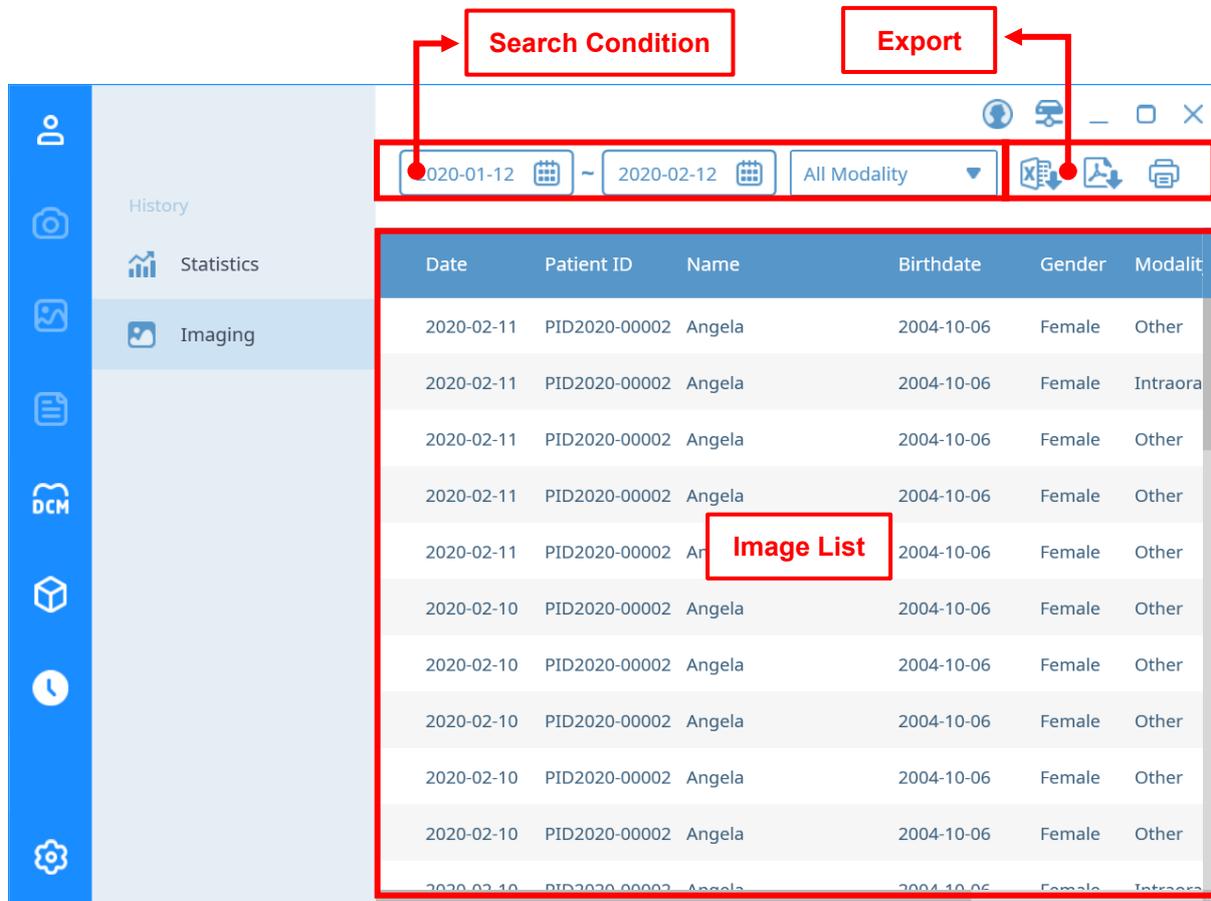


Fig 44 'History' Image Screen

Search Requirement

Item	Description
From	Set the start date of the period to search.
To	Set the end date of the period to search.
Modality	Set modality to search.

Image List

Item	Descripton
Date	Date the image was taken
Patient ID	Patient ID with image
Name	Patient's name with imaging
Date of Birth	Patient's date of birth with imaging
Gender	Patient's gender with imaging
Modality	Image modality
Protocol	Image protocol
Count	Number of bundled images
Description	Image description

Edit Layout

11

11 Edit Layout

Using the 'LAYOUT Edit tool' program, users can add or edit the desired view layout directly. The screen layout of 'LAYOUT Edit tool' and the contents of each item are as follows.

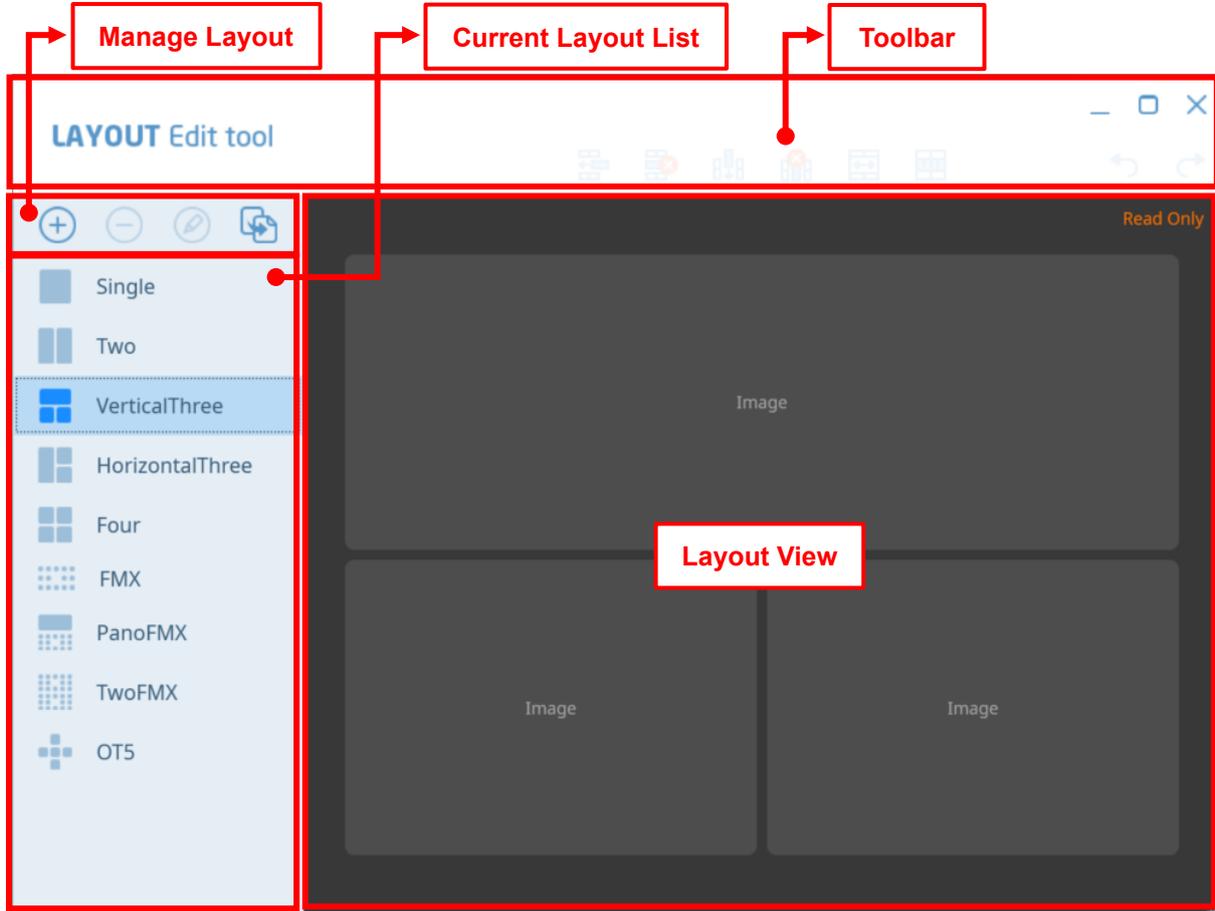


Fig 45 'LAYOUT Edit tool' Main Screen

Layout Management



	Item	Description
	Add Layout	Add layout for the image
	Delete Layout	Delete the layout
	Edit Layout	Change the current layout
	Copy Layout	Copy the current layout

Notice The default layout registered when installing the program cannot be deleted or edited.

Current Layout List



Item		Description
	Basic view	Displays image on one screen.
	Horizontal split view	The image is displayed on two horizontally divided screens.
	Vertical three-part view	Displays the image on the vertical 3-split screen.
	Landscape split view	Displays the image on the horizontal 3 division screen.
	4-split view	The image is displayed on the 4-split screen.
	FMX view	Display the image on the FMX screen.
	Panoramic and FMX views	Displays one panoramic image and FMX screen.
	2-split FMX view	Display images on two FMX screens.
	OT5	Intraoral photos are displayed on a 5-split screen according to their location.

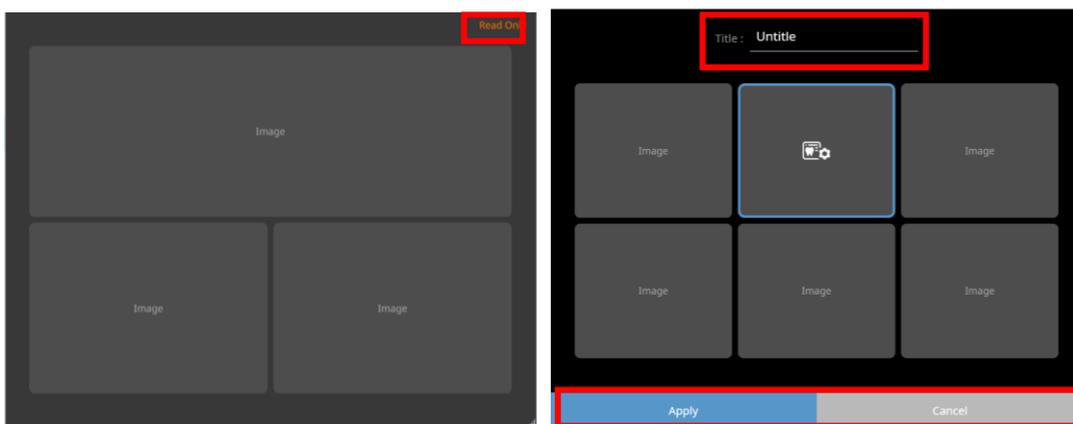
Toolbar



Item	Description
	Add row Add a new row.
	Delete row Delete the row to which the selected cell belongs.
	Add column Add a new column.
	Delete column Delete the column to which the selected cell belongs.
	Merge cells Merge two or more selected cells into one cell.
	Cell separation Add rows and columns to cells as many as the number entered by the user.
	Undo Cancels the executed action.
	Redo Click Undo to redo the undone action.

Notice Deleting rows, deleting columns, and separating cells are activated only when one or more cells are selected, and merging cells is activated only when two or more cells are selected.

Layout View



Indicates the layout selected in the layout list. If the edit mode is not activated, 'Read Only' is displayed in the upper right corner and the layout cannot be edited.

When the edit mode is activated, you can set the layout name in the [Title] column at the top, and the [Apply] and [Cancel] buttons at the bottom can be activated to save or cancel the layout.

Setting

12

12 Setting

You can modify the settings used in the SMARTDent program. You can enter the screen by clicking the [Settings] button at the bottom left of the program.

The basic structure of SMARTDent program is as follows.

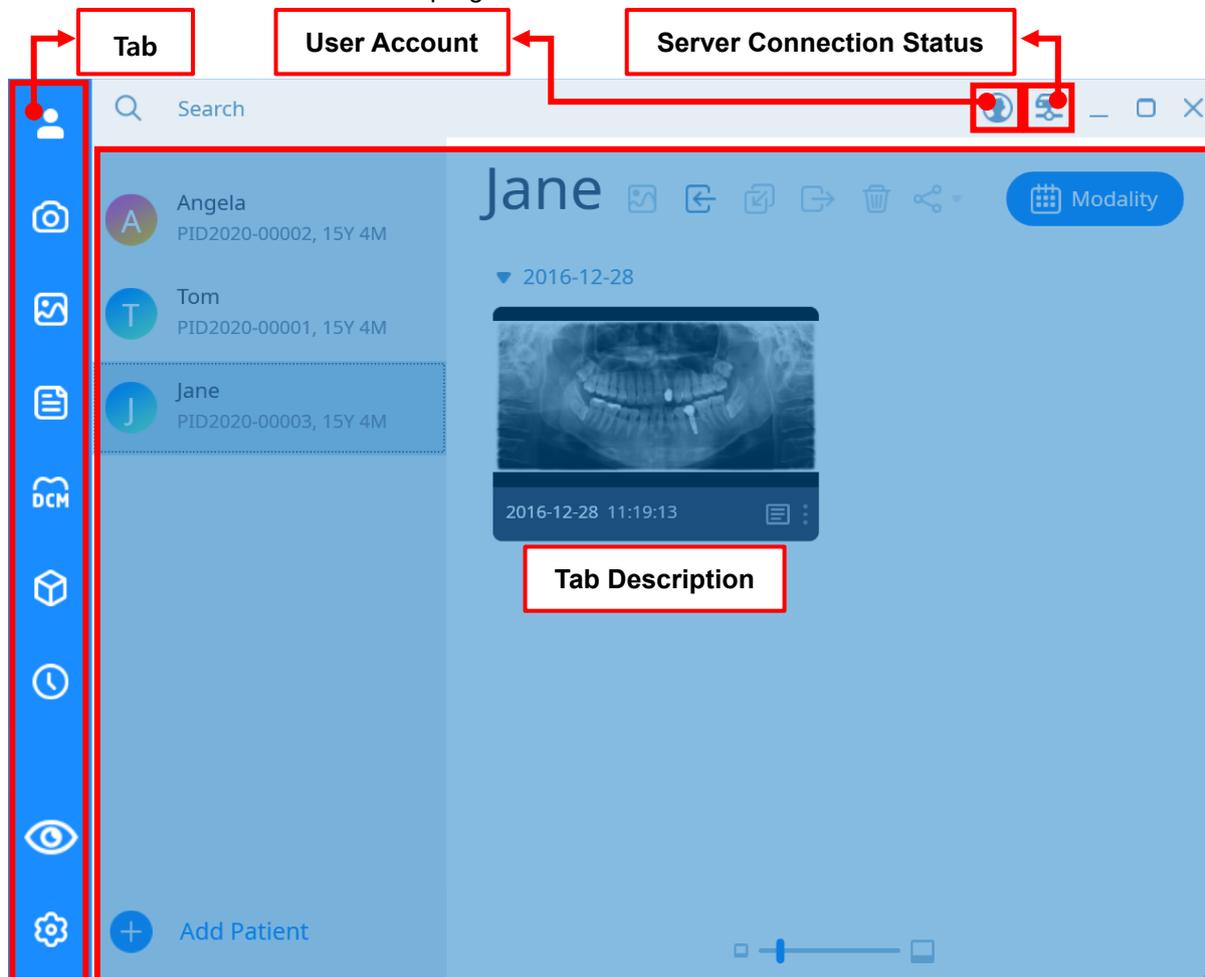
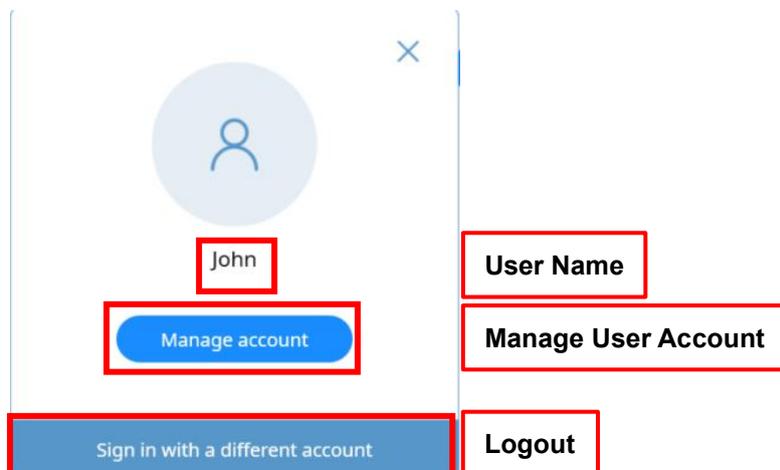


Fig 46 Main Screen – Setting

User Account



Item	Description
User Name	Indicates the name of the currently logged in user.
Manage User Account	Manage the account information of the currently logged in user.
Logout	Logout and go to the login screen.

Server connection status

- 
Server connection complete
Indicates the status when connected to the server.
- 
Disconnect server
Indicates the status when disconnected from the server.

The screen composition of the 'Settings' window and the contents of each item are as follows.



Fig 47 'Settings' Screen

Bottom

Item	Description
Save	Save the changed setting values and exit the setting window.
End	Close the setting window without saving the changed setting values.

12.1 Common Settings

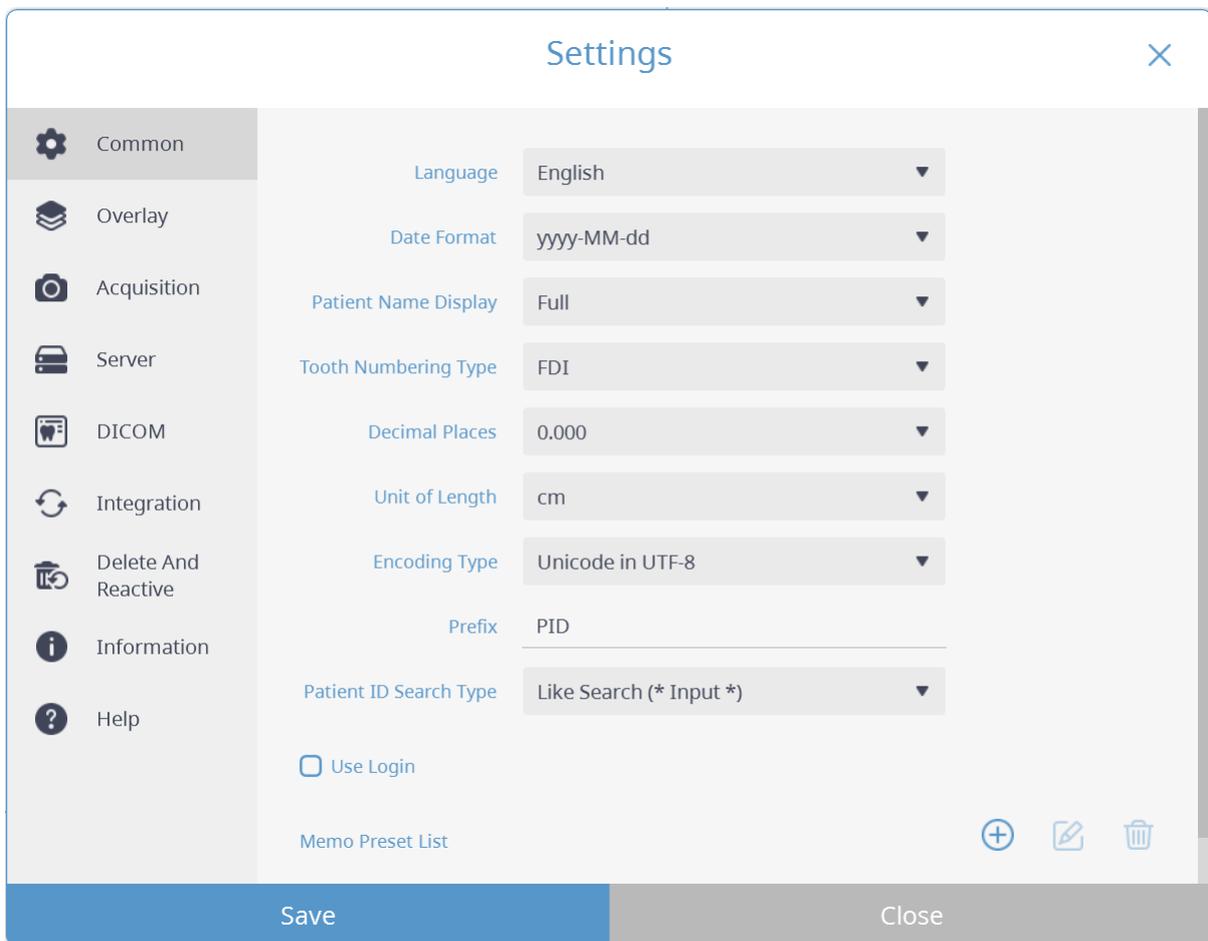


Fig 48 Common Settings

Item	Description
Language	Set language settings.
Date format	Set the date format.
Patient name display format	Change the patient name input and display format.
Tooth numbering method	Sets the display method of the tooth number displayed for each FMX position.
decimal point	Sets the number of decimal places for calculated values expressed as numbers.
Length unit	Set the length unit.

Encoding type	Set the encoding format according to the language setting for each country.
Patient ID prefix	Set the prefix of the patient ID.
Patient ID search type	Set the type when searching for the patient ID.
Whether to use login	Enable or disable login.
Notes prefix list	Set the prefix list when writing notes.

12.2 Overlay Color Settings

Set the color to be displayed in the video view. After selecting the color you want to change, select the desired color when the Windows palette is displayed.

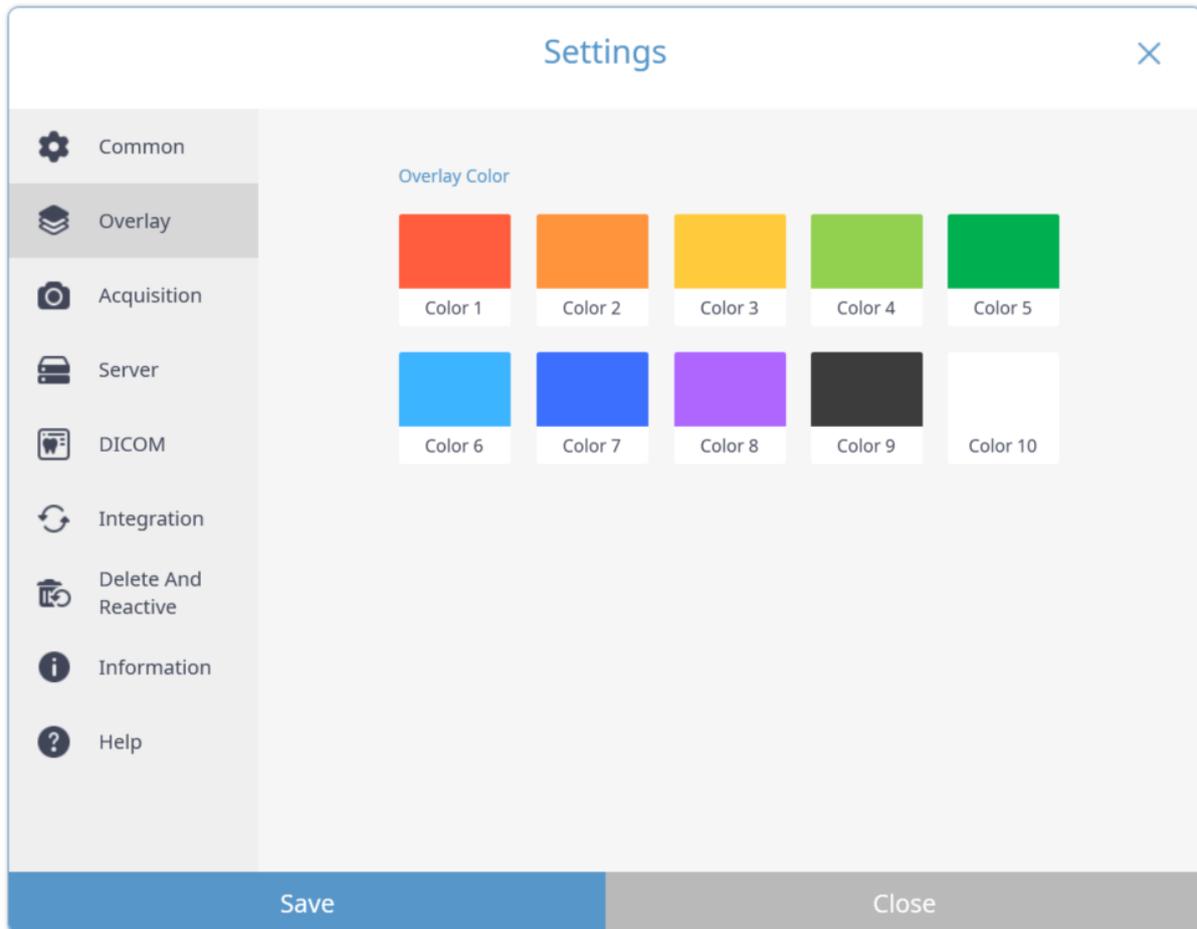


Fig 49 Overlay Settings

12.3 Acquisition Settings

You can set a list of small devices to be shot, auto start (Ready) settings, RIOSensor option settings, and RIOScan IP list.

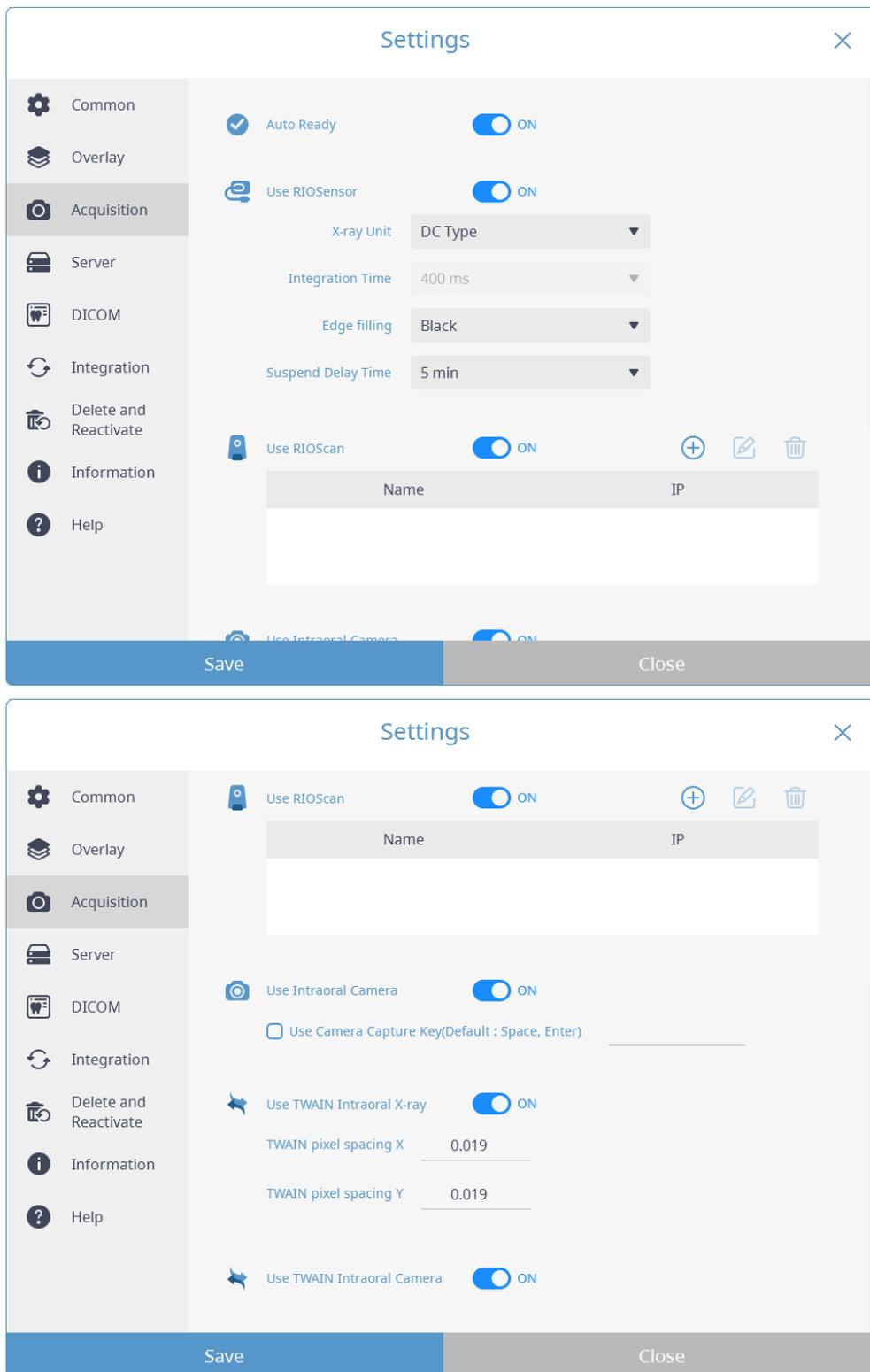


Fig 50 Acquisition Setting

	Item	Description
 Auto Ready	Auto connect	Set whether to automatically connect to the device when shooting is performed.
 Use RIOSensor	Using RIOSensor	Option to use RIOSensor.
RIOSensor Setting	X-ray Unit	Set whether the X-ray generator type is DC / AC.
	Integration Time	When using an AC type X-ray unit, set the time that adds 20% to the maximum X-ray irradiation time.
	Edge Filling	Set the color to fill the corners of the sensor.
	Sleep mode time	Set the waiting time to enter power saving mode to prevent fever.
	 Use RIOScan	Using RIOSensor
 Use Intraoral Camera	Oral camera use	Set whether to use the oral camera. In addition to 'Space' and 'Enter', set the key to be used for capture.
 Use TWAIN Intraoral X-ray	Using oral X-ray TWAIN	Set whether to use Oral X-ray TWAIN. Others Set the pixel size of the video of the TWAIN device.
 Use TWAIN Intraoral Camera	Using the oral camera TWAIN	Set whether to use the intraoral camera TWAIN.

12.4 Server Settings

Change the hospital name, hospital ledger name, and hospital logo image settings. When changing the server IP, be sure to check the connection to the server by selecting [Verify] button.

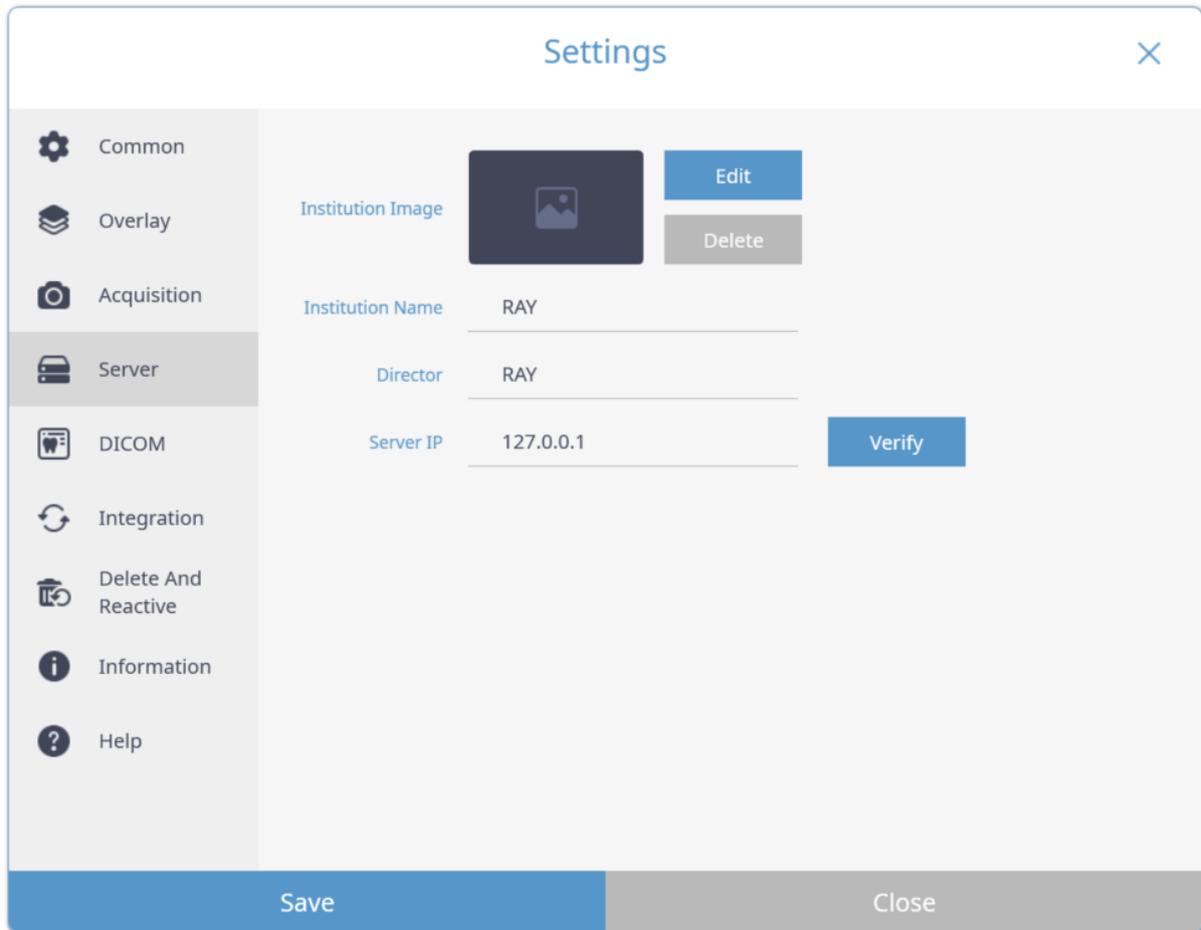


Fig 51 Server Settings

12.5 DICOM Setting

It supports MWL SCP for linking PACS and shooting list, Print SCP for DICOM Print, and Storage SCP for sending images to PACS. You can add / modify / delete SCP to each service.

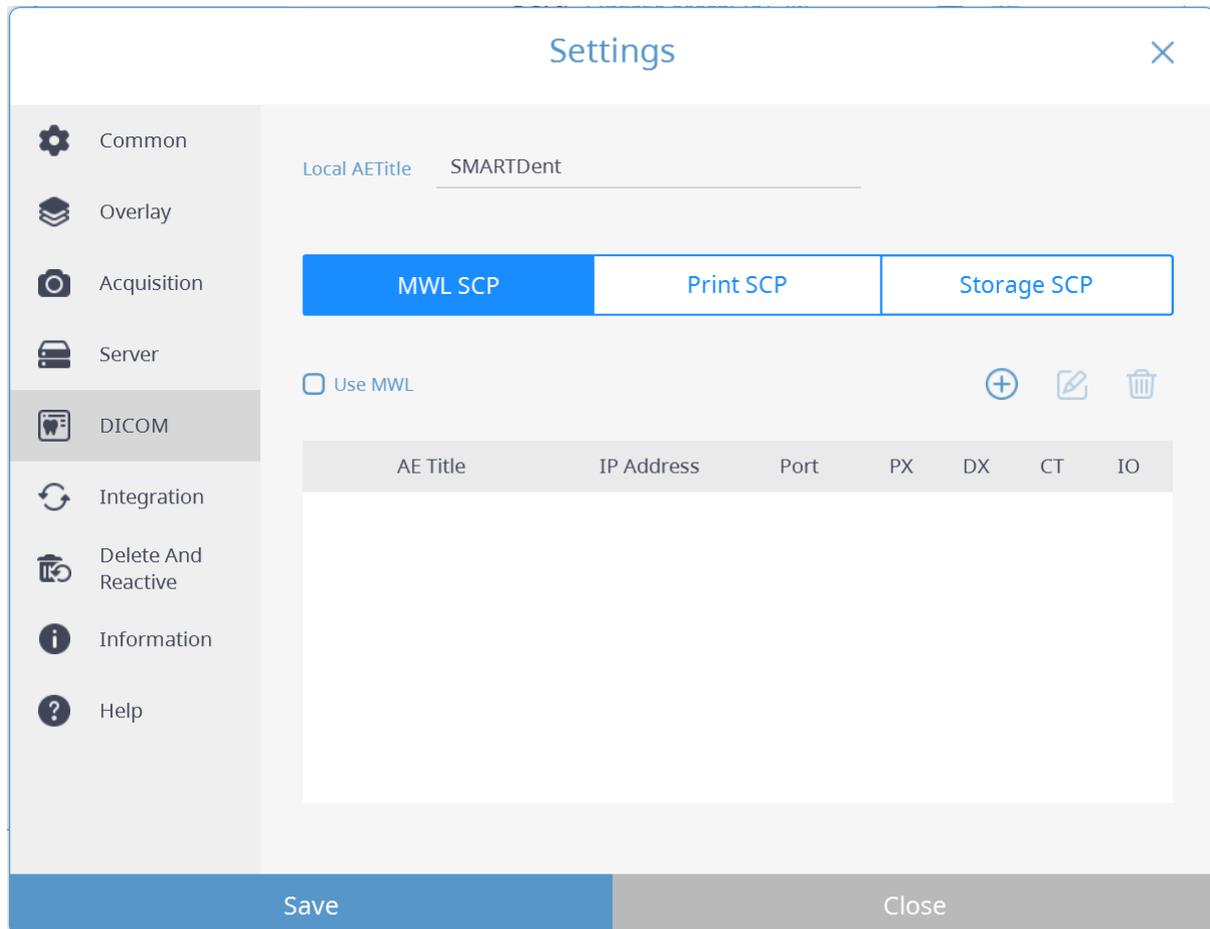
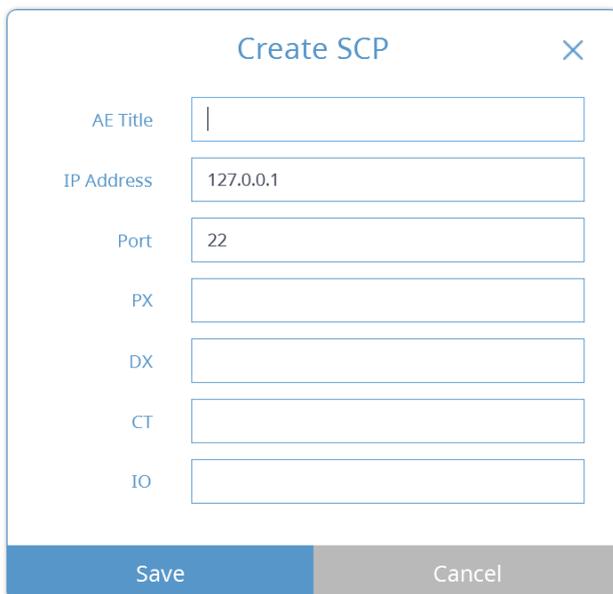


Fig 52 DICOM Settings

When the MWL SCP creation / editing window is displayed, set “AE Title”, “IP Address”, and “Port” and save. If a different modality name is used in PACS, you must enter that name for each modality.



The screenshot shows a 'Create SCP' dialog box with a close button (X) in the top right corner. The dialog contains several input fields: 'AE Title' (empty), 'IP Address' (127.0.0.1), 'Port' (22), 'PX' (empty), 'DX' (empty), 'CT' (empty), and 'IO' (empty). At the bottom, there are two buttons: 'Save' (highlighted in blue) and 'Cancel' (greyed out).

Fig 53 MWL SCP Settings

When creating and modifying Print SCP, the setting window is displayed as shown below. Set “AE Title”, “IP Address”, “Port” and “BitStored” and save



The screenshot shows a 'Create SCP' dialog box with a close button (X) in the top right corner. The dialog contains several input fields: 'AE Title' (Print_SCP), 'IP Address' (127.0.0.1), 'Port' (1200), and 'BitStored' (8). At the bottom, there are two buttons: 'Save' (highlighted in blue) and 'Cancel' (greyed out).

Fig 54 Print SCP Settings

When creating and modifying Storage SCP, the setting window is displayed as shown below. Set “AE Title”, “IP Address” and “Port” and save. Depending on the usage environment, you can use the settings of “automatic transmission”, “modality matching”, “user magnification setting”, and “use alternative tags for oral X-ray images”.

Fig 55 Storage SCP

12.6 Integration Setting

You can set the linked program supported by SMARTDent, and if you set the linked program according to the modality, the linked program menu is displayed when you select the image.

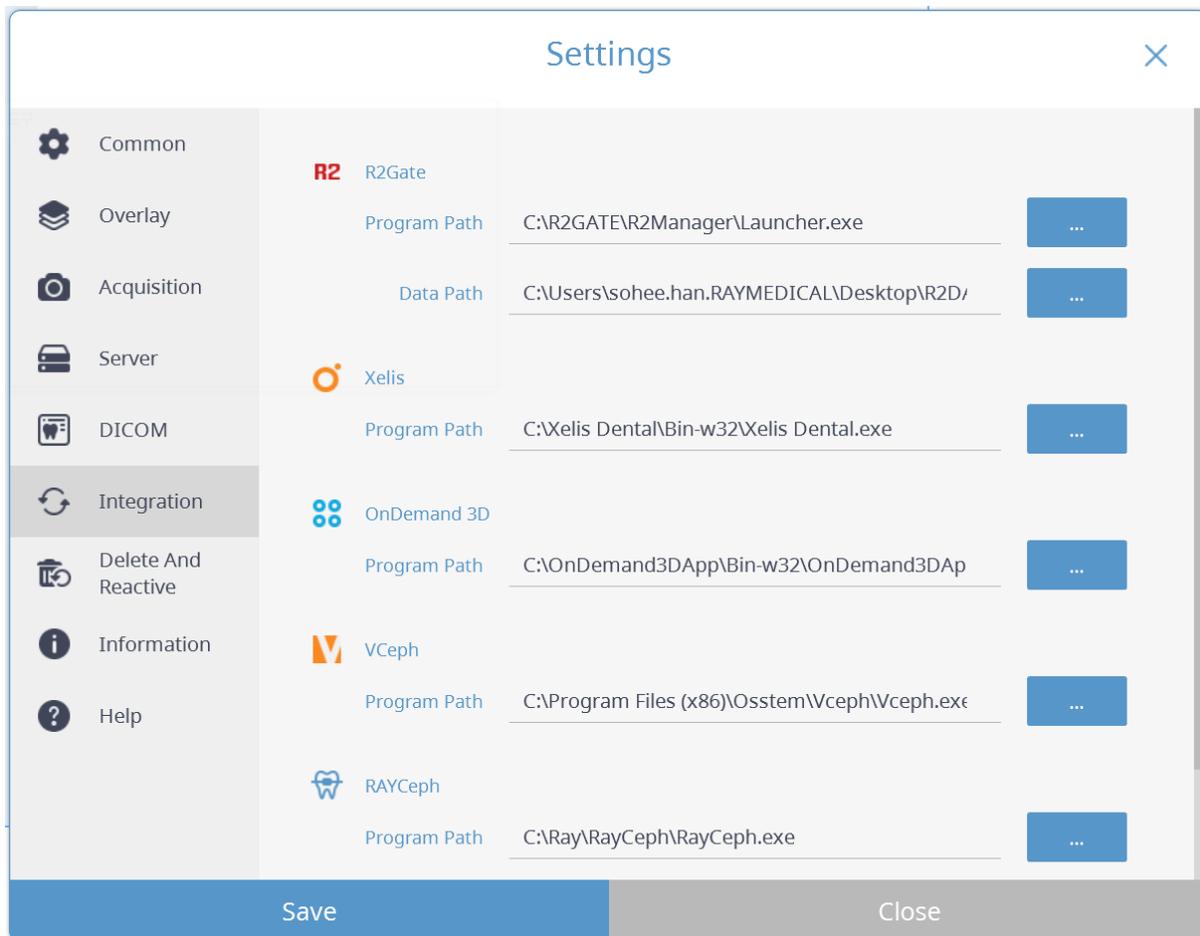


Fig 56 Integration Settings

Notice SMARTDent can add a link if it is possible to link through software path and data path settings. If it does not work even after the normal link setting, please contact the technical support center.

12.7 Patient, Image Information Activation and Deletion

When deleting a patient or image, SMARTDent does not search for the patient or image, but the server does not completely delete the data for later restoration. It displays the list of deleted patients or images and supports the function to restore selected patient or image information again or to delete them completely from the server.

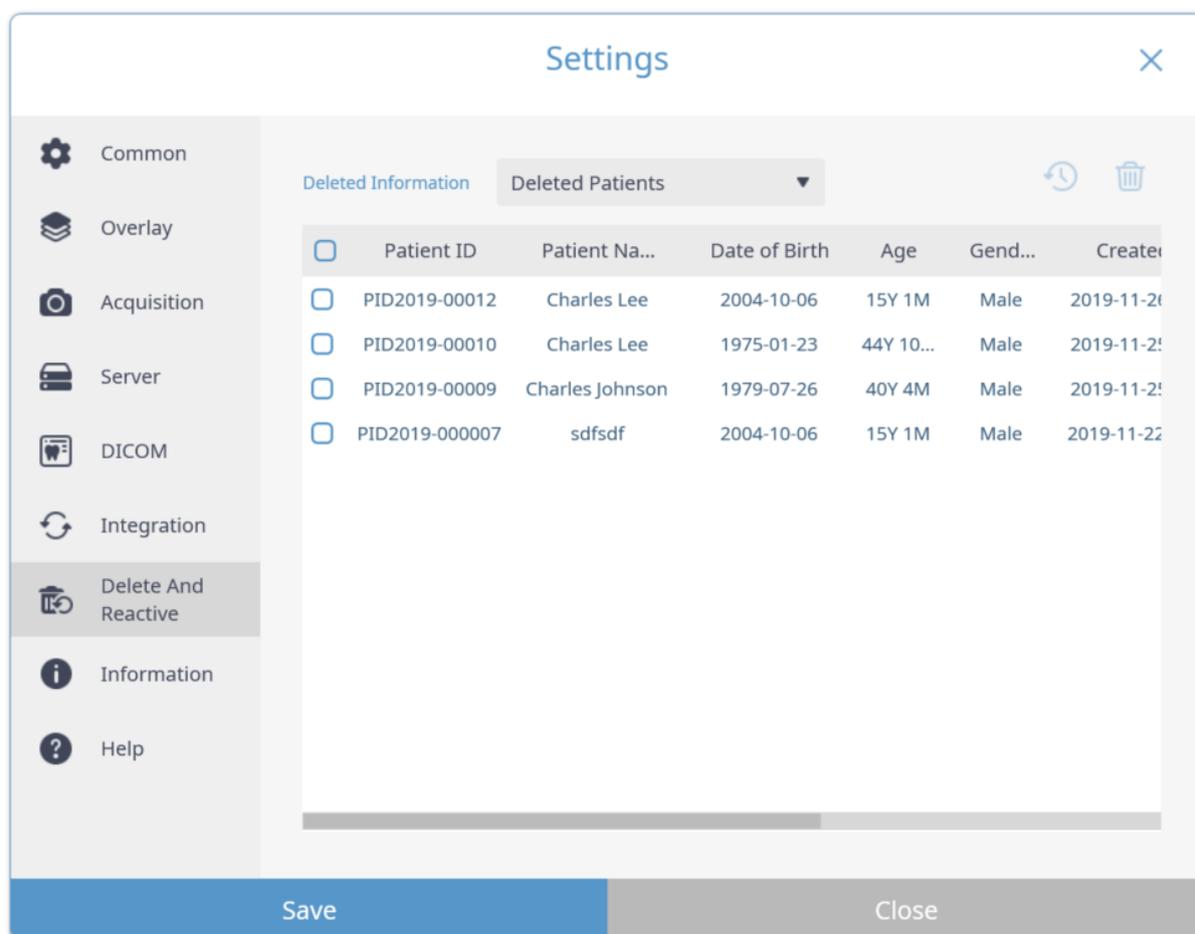
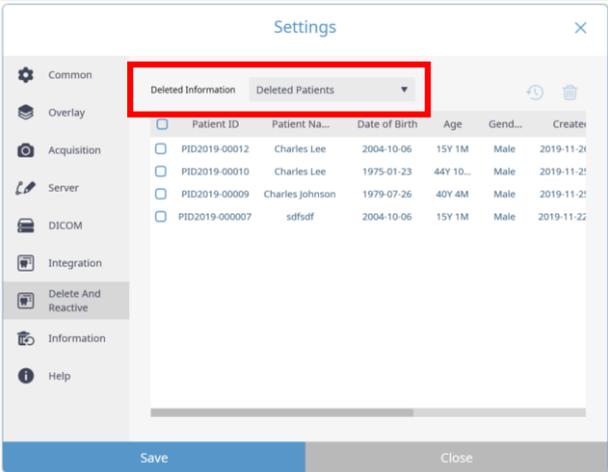
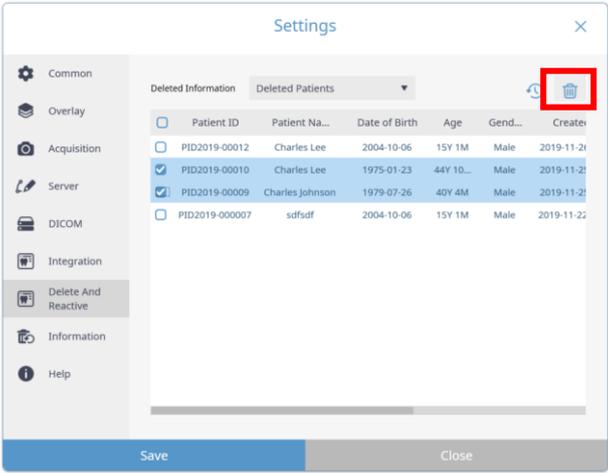
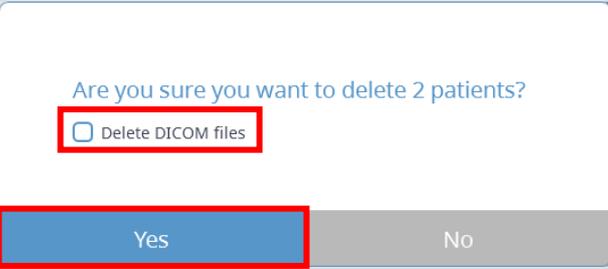
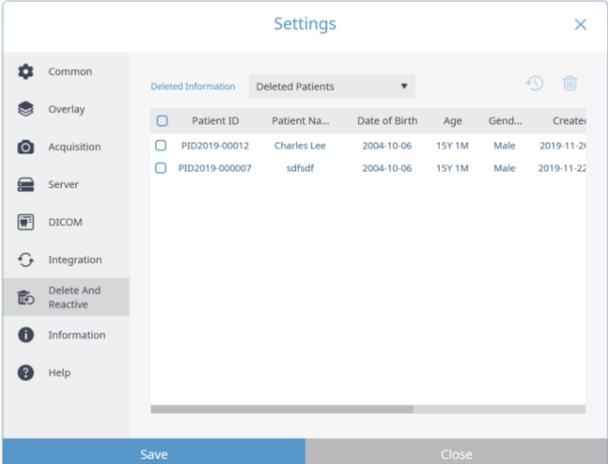
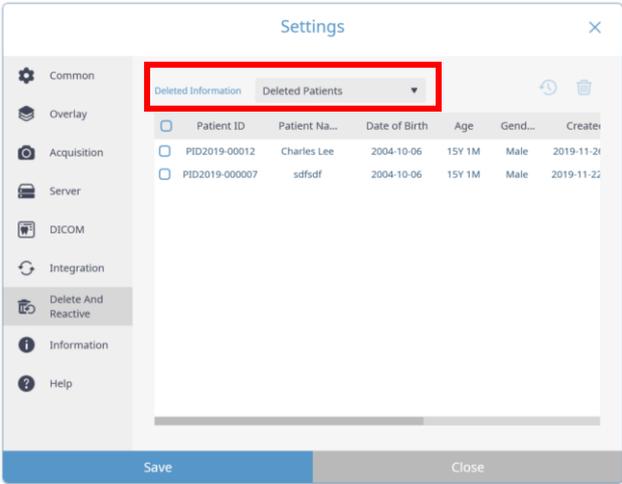
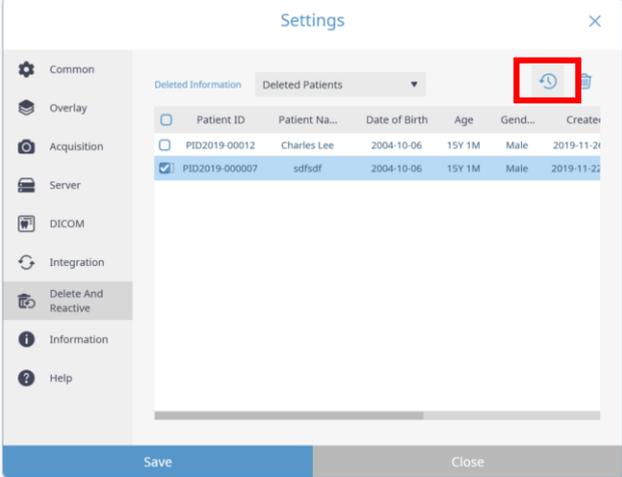
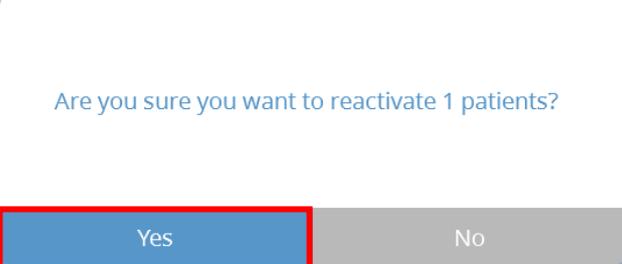


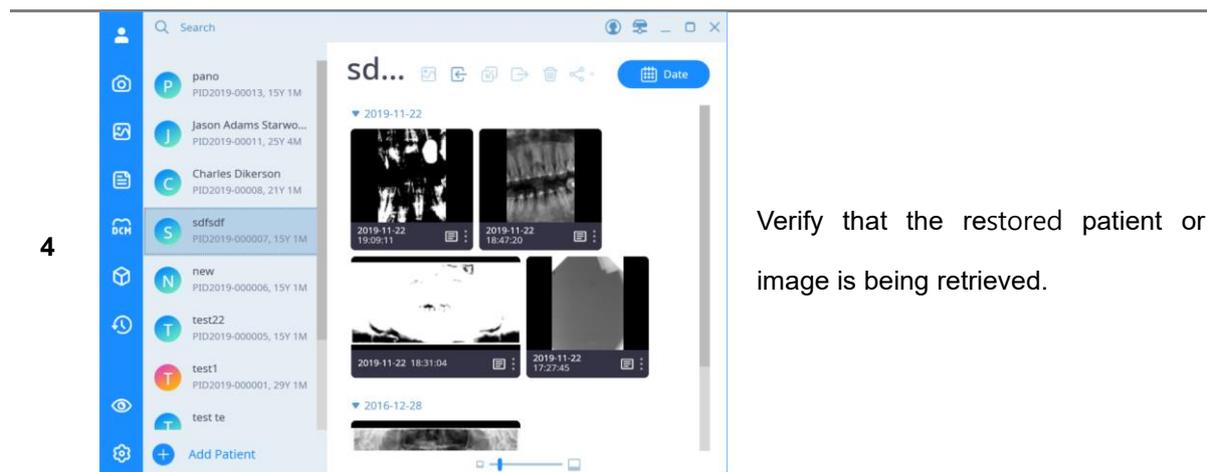
Fig 57 Delete and Restore Settings

Permanent Delete

No.	Figure	Description																																		
1		Select [Deleted patient] or [Deleted video] for 'Deleted information'.																																		
2	 <table border="1" data-bbox="443 884 880 1025"> <thead> <tr> <th>Patient ID</th> <th>Patient Na...</th> <th>Date of Birth</th> <th>Age</th> <th>Gend...</th> <th>Creates</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td>PID2019-00012</td> <td>Charles Lee</td> <td>2004-10-06</td> <td>15Y 1M</td> <td>Male</td> <td>2019-11-21</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>PID2019-00010</td> <td>Charles Lee</td> <td>1975-01-23</td> <td>44Y 10...</td> <td>Male</td> <td>2019-11-21</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>PID2019-00009</td> <td>Charles Johnson</td> <td>1979-07-26</td> <td>40Y 4M</td> <td>Male</td> <td>2019-11-21</td> </tr> <tr> <td><input type="checkbox"/></td> <td>PID2019-00007</td> <td>sdfsdf</td> <td>2004-10-06</td> <td>15Y 1M</td> <td>Male</td> <td>2019-11-22</td> </tr> </tbody> </table>	Patient ID	Patient Na...	Date of Birth	Age	Gend...	Creates	<input type="checkbox"/>	PID2019-00012	Charles Lee	2004-10-06	15Y 1M	Male	2019-11-21	<input checked="" type="checkbox"/>	PID2019-00010	Charles Lee	1975-01-23	44Y 10...	Male	2019-11-21	<input checked="" type="checkbox"/>	PID2019-00009	Charles Johnson	1979-07-26	40Y 4M	Male	2019-11-21	<input type="checkbox"/>	PID2019-00007	sdfsdf	2004-10-06	15Y 1M	Male	2019-11-22	Select patient information or image information and click the [Delete] button at the top.
Patient ID	Patient Na...	Date of Birth	Age	Gend...	Creates																															
<input type="checkbox"/>	PID2019-00012	Charles Lee	2004-10-06	15Y 1M	Male	2019-11-21																														
<input checked="" type="checkbox"/>	PID2019-00010	Charles Lee	1975-01-23	44Y 10...	Male	2019-11-21																														
<input checked="" type="checkbox"/>	PID2019-00009	Charles Johnson	1979-07-26	40Y 4M	Male	2019-11-21																														
<input type="checkbox"/>	PID2019-00007	sdfsdf	2004-10-06	15Y 1M	Male	2019-11-22																														
3		Click the [Yes] button to permanently delete patient information or image information. You can set whether to delete the image file (DICOM) when deleting the patient.																																		
4		Check for permanently deleted patients or images.																																		

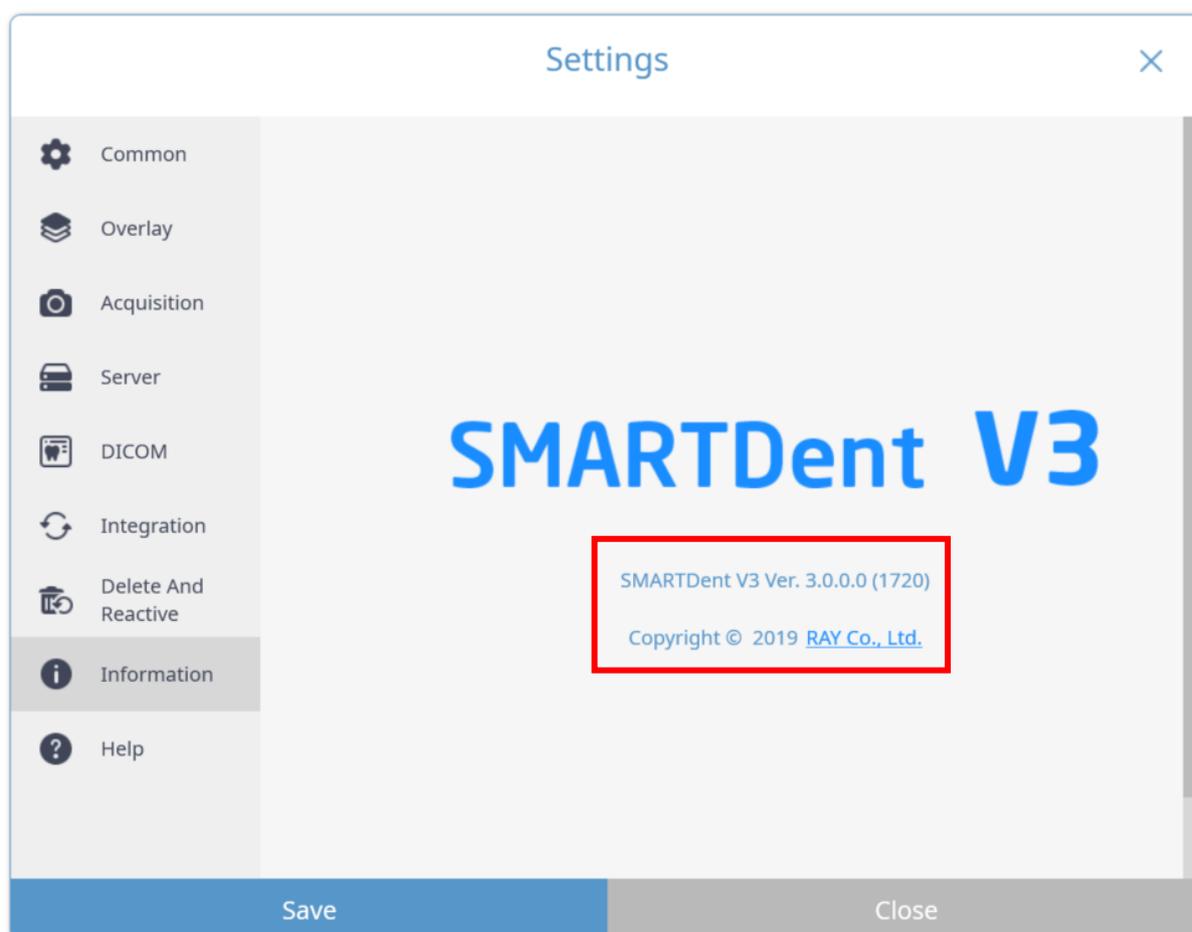
Restore

No.	Figure	Description																		
1	 <table border="1" data-bbox="438 459 885 537"> <thead> <tr> <th>Patient ID</th> <th>Patient Na...</th> <th>Date of Birth</th> <th>Age</th> <th>Gen...</th> <th>Created</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> PID2019-00012</td> <td>Charles Lee</td> <td>2004-10-06</td> <td>15Y 1M</td> <td>Male</td> <td>2019-11-21</td> </tr> <tr> <td><input type="checkbox"/> PID2019-000007</td> <td>sdfsf</td> <td>2004-10-06</td> <td>15Y 1M</td> <td>Male</td> <td>2019-11-22</td> </tr> </tbody> </table>	Patient ID	Patient Na...	Date of Birth	Age	Gen...	Created	<input type="checkbox"/> PID2019-00012	Charles Lee	2004-10-06	15Y 1M	Male	2019-11-21	<input type="checkbox"/> PID2019-000007	sdfsf	2004-10-06	15Y 1M	Male	2019-11-22	Set 'Deleted Information' to [Deleted Patient] or [Deleted Image].
Patient ID	Patient Na...	Date of Birth	Age	Gen...	Created															
<input type="checkbox"/> PID2019-00012	Charles Lee	2004-10-06	15Y 1M	Male	2019-11-21															
<input type="checkbox"/> PID2019-000007	sdfsf	2004-10-06	15Y 1M	Male	2019-11-22															
2	 <table border="1" data-bbox="438 952 885 1030"> <thead> <tr> <th>Patient ID</th> <th>Patient Na...</th> <th>Date of Birth</th> <th>Age</th> <th>Gen...</th> <th>Created</th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> PID2019-00012</td> <td>Charles Lee</td> <td>2004-10-06</td> <td>15Y 1M</td> <td>Male</td> <td>2019-11-21</td> </tr> <tr> <td><input checked="" type="checkbox"/> PID2019-000007</td> <td>sdfsf</td> <td>2004-10-06</td> <td>15Y 1M</td> <td>Male</td> <td>2019-11-22</td> </tr> </tbody> </table>	Patient ID	Patient Na...	Date of Birth	Age	Gen...	Created	<input type="checkbox"/> PID2019-00012	Charles Lee	2004-10-06	15Y 1M	Male	2019-11-21	<input checked="" type="checkbox"/> PID2019-000007	sdfsf	2004-10-06	15Y 1M	Male	2019-11-22	Select the patient or image information to restore and click the [Reactive] button at the top.
Patient ID	Patient Na...	Date of Birth	Age	Gen...	Created															
<input type="checkbox"/> PID2019-00012	Charles Lee	2004-10-06	15Y 1M	Male	2019-11-21															
<input checked="" type="checkbox"/> PID2019-000007	sdfsf	2004-10-06	15Y 1M	Male	2019-11-22															
3	 <p>Are you sure you want to reactivate 1 patients?</p> <p><input checked="" type="button" value="Yes"/> <input type="button" value="No"/></p>	Click the [Yes] button to proceed with the restoration.																		



12.8 Program Information

You can check the version information and copyright information of the current program. Click the link to go to the RAY website.



12.9 Help

SMARTDent V3 provides video manuals. You can watch the manual of the function in videos on Youtube.

