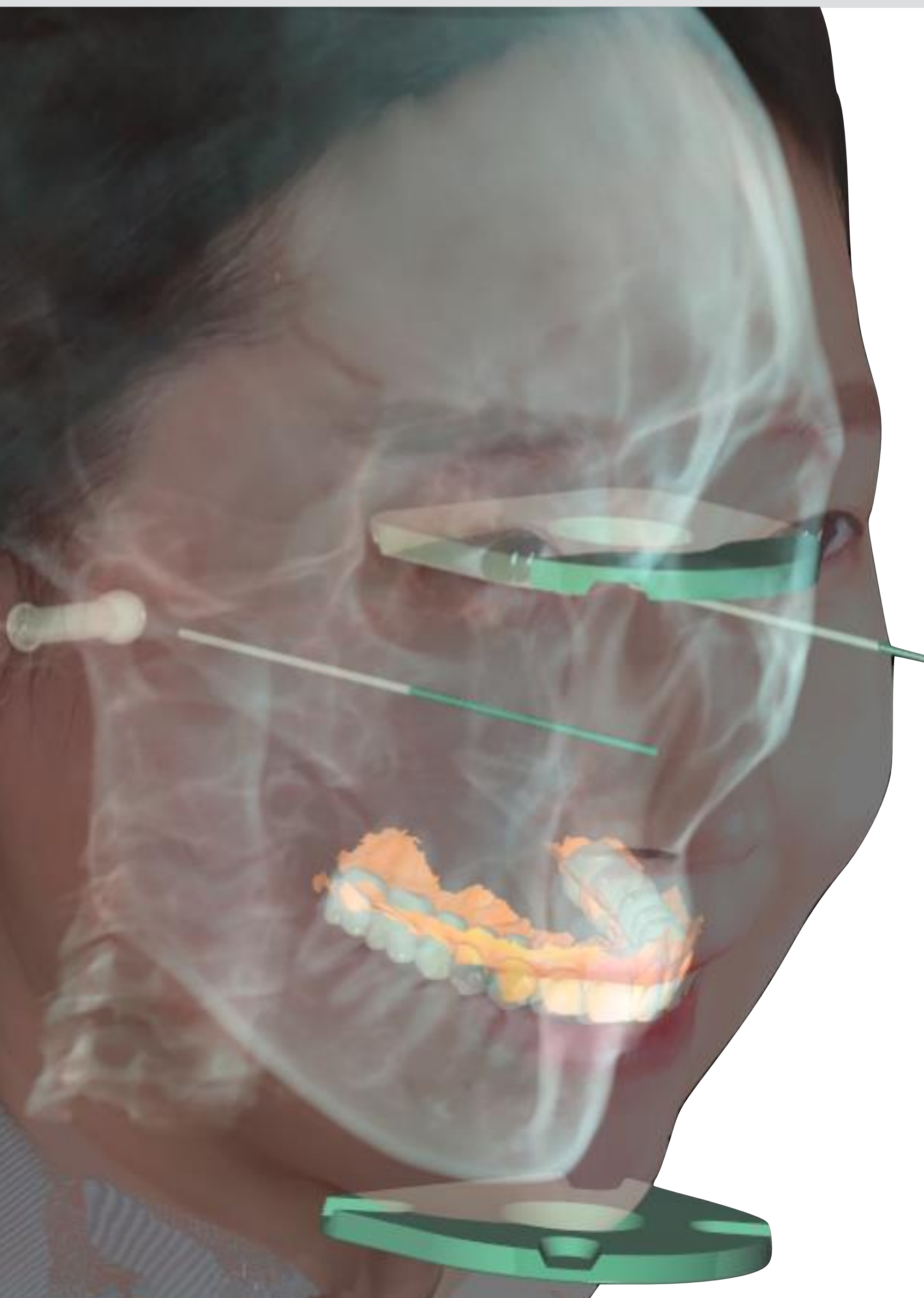




# R2GATE™ 2.0

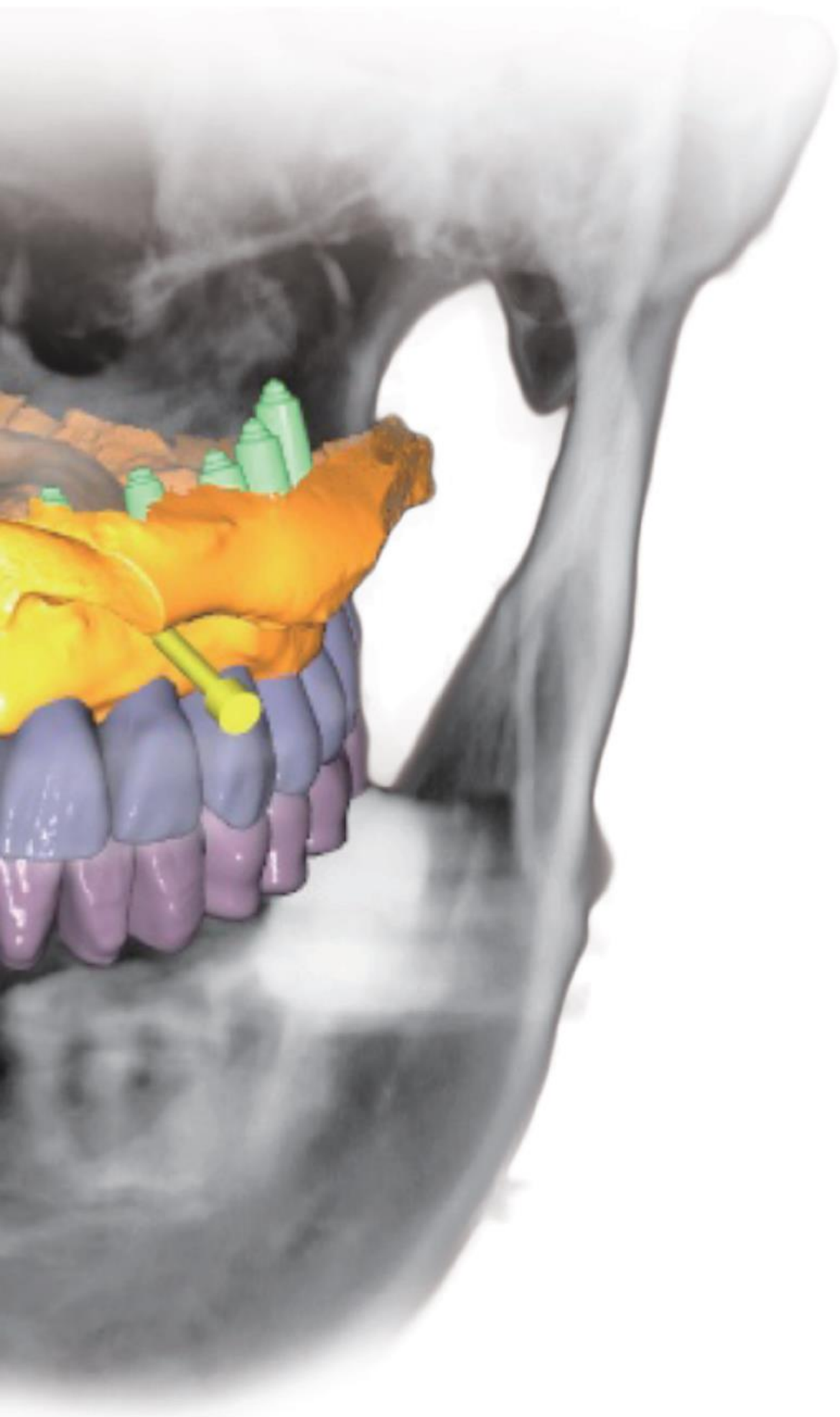
## Appendix



# INDEX

# R2GATE™

Turning imagination into reality  
since 2012



## About R2 GATE™ Appendix

### 1. Chair-side(clinic) preparation

- 1.1 CBCT & model
- 1.2 R2 Tray preparation
- 1.3 Taking CBCT

### 2. Lab-side preparation

- 2.1 Model scan procedure for R2GATE
- 2.2 R2CAD diagnostic wax-up

### 3. R2GATE Lite™

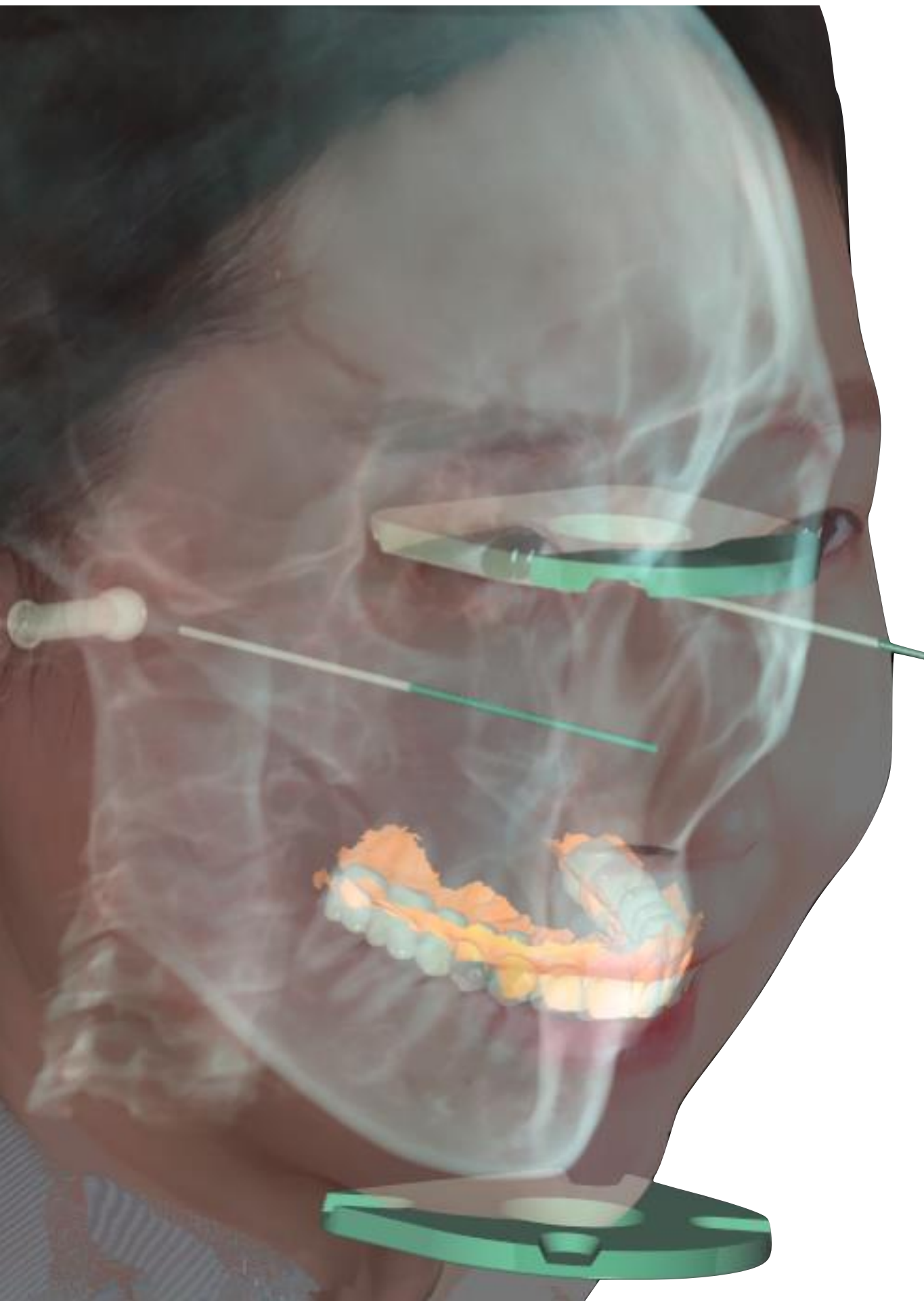
- 3.1 Introduction
- 3.2 Installation
- 3.3 How to use
- 3.4 Backup
- 3.5 Restore

### 4. Trouble shooting

- 4.1 Trouble shooting

**R2GATE™**

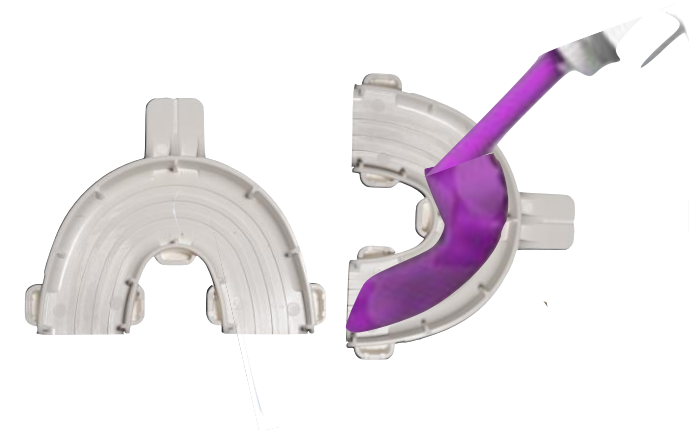
Turning imagination into reality



# 1 Chair-side (clinic) Preparation

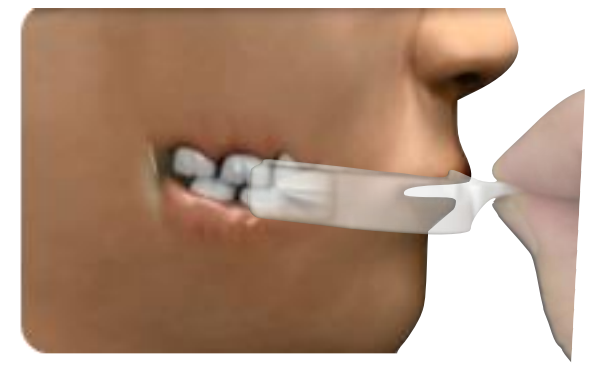
## Taking CBCT

Prepare R2Tray



Inject bite material evenly into R2 Tray: rigid or heavy-body impression material is recommended

Seat R2Tray



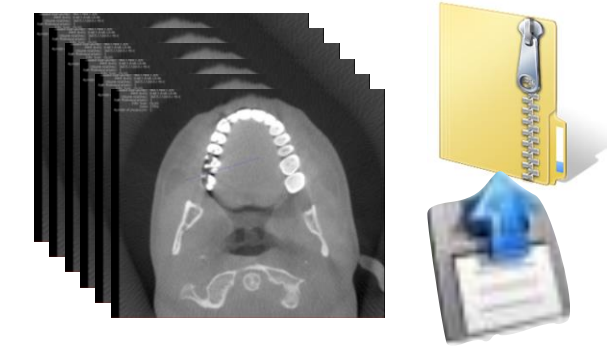
Seat R2 Tray in patient's mouth with impression side facing implant site

Take CBCT



Take CBCT with patient biting R2 Tray: do NOT bite CBCT machine bite block

Convert to DICOM



Convert CBCT to DICOM format (100-500 DCM files depending on FOV)

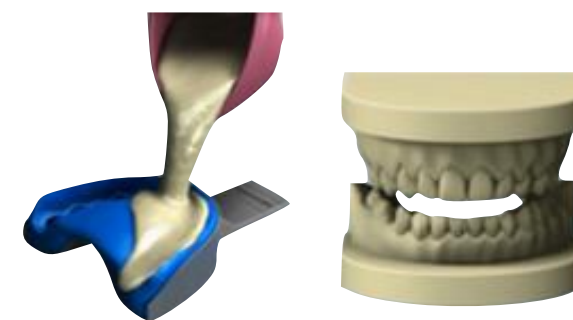
## Model fabrication

Take impression



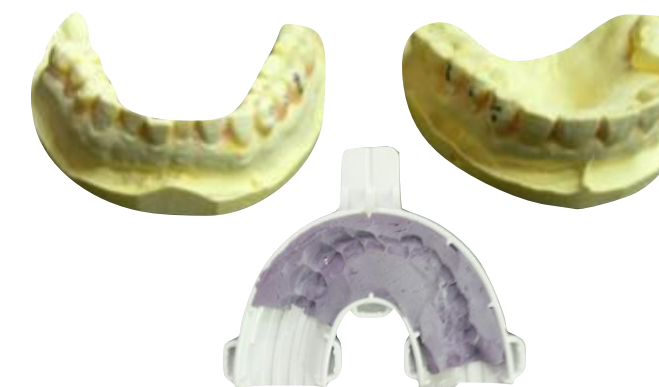
Take impressions of implant & antagonist sites using alginate or rubber material

Fabricate model



Pour gypsum into tray immediately after impression hardens...be aware of gypsum P/W ratio & working time to prevent distortion

Check model



Check stone model for any distortion or damage

Scan or Ship



Scan stone model & R2 Tray from CBCT using R2 scan protocol or ship both to local R2 Centre

# 1.2 Chair-side (clinic) R2 Tray preparation



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## R2 Tray? when? why?

**R2 Tray provides key index to superimpose CBCT & model scan file(STL)...**

As a result, R2GATE shows all skeletal information from CBCT + anatomical information of oral cavity (teeth, gingival form, occlusion)



R2 Tray provides radiographic index for CBCT image

! R2 Tray is NOT regular bite registration

**Natural teeth arch**

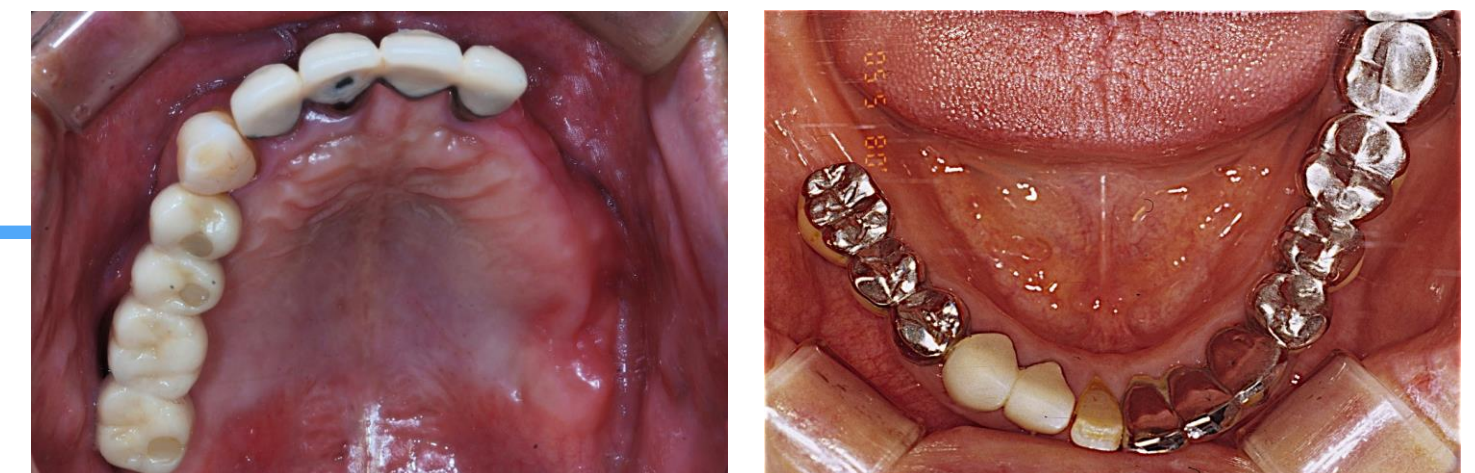
**No  
R2 Tray**



- Outline of natural teeth around (mesiodistal) implant site is used to merge CBCT & model scan file (STL)
- 1~2 natural teeth on opposite site are used for accurate merging

**Prostheses  
or  
partially edentulous arch**

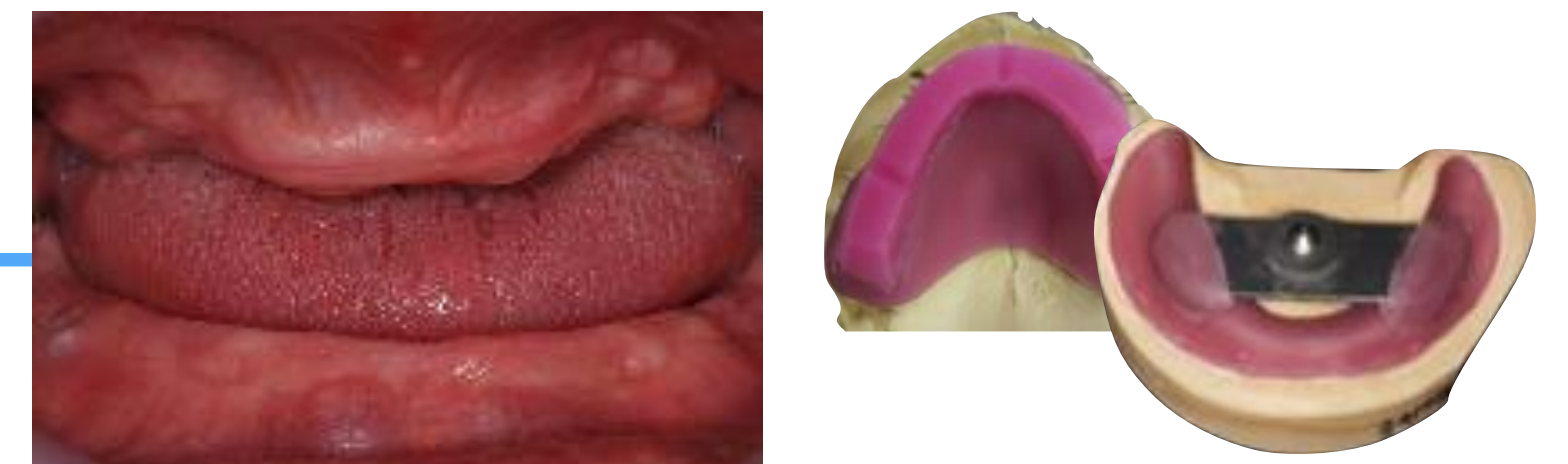
**Yes  
R2 Tray**



- R2 Tray is required due to lack of index from natural teeth or scanning interference from metal prosthetics

**Fully or partially edentulous arch**

**Yes  
Customized  
R2 Tray**



- Take alginate impression & make stone model
- Customized R2 Tray is then fabricated by R2 Centre after receiving stone model

# 1.2 Chair-side (clinic) R2 Tray preparation



CBCT & model



R2 Tray  
preparation



Taking CBCT

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Radiopaque  
material



Use light-curing  
preformed tray  
base material

Most light-curing materials are  
radiopaque & show clearly on CBCT



**Send stone model to R2 Center  
for fabrication of customized R2 Tray**

Made by R2 Center

1

Model &  
block-out



## Model

- Take alginate impression & make stone model
- Check stone model for any distortion or damage
- Draw outline of tray base

## Block-out

- Block-out undercut of model using paraffin wax or utility wax
- Spread separating cream or oil on surface to prevent sticking with tray resin

2

Light-curing  
resin base



- Spread preformed tray resin on model & trim superfluous parts using knife
- Cure using light-curing machine & separate from model
- Trim any sharp edges

3

Build wax rim



- Build wax rim on tray base for relationship between upper & lower jaws
- Standard height of wax rim  
upper: 22mm  
lower: 18mm
- Make retention form for bite materials

4

Fitting



- Seat customized R2 Tray in patient's mouth & adjust wax rim height
- Mark mid-line & canine position on wax rim for wax-up & teeth arrangement

5

CBCT scan



- Take CBCT while patient is biting customized R2 Tray



- Export multi-frame DICOM files

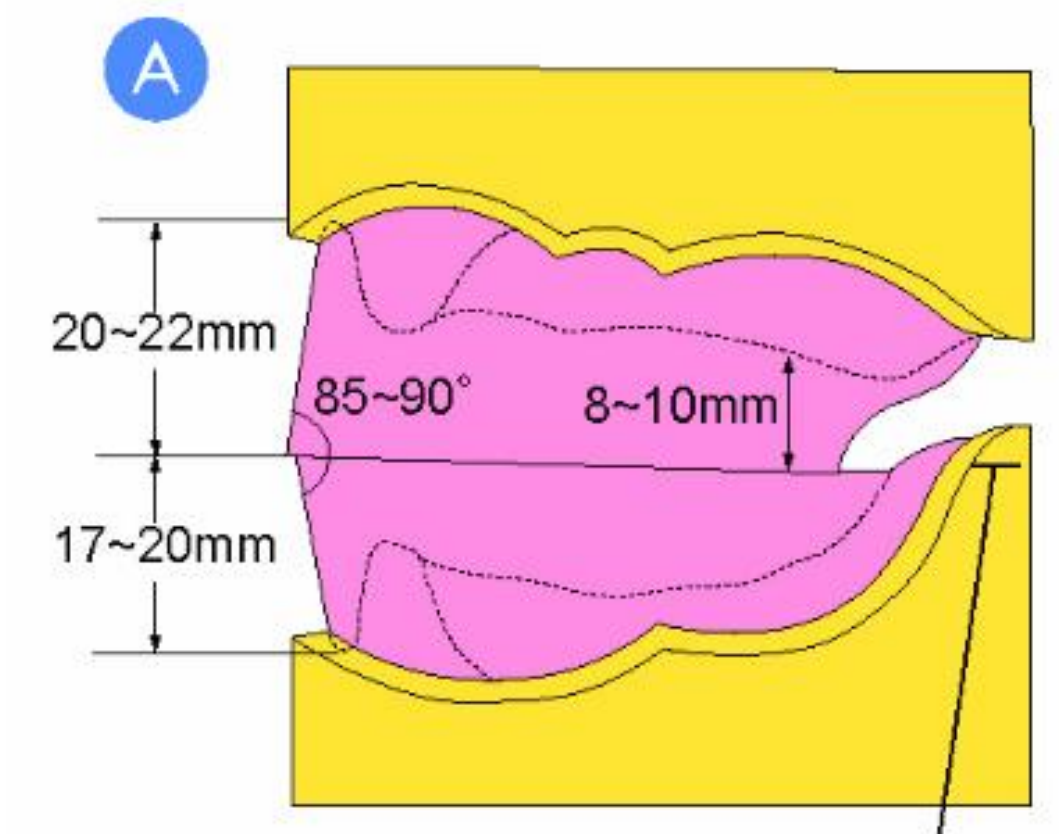
# 1.2 Chair-side (clinic) R2 Tray preparation



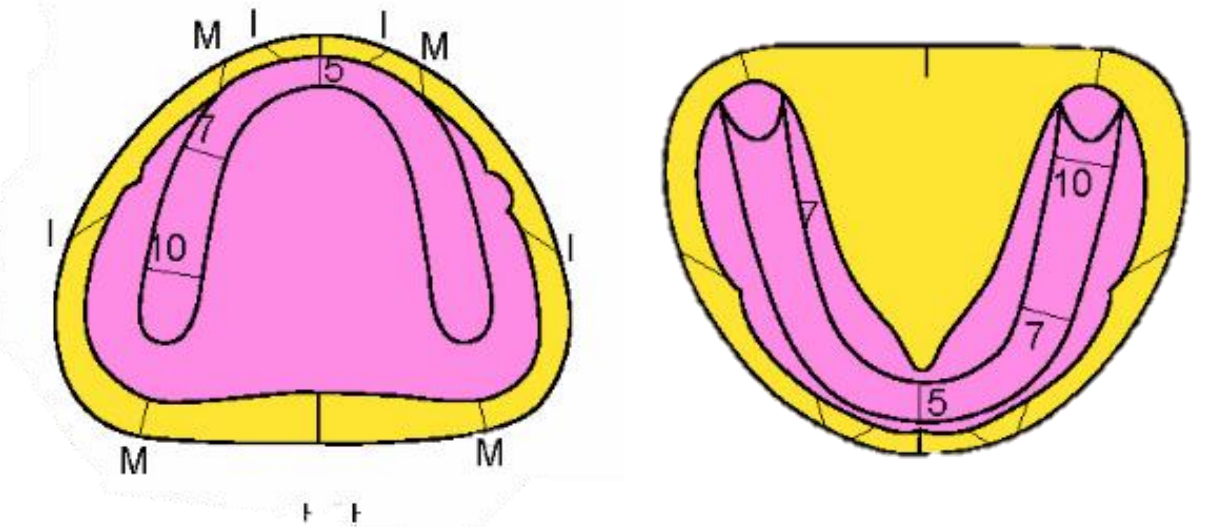
## Examples of customized R2 Trays



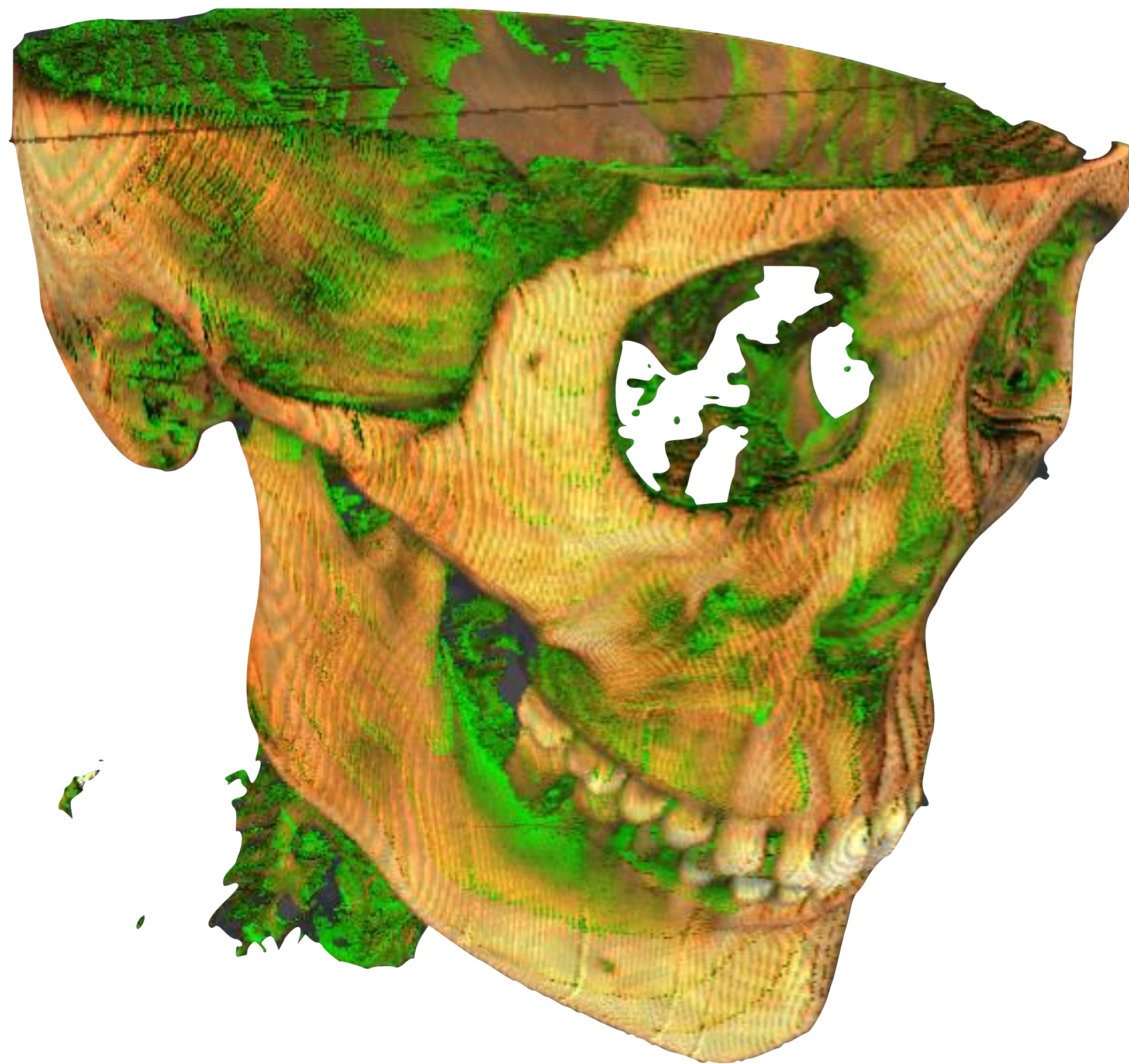
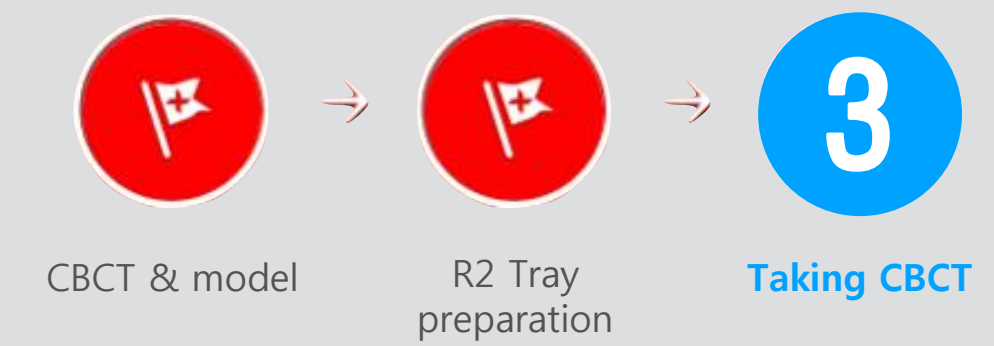
Form rim using paraffin wax according to normal Full denture standards



2/3 or 1/2 height of retromolar pad



# 1.3 Chair-side (clinic) CBCT check points!



## Any kind of CBCT is OK

### FOV (Field Of View )

Angle through which detector is sensitive to electromagnetic radiation

### FOV for R2GATE

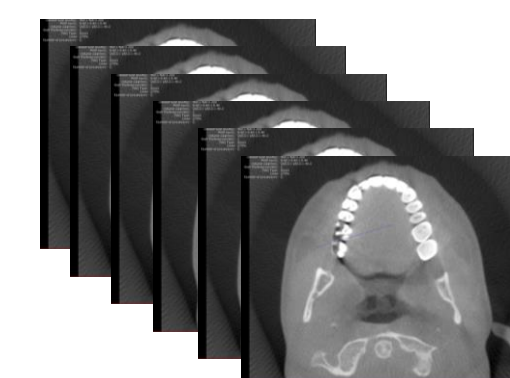
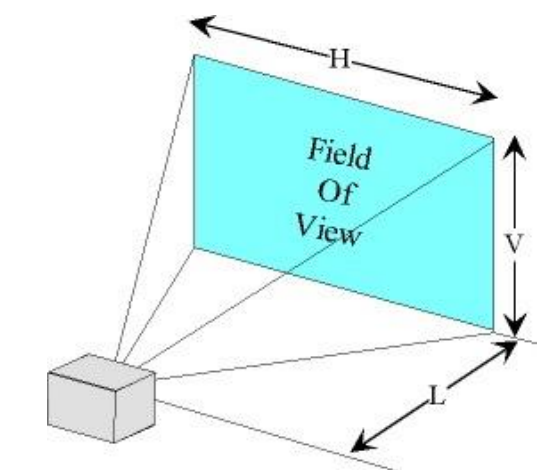
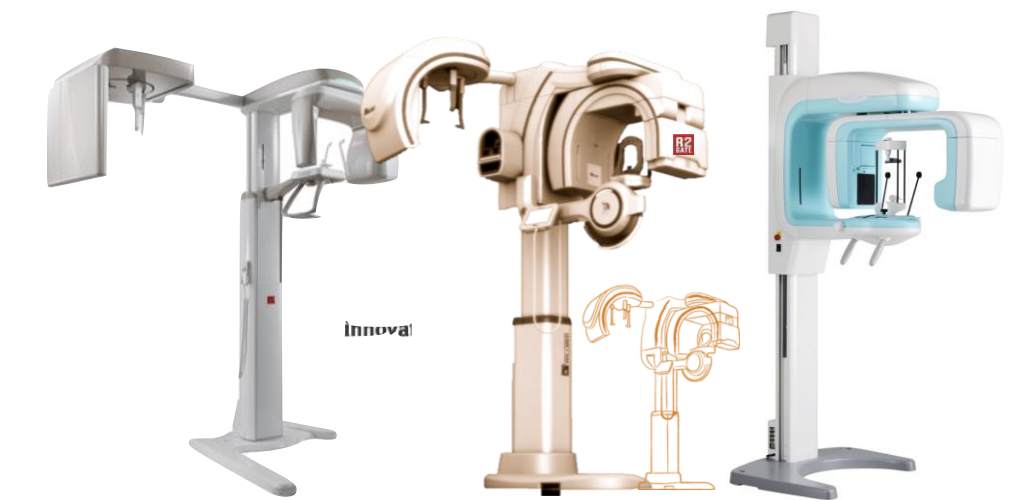
- 5 x 5 only in limited cases
- Over 8 x 8 recommended for R2GATE diagnosis
- Over 17 x 11 required for cephalo-facial analysis
  - 5 x 5: partial arch of one jaw (¼ arch)
  - 8 x 8: full or partial arch of both jaws
  - 10 x 10: full arch of both jaws
  - 17 x 13.5: full face

### Multi-frame DICOM files only

- R2GATE only works with multi-frame DICOM file
- Convert CBCT data to multi-frame DICOM file (NOT single DICOM file)
- In case of problems, contact CBCT services

Multi-frame DICOM file includes 100 ~500 single slice files according to FOV

## Cone Beam CT



Multi-frame DICOM



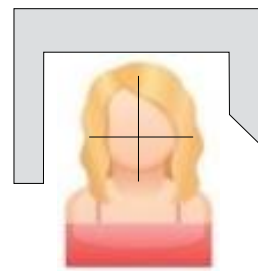
CBCT &amp; model

R2 Tray  
preparation

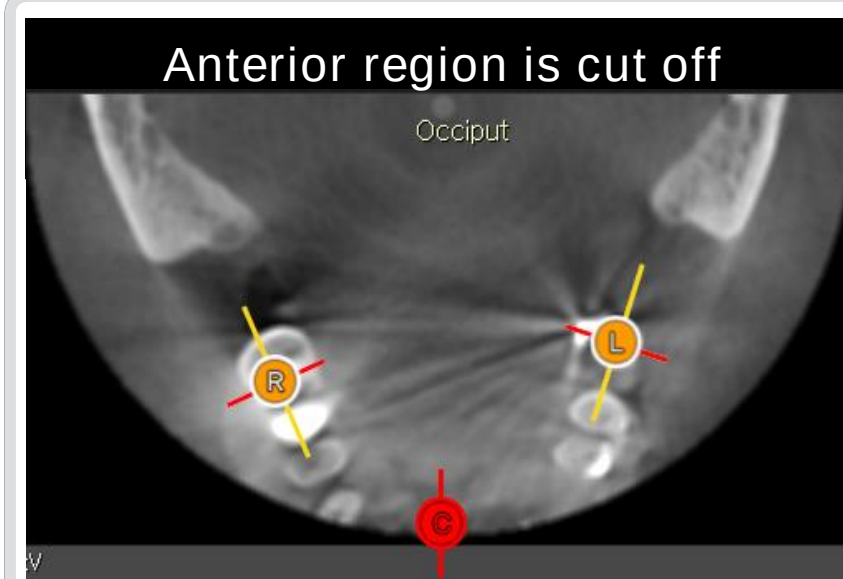
Taking CBCT

## Check points when taking CBCT

Position

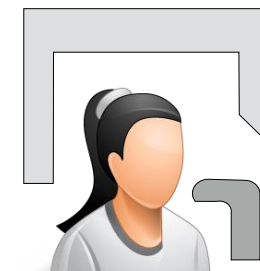


CBCT range error



Incorrect patient position or CBCT setting error can cause insufficient coverage of implant area

No biting!



Use chin holder

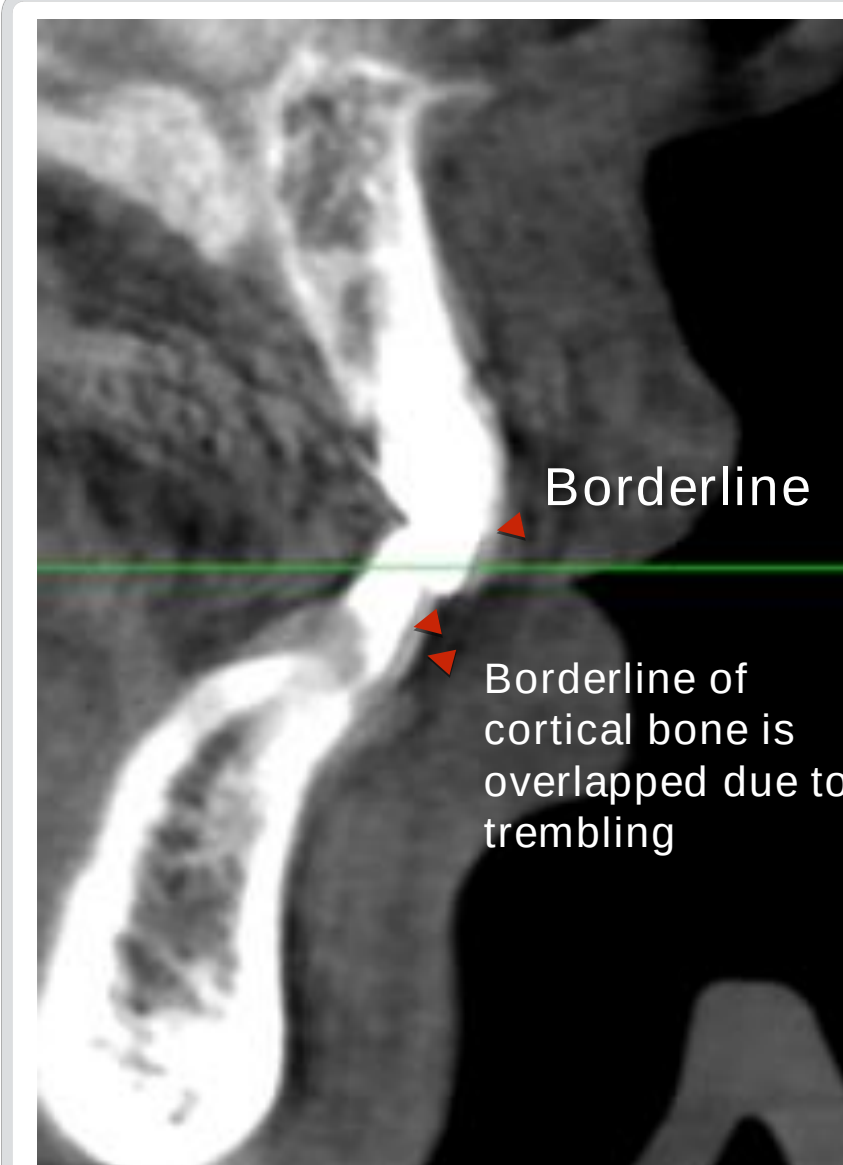


- When taking CBCT with R2 Tray, patient should avoid biting CBCT bite block, as this tilts & separates R2 Tray from residual ridge
- Use chin holder to fix patient's head

Trembling

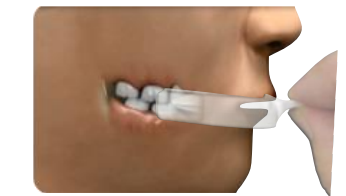


Movement error

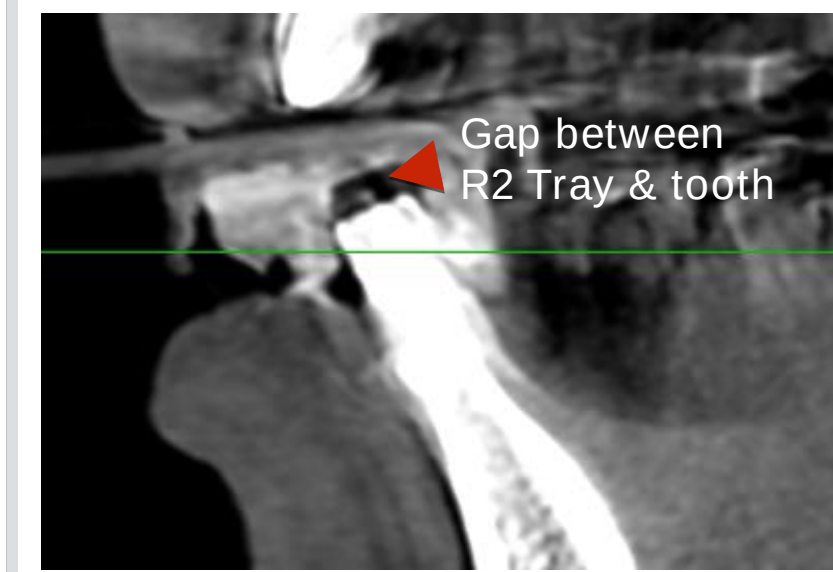


Patient movement during scanning or sensor error can cause trembling in final CBCT scan

R2 Tray



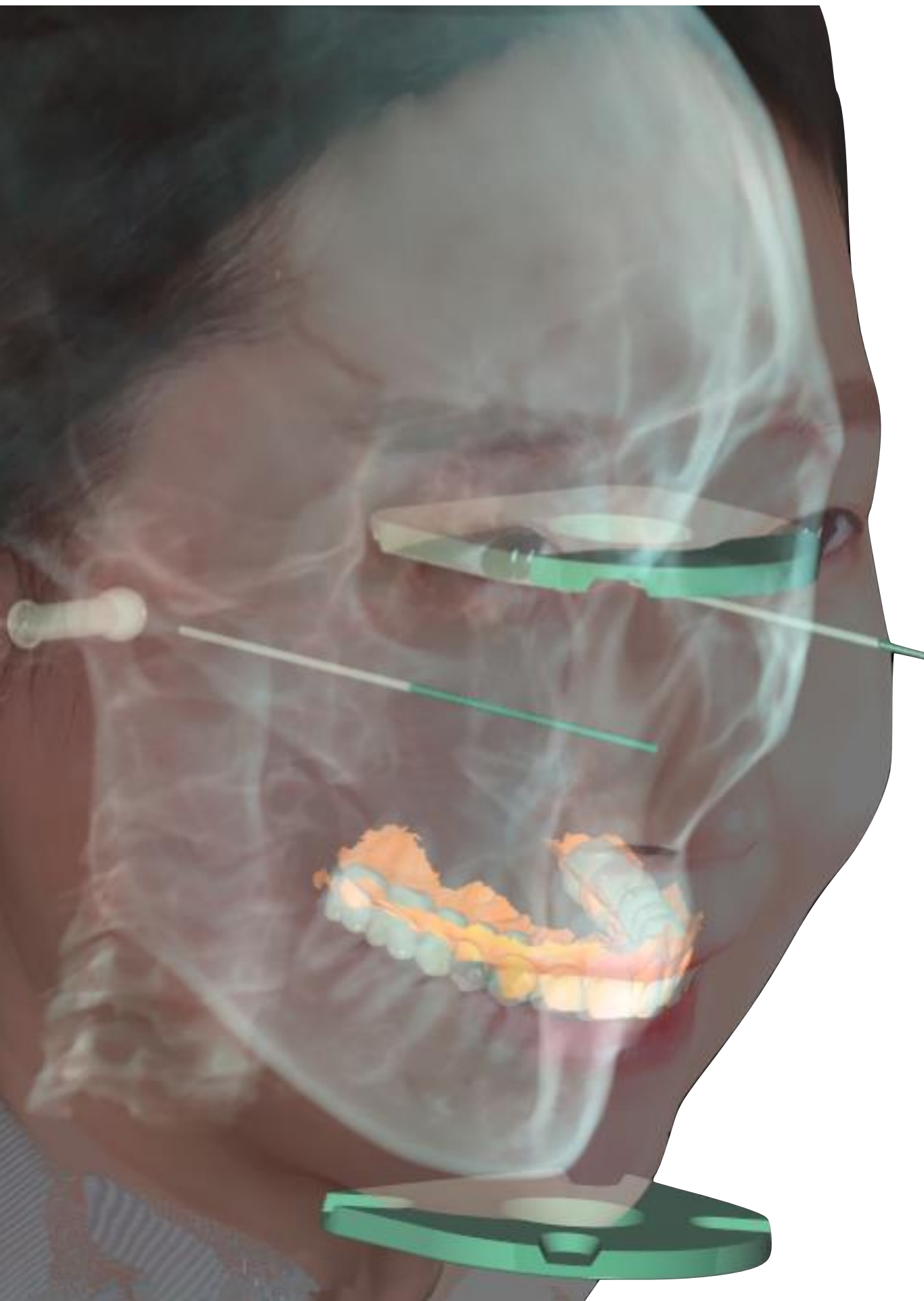
R2 Tray fitting error



- Exceptional bite force can detach R2 Tray
- All teeth & residual ridge should be covered by R2 Tray

**R2GATE™**

Turning imagination into reality



## 2 Lab-side Preparation

# 2.1 Lab-side Model scan protocol



Model scan protocol



Diagnostic wax-up

R2  
GATE

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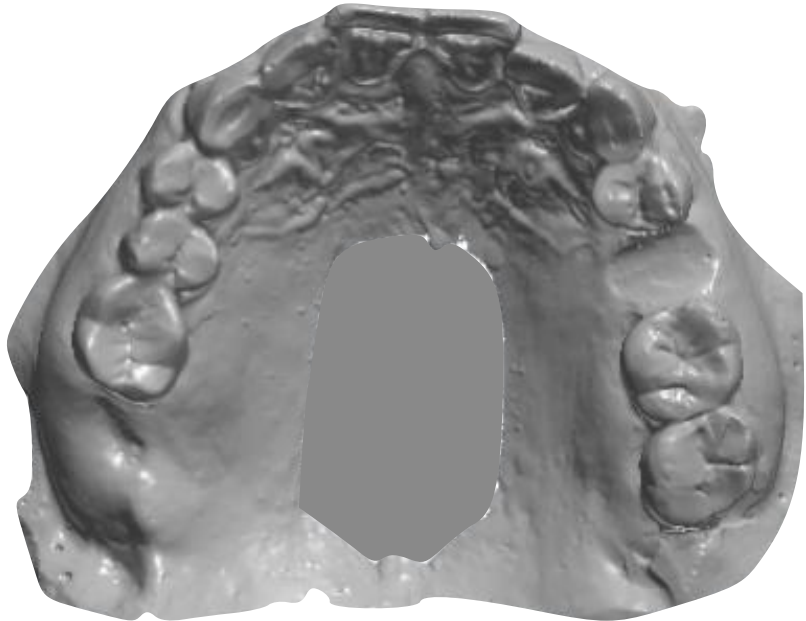
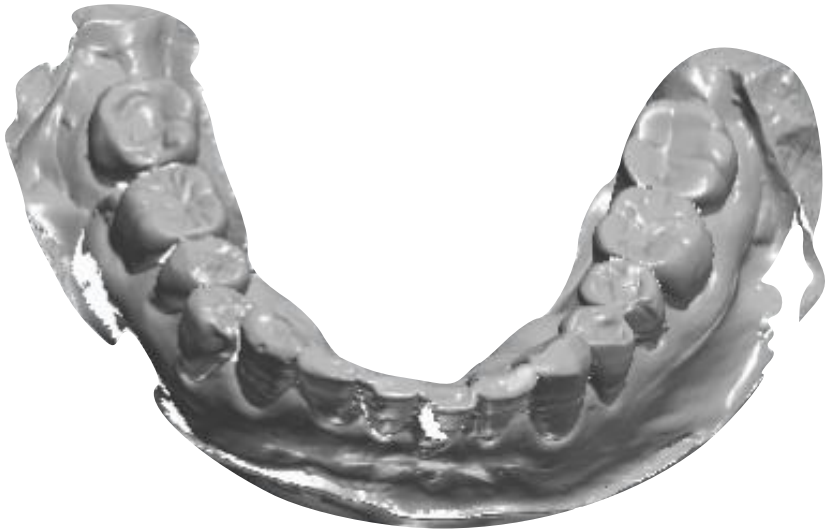
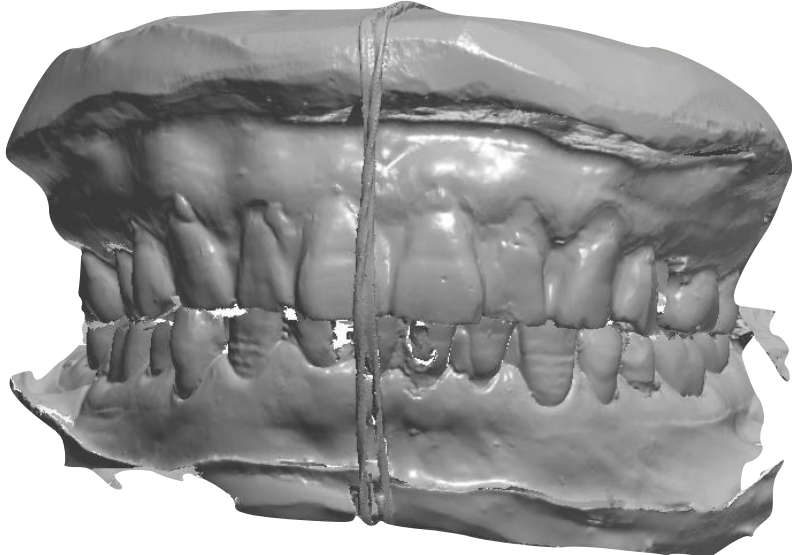
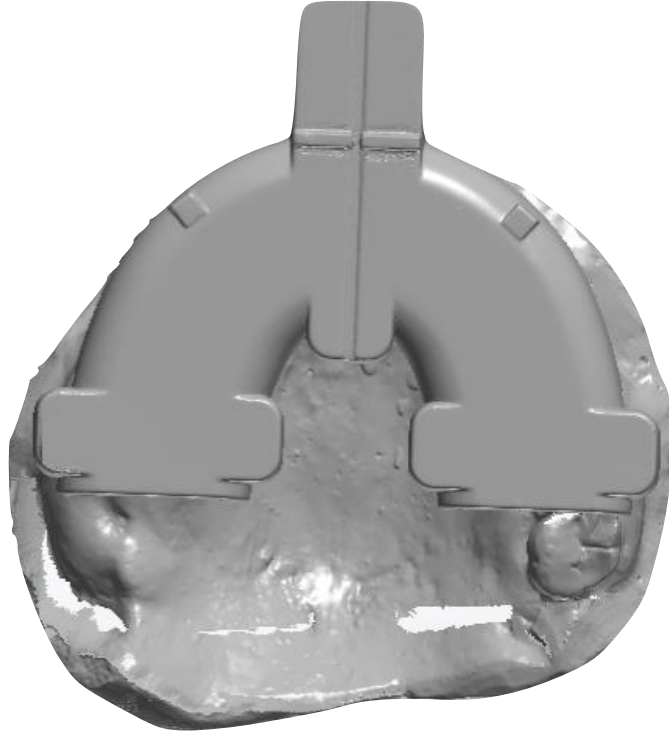
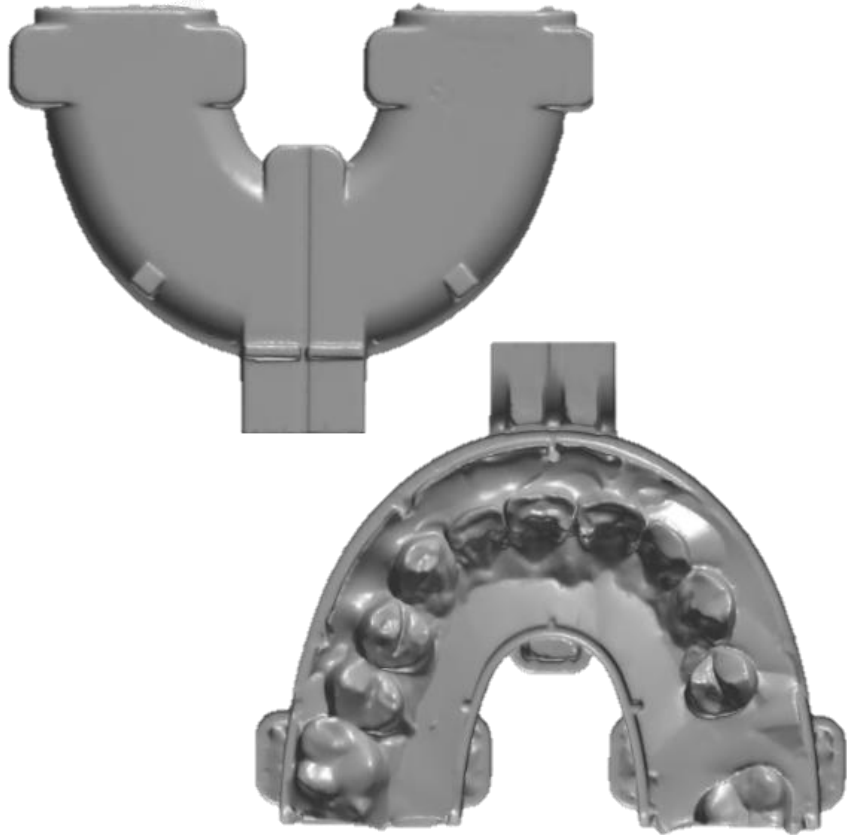


## Model scanning

Use any kind of model (desktop) scanner that can create STL file  
Scan model using normal process & perform additional scan of R2 Tray

3Shape scanner can also be used, but additional software is required to convert dcm to STL file



| Basic scan                                                                                                                                                                                                                             |                                                                                     |                                                                                                                                                                                                                                                                                               | Additional scan of R2 Tray                                                               |                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Working site                                                                                                                                                                                                                           | Antagonist                                                                          | Occlusion                                                                                                                                                                                                                                                                                     | R2 Tray + working model                                                                  | R2 Tray                                                                                                                                                                                                                                          |
|                                                                                                                                                       |  |                                                                                                                                                                                                           |      |                                                                                                                                                              |
| <div><div>1</div><div>Working site</div><div><ul style="list-style-type: none"><li>Fill any missing sections in scan file</li><li>Scanned surgical site should be very clean</li></ul></div></div> <div>File name: Upper jaw.stl</div> | <div><div>2</div><div>Antagonist</div></div> <div>File name: Lower jaw.stl</div>    | <div><div>3</div><div>Occlusion</div><div><ul style="list-style-type: none"><li>When loading upper &amp; lower scan files, coordinates should be in state of occlusion</li><li>For edentulous case, refer to bite sent by clinician</li></ul></div></div> <div>File name: occlusion.stl</div> | <div><div>4</div><div>R2 Tray + working model</div></div> <div>File name: bite.stl</div> | <div><div>5</div><div>R2 Tray</div><div><ul style="list-style-type: none"><li>Scan inside &amp; outside of R2 Tray</li><li>If scanning is difficult, scan inside &amp; outside separately</li></ul></div></div> <div>File name: r2tray.stl</div> |

# 2.1 Lab-side Model scan protocol

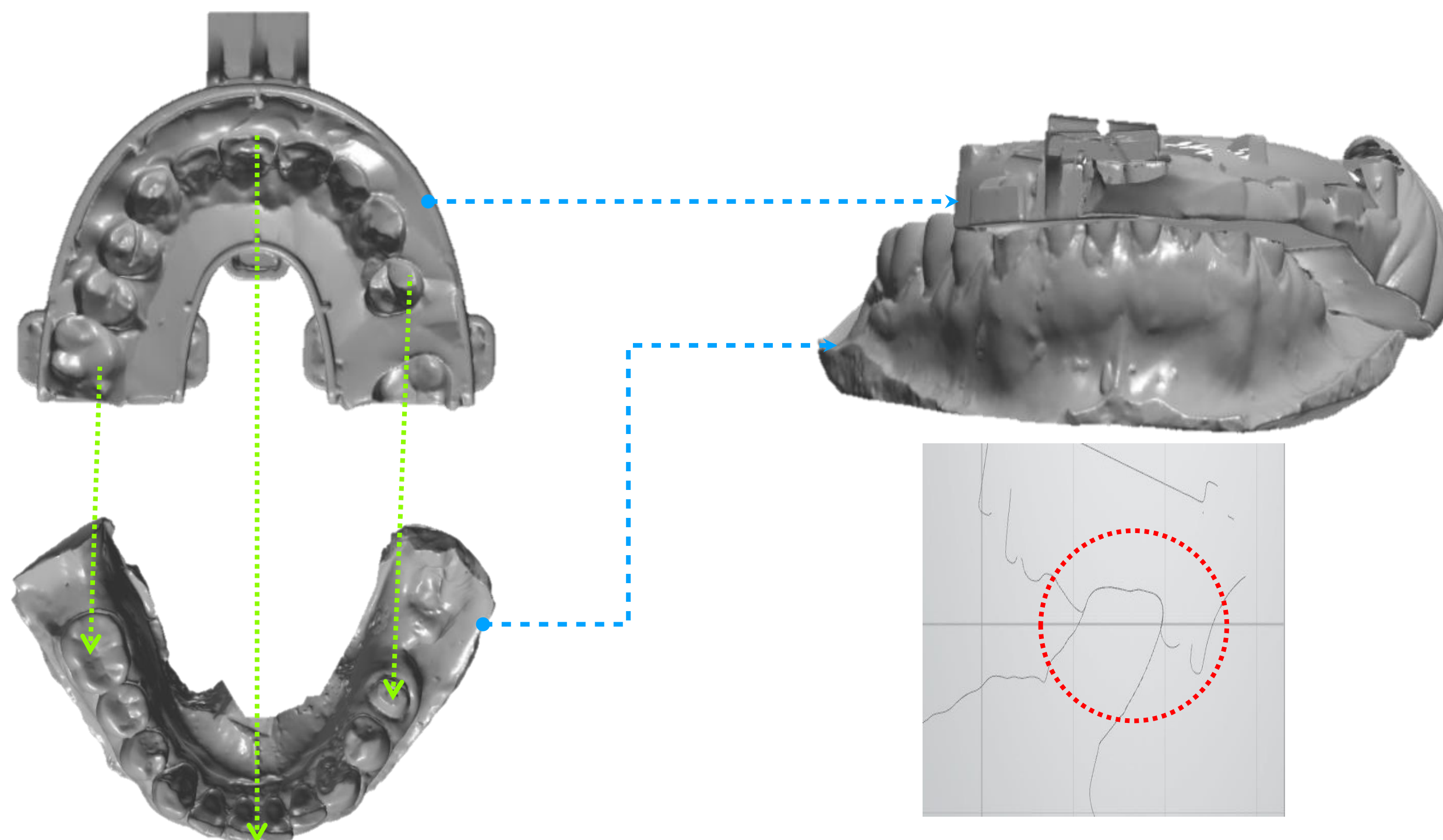
1  
Model scan  
protocol

Diagnostic  
wax-up

R2  
GATE

R2GATE 2.0  
Apr. 2019

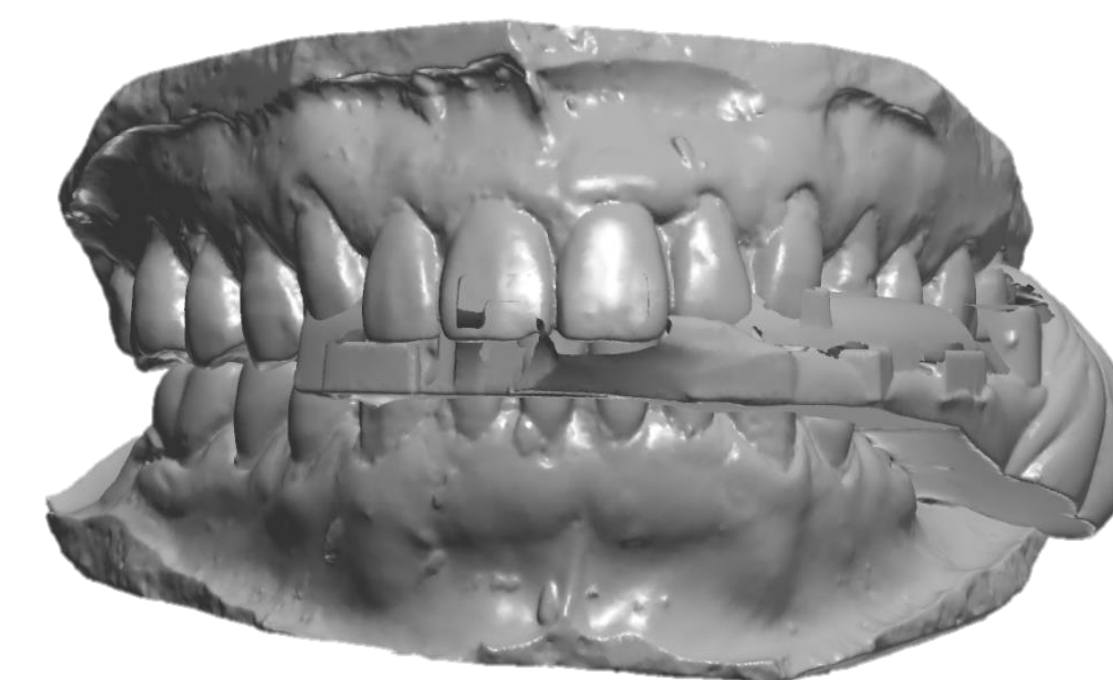
## R2 Tray scan & mesh alignment



1 To match 3D coordinates of R2 Tray & working model, align two scan files using 3rd party software, such as R2CAD or EXOCAD

2 Check alignment status of R2 Tray & working model

3 After scanning & aligning, open each file to check alignment status of scan files



# 2.1 Lab-side Model scan protocol

1  
Model scan  
protocol

→  
Diagnostic  
wax-up

R2  
GATE

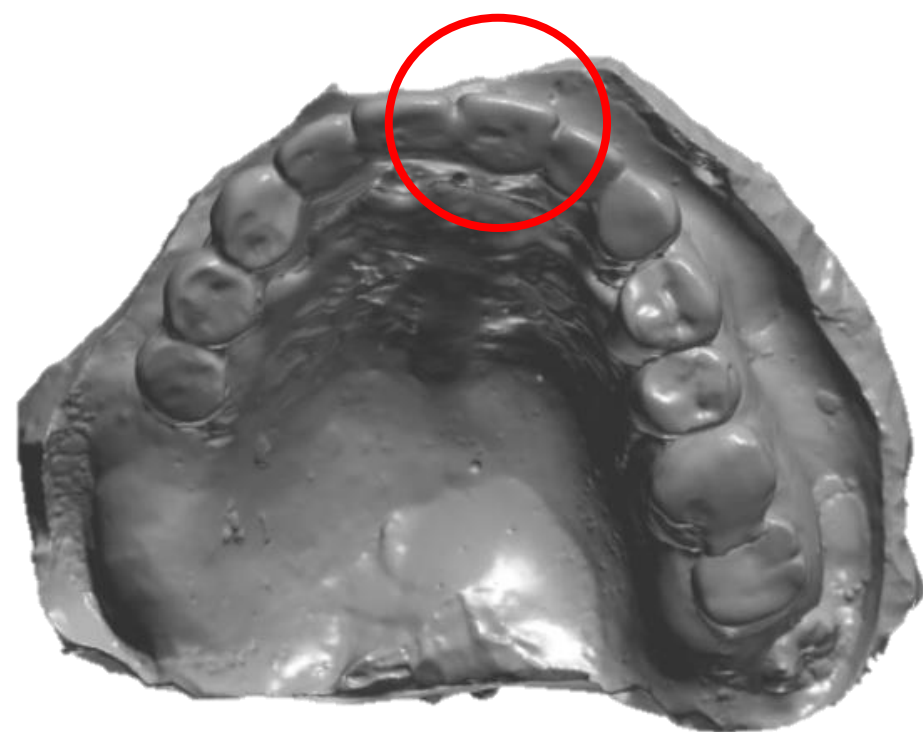
R2GATE 2.0  
Apr. 2019

TIP

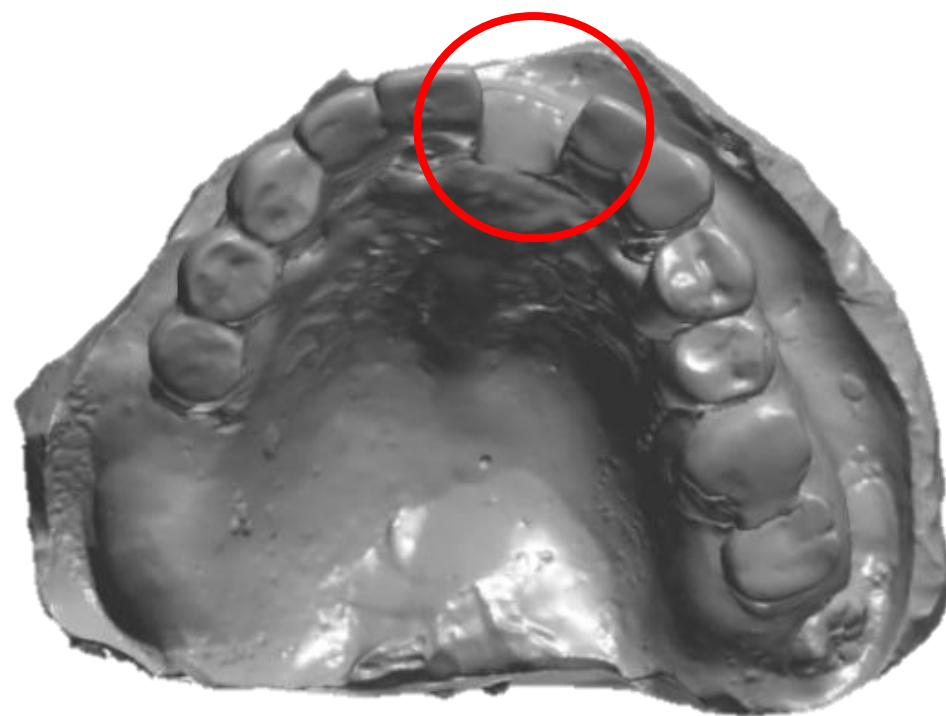
## Scan for immediate placement after tooth extraction

Use two scans for case of immediate placement:

- scan working model first
- remove tooth manually, then scan again
- align 3D coordinates of two scan files



1 Pre-extraction working model scan (usual)



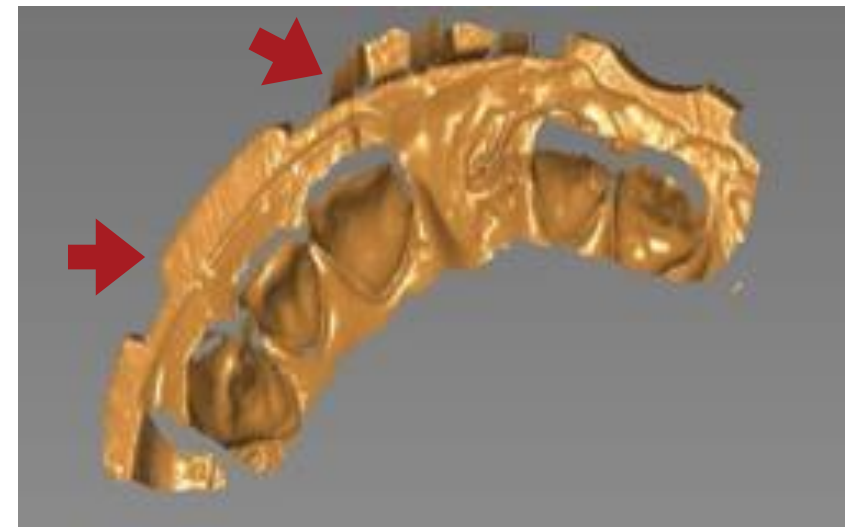
2 Post-extraction working model scan (additional)

TIP

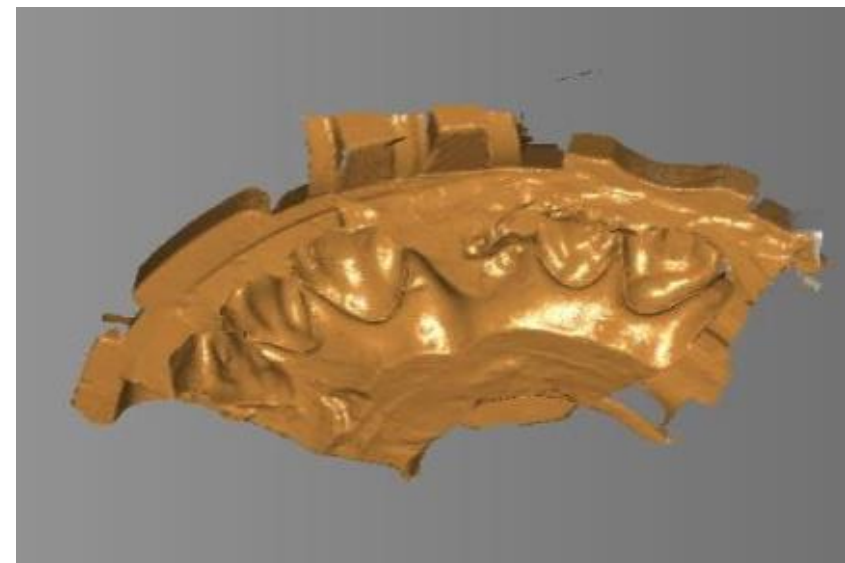
## R2 Tray scanning using intra oral scanner

- Scan working site & antagonist bite
- Scan inside of R2 Tray
- R2CAD provides mesh aligning function for easy 3D alignment of scan files

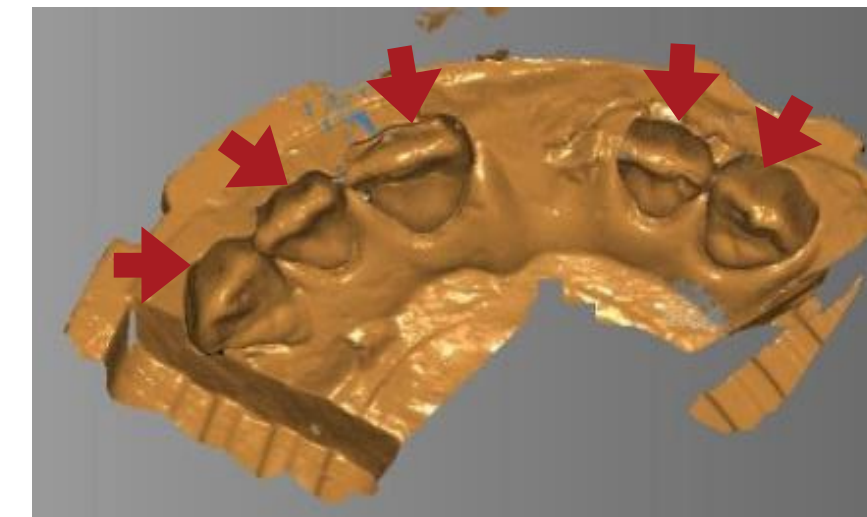
1 Scan outer structure for alignment



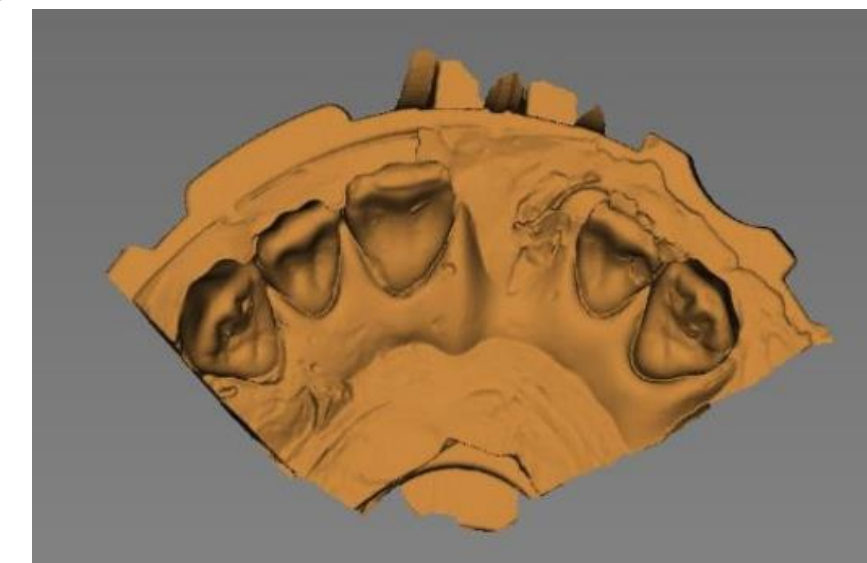
3 Take additional scan of insufficient parts



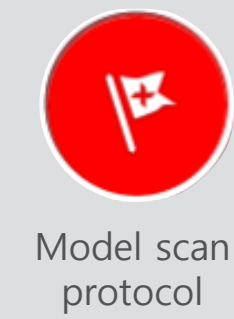
2 Scan impressed teeth



4 Finish scan rendering



# 2.2 Lab-side Diagnostic wax-up with R2CAD



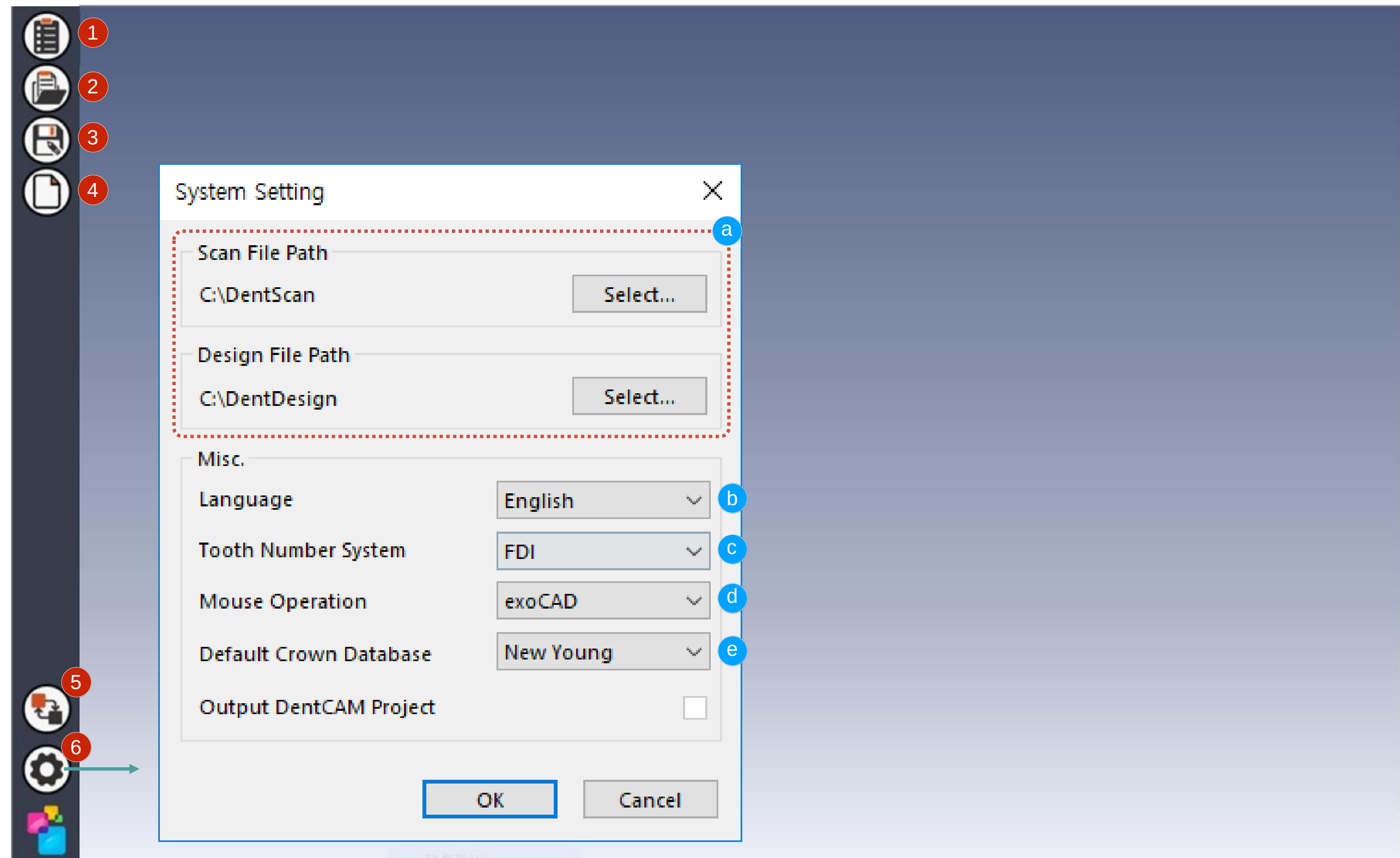
**R2  
GATE**

R2GATE 2.0  
Apr. 2019

## R2CAD: Interface & functions

For complete top-down treatment, R2GATE uses diagnostic wax-up created by R2CAD, unique dental CAD software

- 1 New order
- 2 Import design file [project file]
- 3 Save design file
- 4 Exit design file
- 5 Open mesh alignment
- 6 System settings:
  - a Select scan file & design file paths
  - b Set language
  - c Set dental formula system
  - d Mouse setting [EXOCAD, 3SHAPE, R2GATE]
  - e Set default teeth library type



# 2.2 Lab-side Diagnostic wax-up with R2CAD



Model scan  
protocol



Diagnostic  
wax-up

R2  
GATE

R2GATE 2.0  
Apr. 2019

## R2CAD: Diagnostic wax-up

Create new order for diagnostic wax-up

1 Import scan file to create new order:

- a Import scan file (upper, lower)
- b Delete imported scan file
- c Import scan file from intraoral scanner

2 Select scan file

3 Complete basic order information

4 Select teeth:

- d Click on teeth requiring design work

CTRL + Select multiple teeth in separate positions

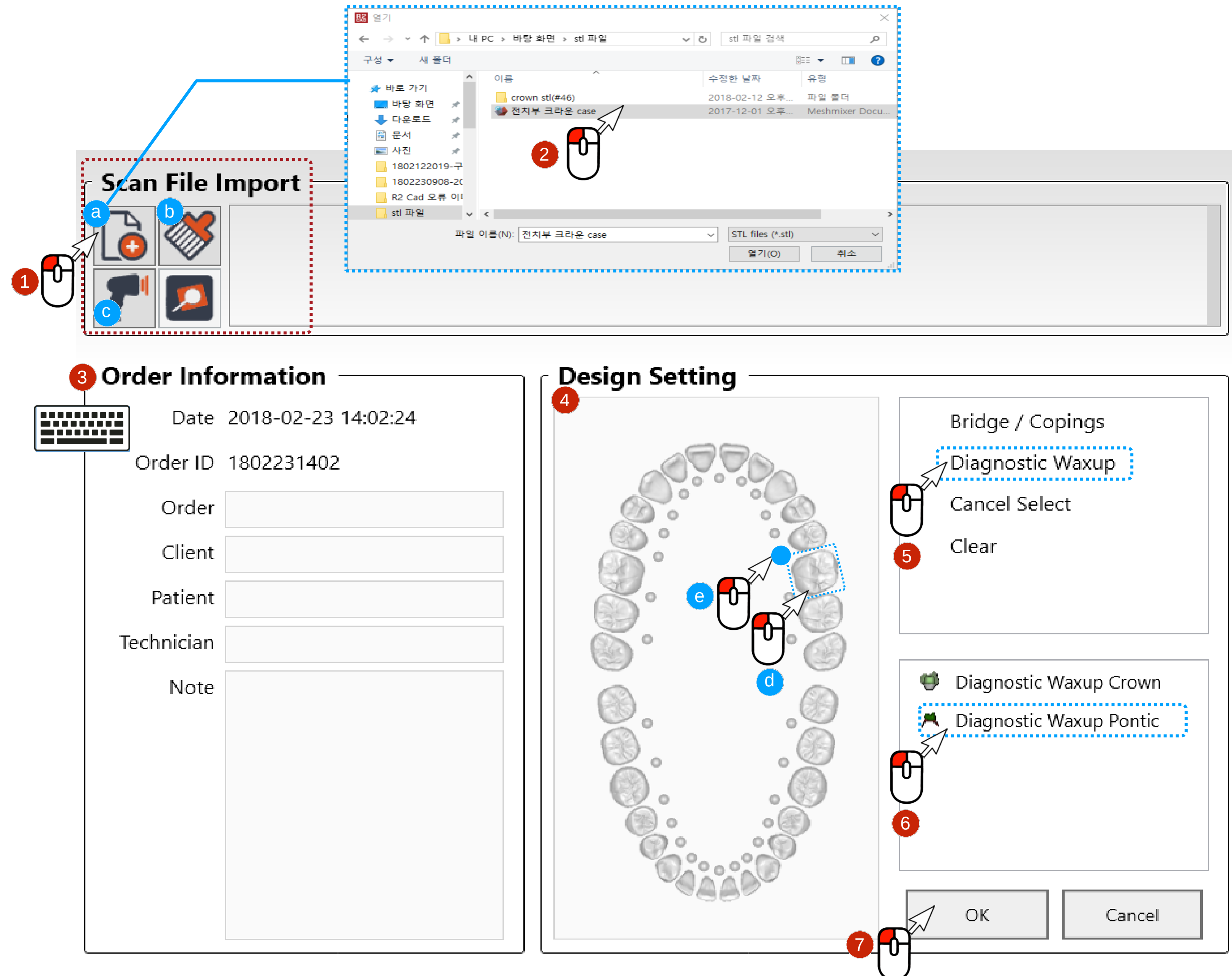
SHIFT + Select multiple teeth in contiguous positions

- e Click if bridge required

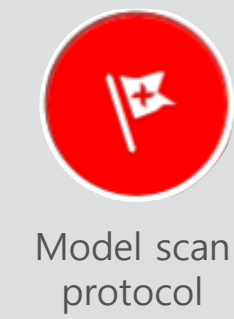
5 Click **Diagnostic wax-up**

6 Click **Diagnostic wax-up pontic**

7 Click **OK** to proceed



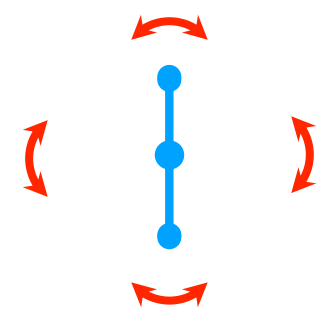
# 2.2 Lab-side Diagnostic wax-up with R2CAD



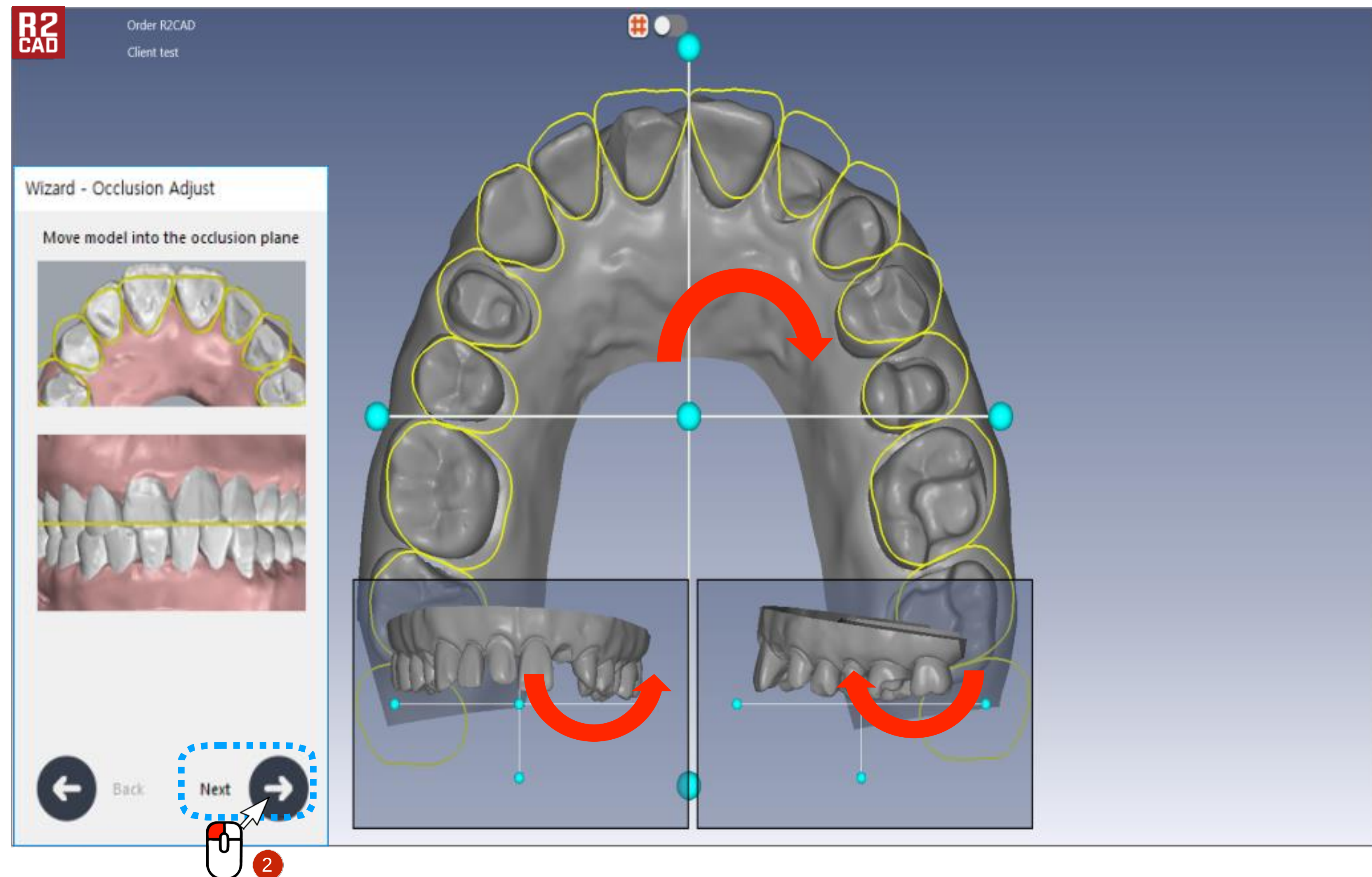
## R2CAD: Set occlusion plan of model

- 1 Move & rotate model around cross-point center & set teeth positions using yellow guidelines

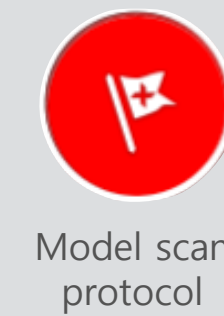
- a Use cross-point bars to move model



- 2 Click **NEXT** to proceed



# 2.2 Lab-side Diagnostic wax-up with R2CAD



R2  
GATE

R2GATE 2.0  
Apr. 2019

## R2CAD: Library loading & design

1 Load tooth library & adjust position & size

2 Adjust shape of library teeth using design tools

- a Freeform: morphing function
- b Add wax to make ridge or groove
- c Add wax
- d Remove wax
- e Smoothen surface:
  - Size: size of smoothing brush
  - Strength: strength of smoothing brush

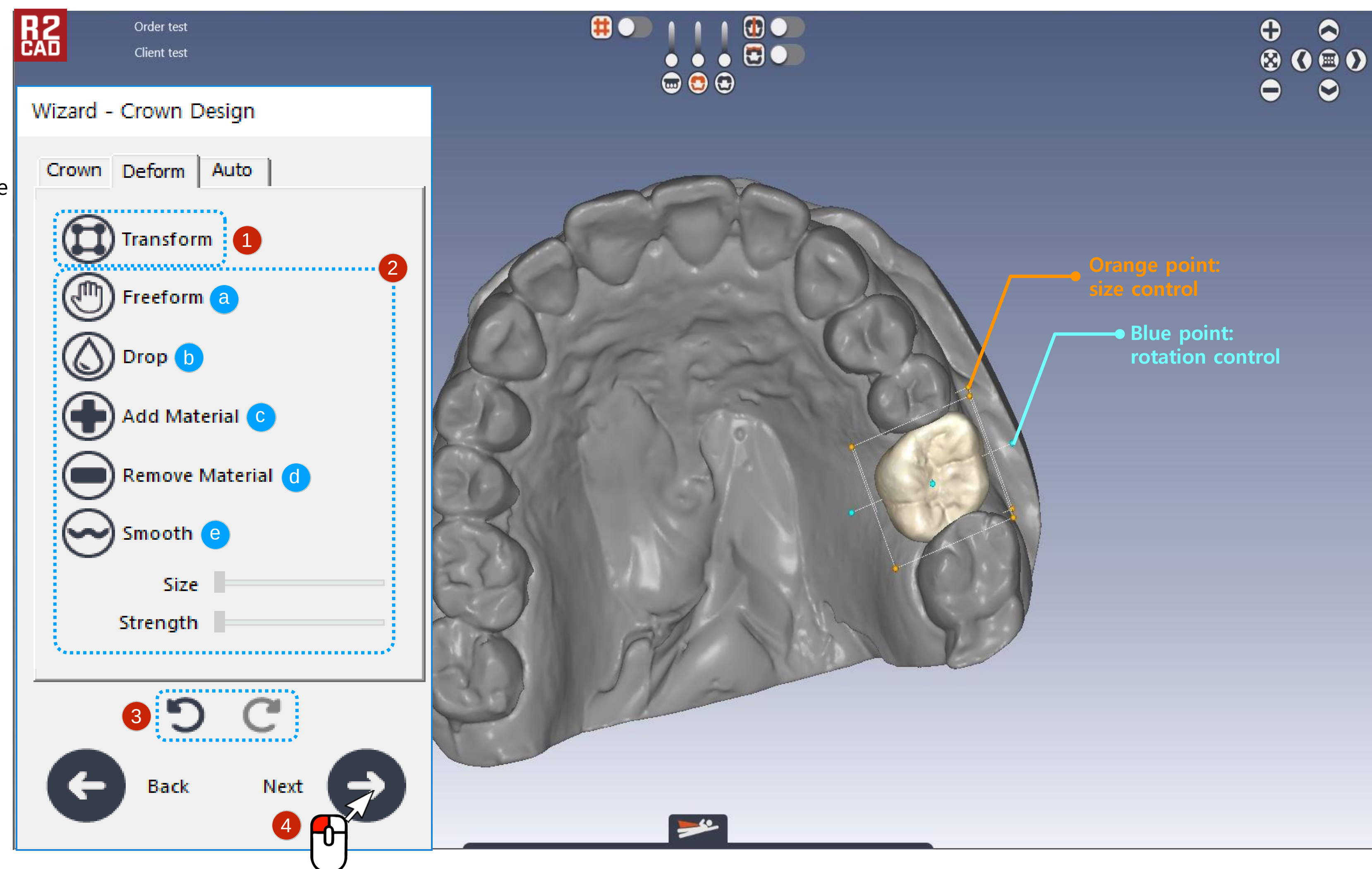
3 Undo & redo button



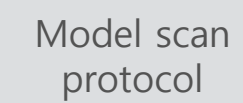
! Keyboard functions

- CTRL+Z: Undo
- CTRL+Shift+Z: Redo

4 Click **NEXT** to proceed



## 2.2 Lab-side Diagnostic wax-up with R2CAD

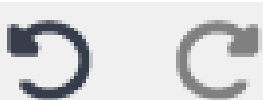


2

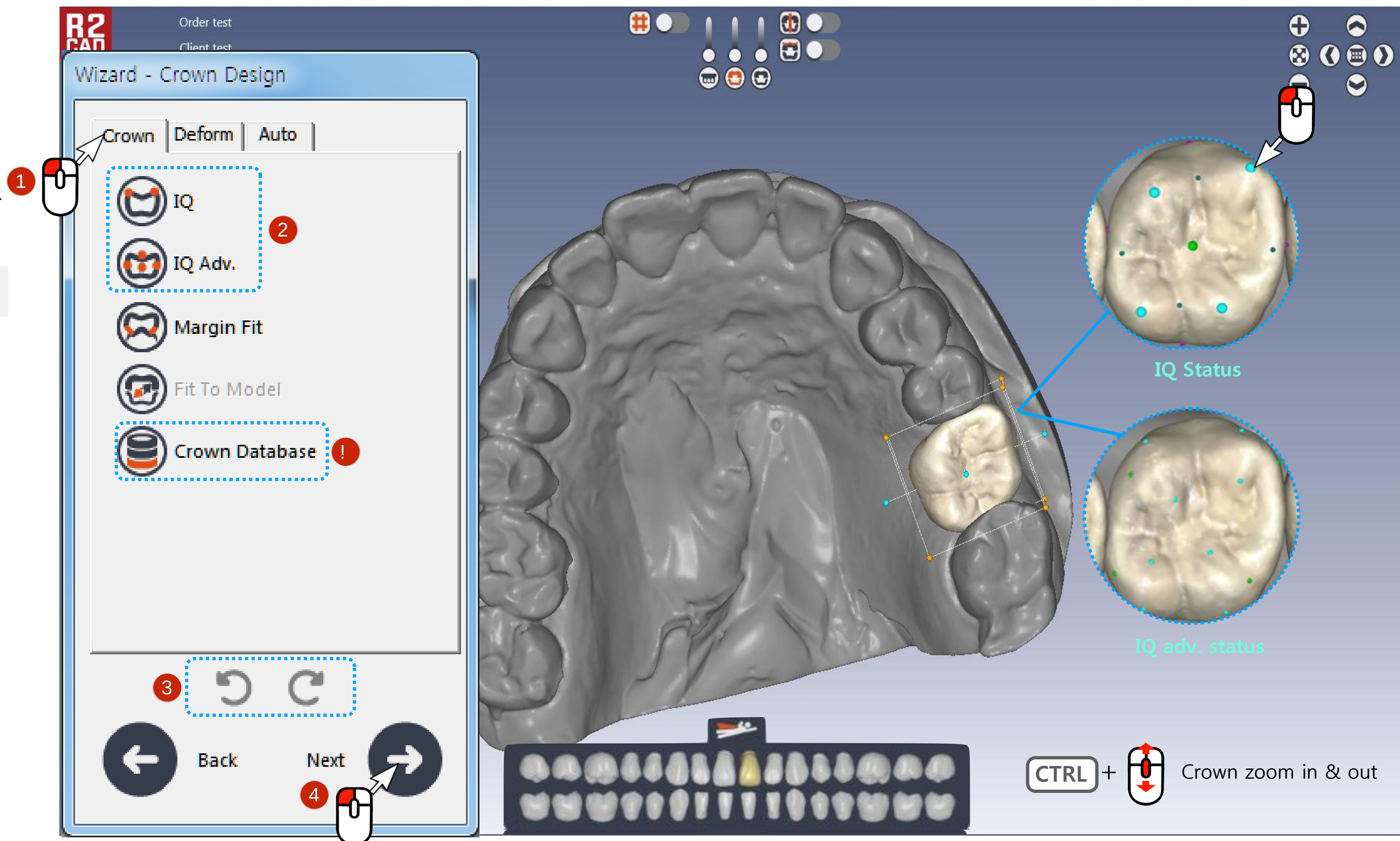
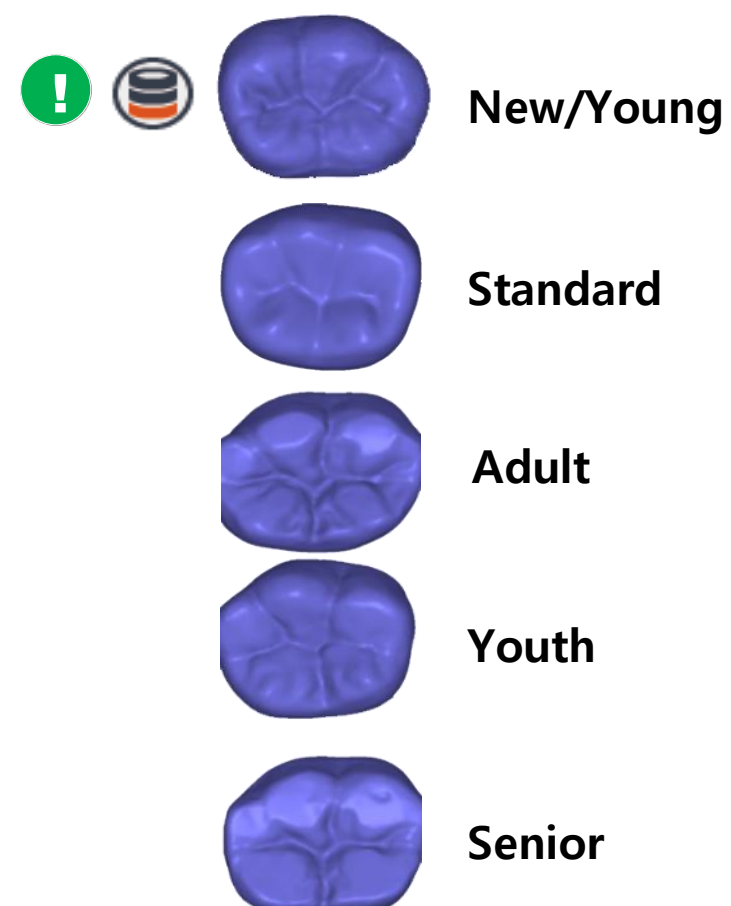
## Diagnostic wax-up

**R2GATE 2.0**  
**Apr. 2019**

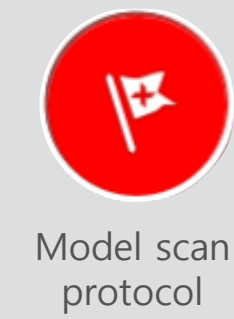
## R2CAD: Detailed design of diagnostic wax-up

- 1 Click **CROWN** for detailed design
- 2 Tooth design functions:
  - IQ & IQ Adv: drag point on wax-up for detailed design modification
- 3 Undo & redo buttons 
- 4 Keyboard functions
  - CTRL+Z: Undo
  - CTRL+Shift+Z: Redo
- 5 Click **NEXT** to proceed

Change library: 5 options



# 2.2 Lab-side Diagnostic wax-up with R2CAD

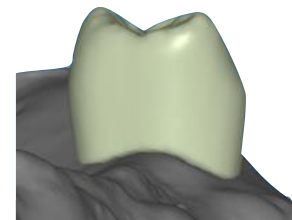


R2  
GATE

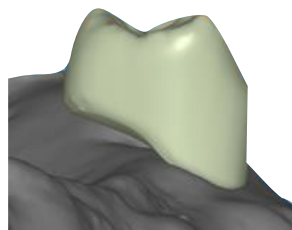
R2GATE 2.0  
Apr. 2019

## R2CAD: Detailed design of diagnostic wax-up

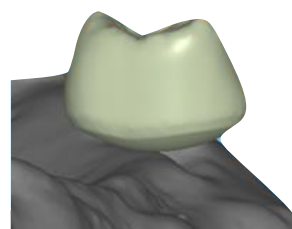
### 1 Select pontic shape



a Saddle



b Ridge lap

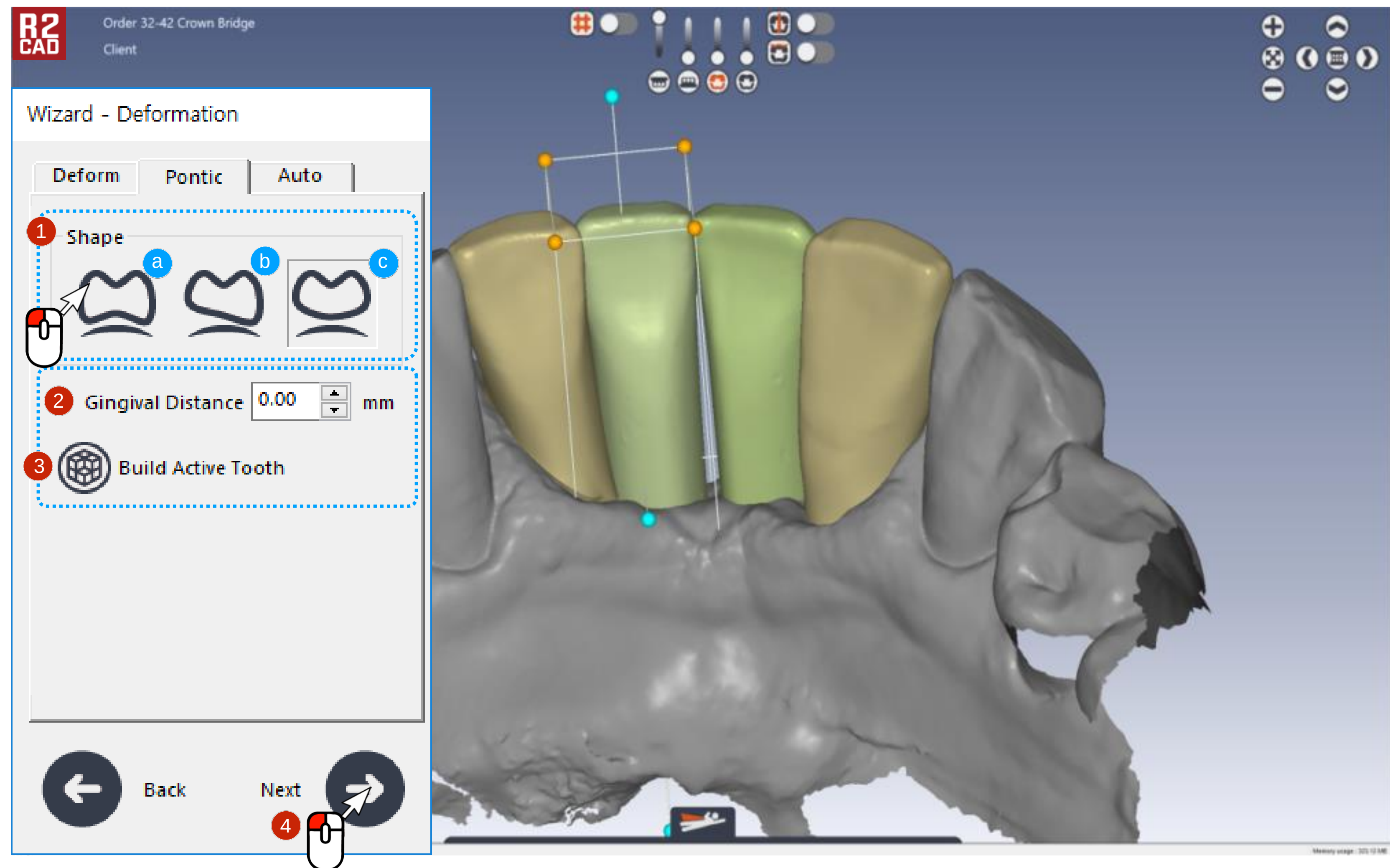


c Ovate

### 2 Set distance from gingiva

### 3 Click to icon Build Active Tooth

### 4 Click **NEXT** to proceed



# 2.2 Lab-side Diagnostic wax-up with R2CAD



Model scan  
protocol



Diagnostic  
wax-up

R2  
GATE

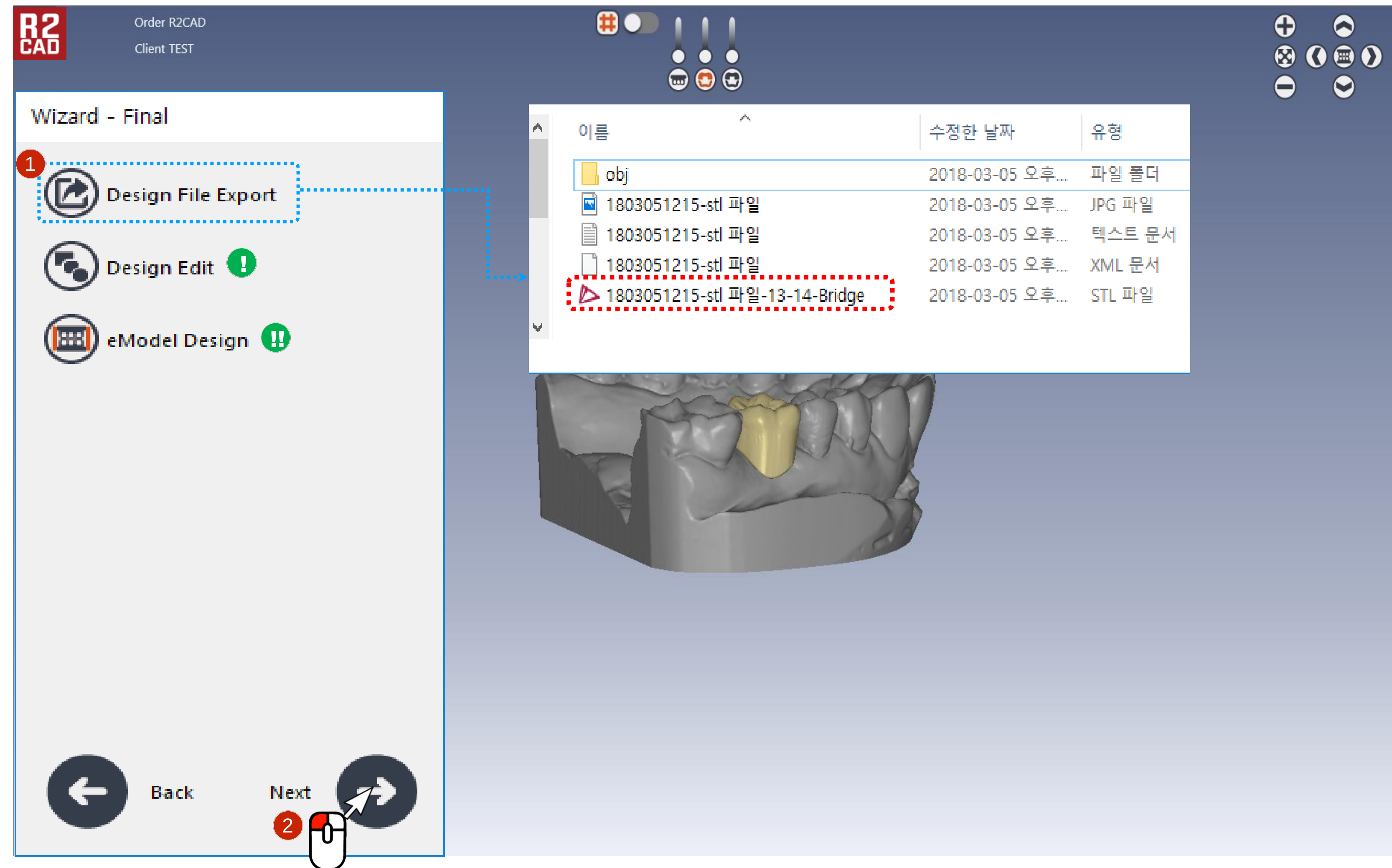
R2GATE 2.0  
Apr. 2019

## R2CAD: Export diagnostic wax-up

1 Export diagnostic wax-up & save it

- ! Modify wax-up design
- !! Model builder

2 Click **NEXT** to proceed



# 2.2 Lab-side Diagnostic wax-up with R2CAD



Model scan  
protocol

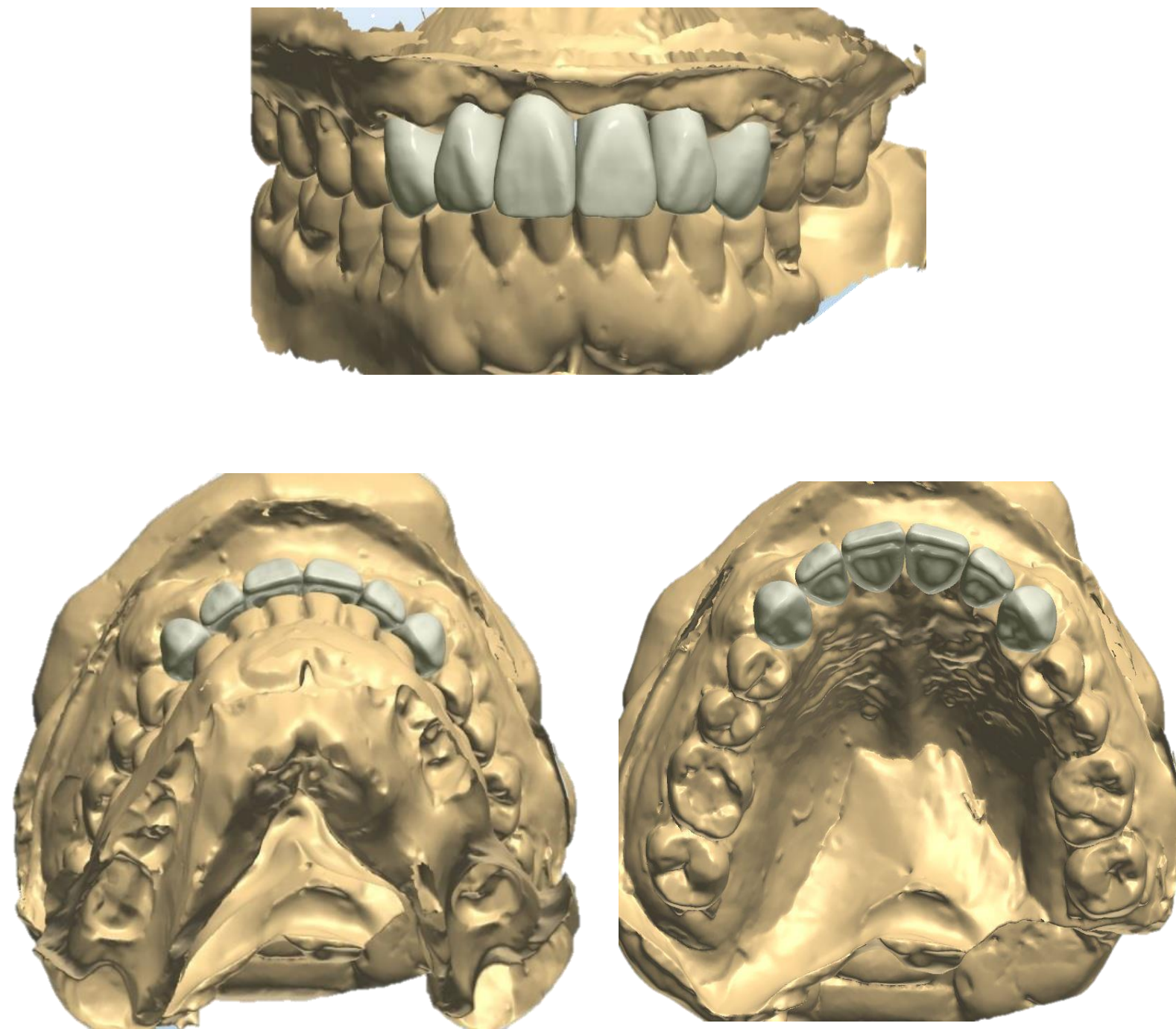


Diagnostic  
wax-up

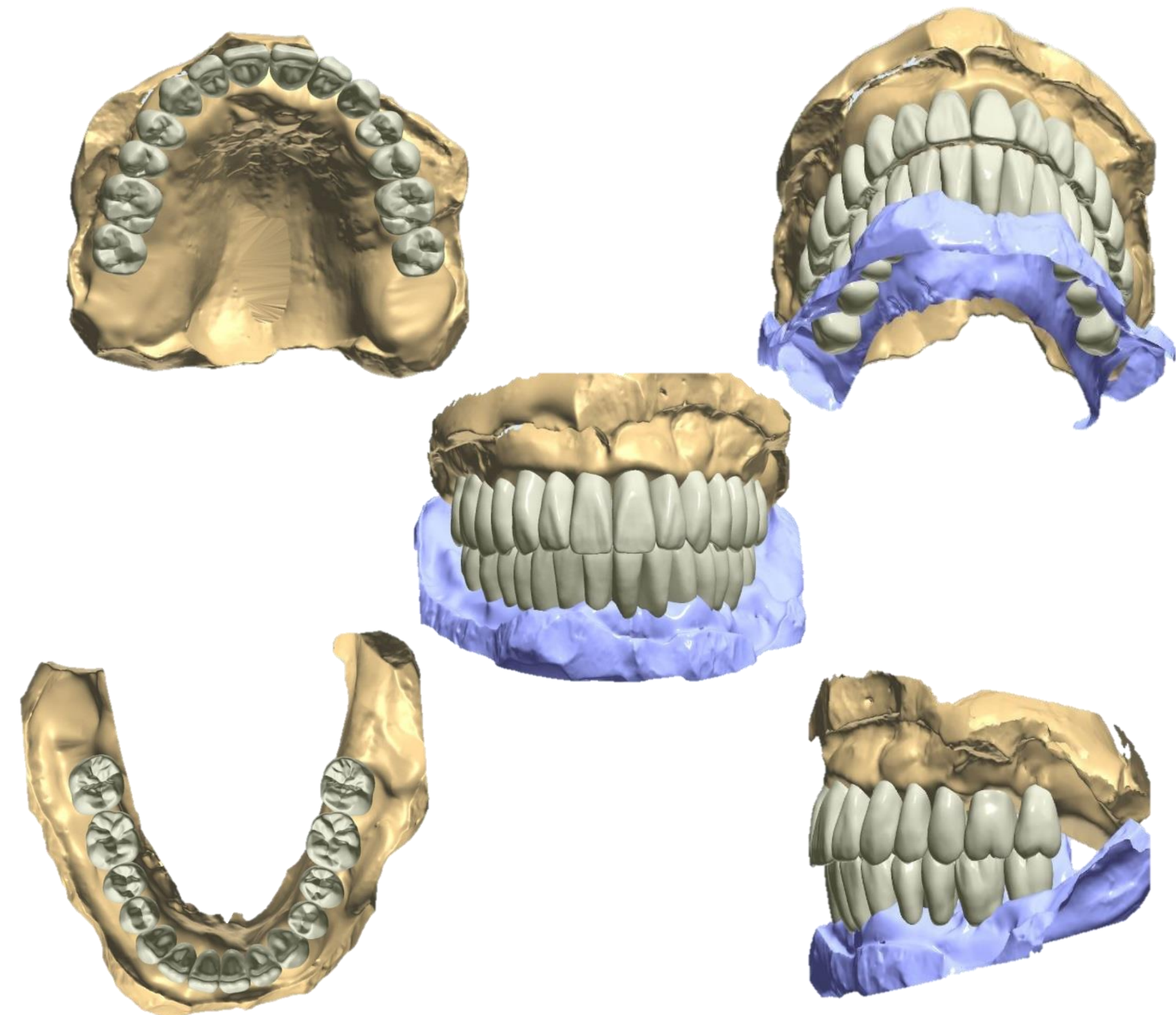
**R2**  
GATE

R2GATE 2.0  
Apr. 2019

Upper 6 anterior diagnosis wax-up

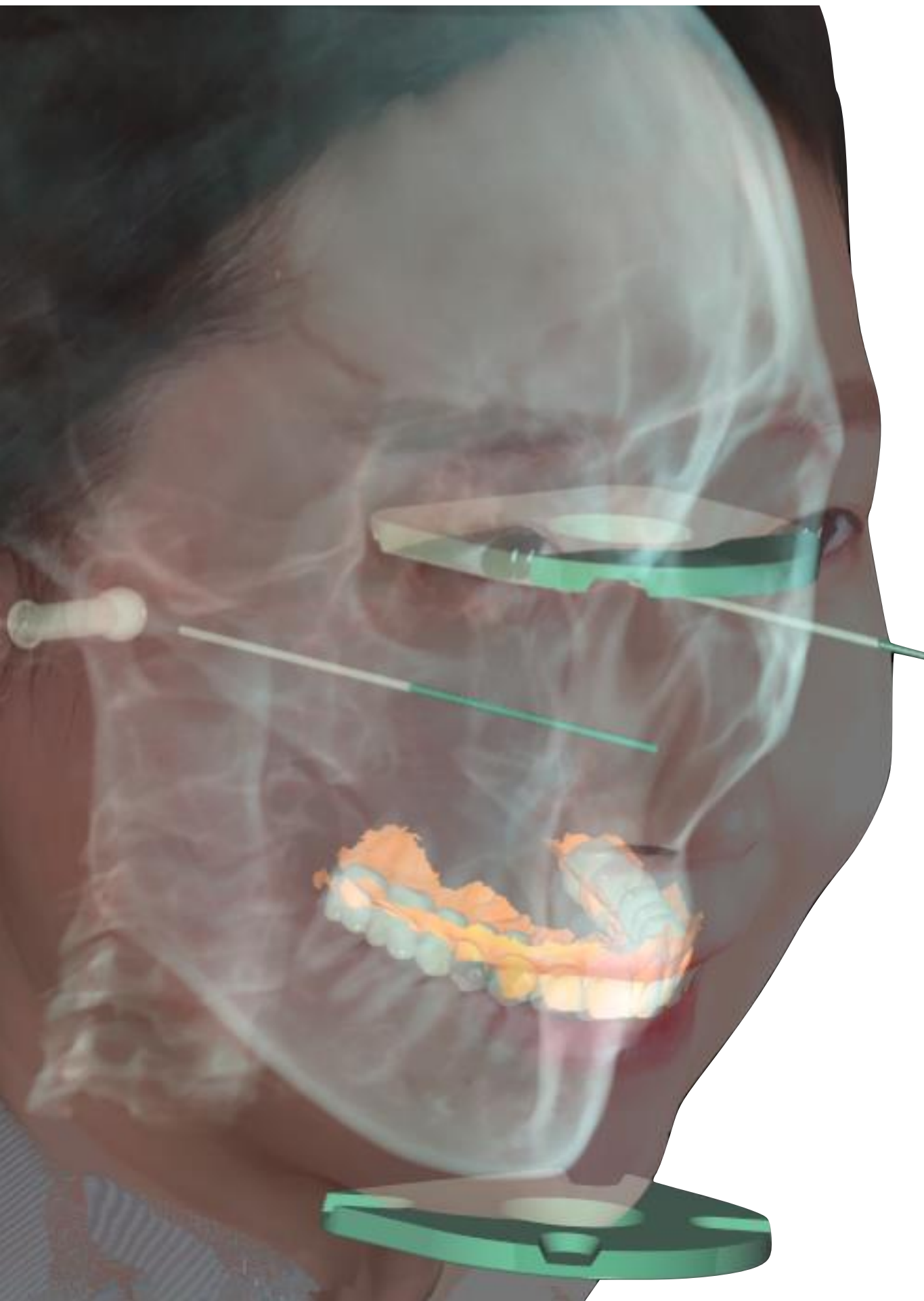


Upper & lower edentulous wax-up



**R2GATE™**

Turning imagination into reality



# 3 R2GATE Lite™

# 3.1 R2GATE Lite™ Introduction



Introduction



Installation



How to use



Backup



Restore

**R2  
GATE**

R2GATE 2.0  
Apr. 2019

## R2GATE Lite™

Special user-friendly intuitive software for real-time implant planning & communication

- Diagnostic information (project file) sent to clinician for final approval
- Amended & approved treatment plan is then automatically returned to R2 Centre
- R2GATE is available for Mac and PC, IOS mobile devices



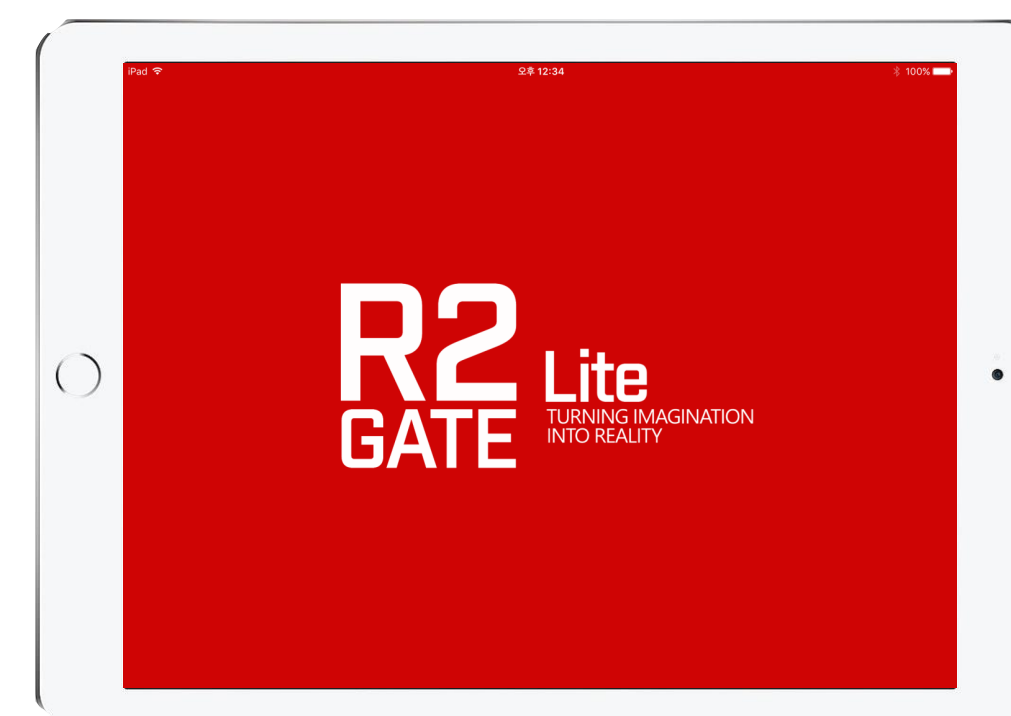
windows



MAC



iPad & iPhone



- I-Pad Air ii & above



- iPhone 6 & above, but only demo version

# 3.2 R2GATE Lite™ Download & installation



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Restore

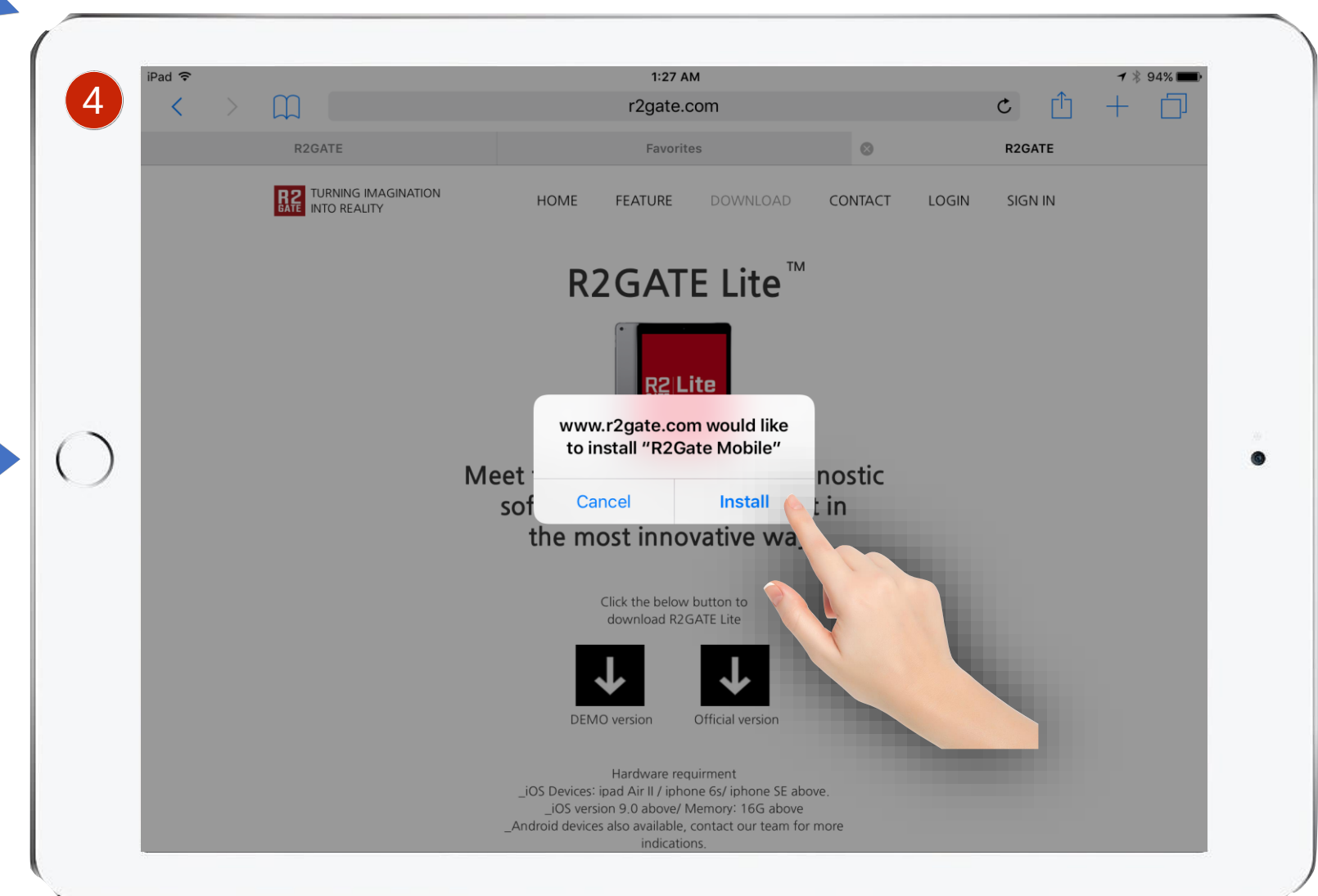
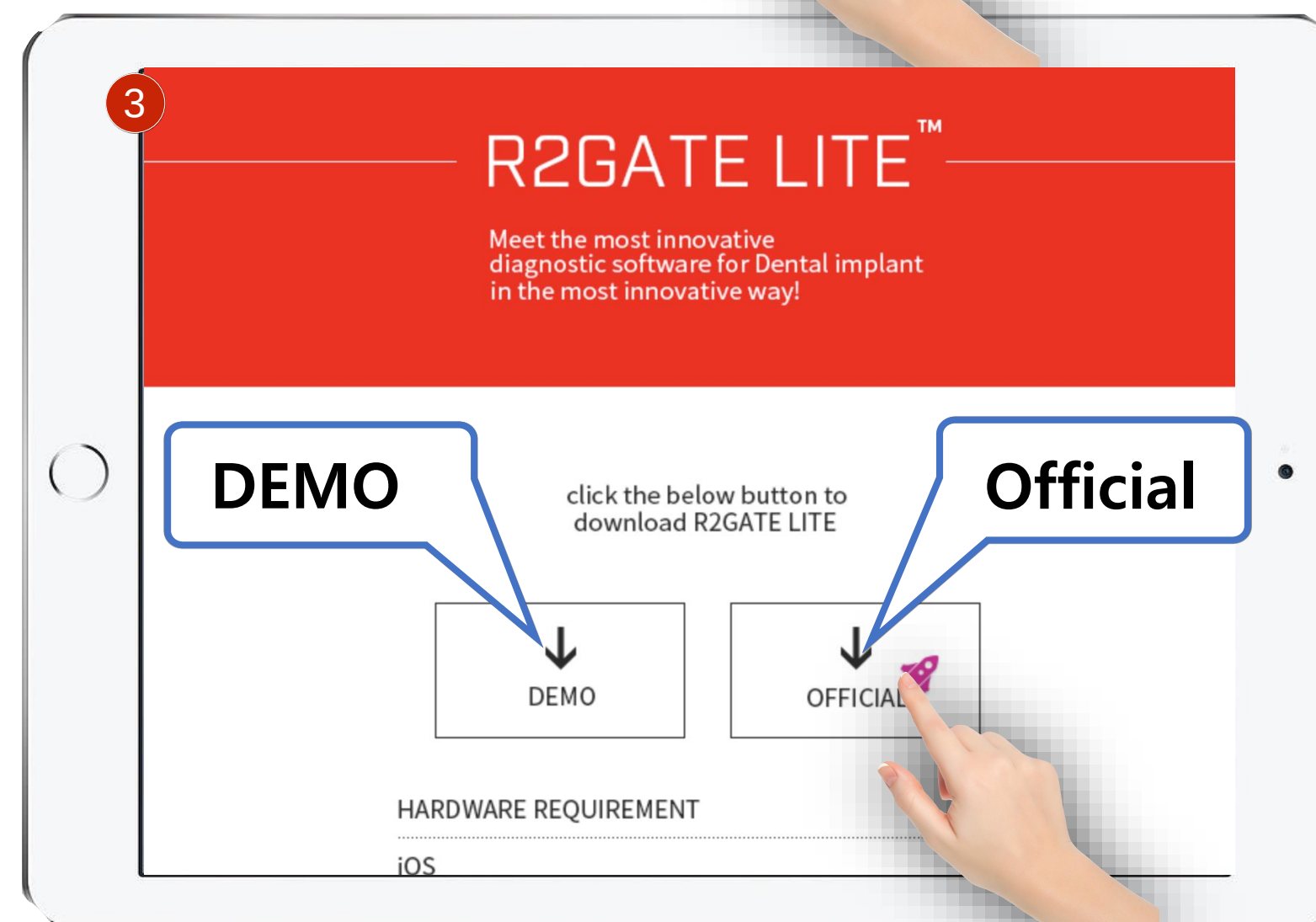
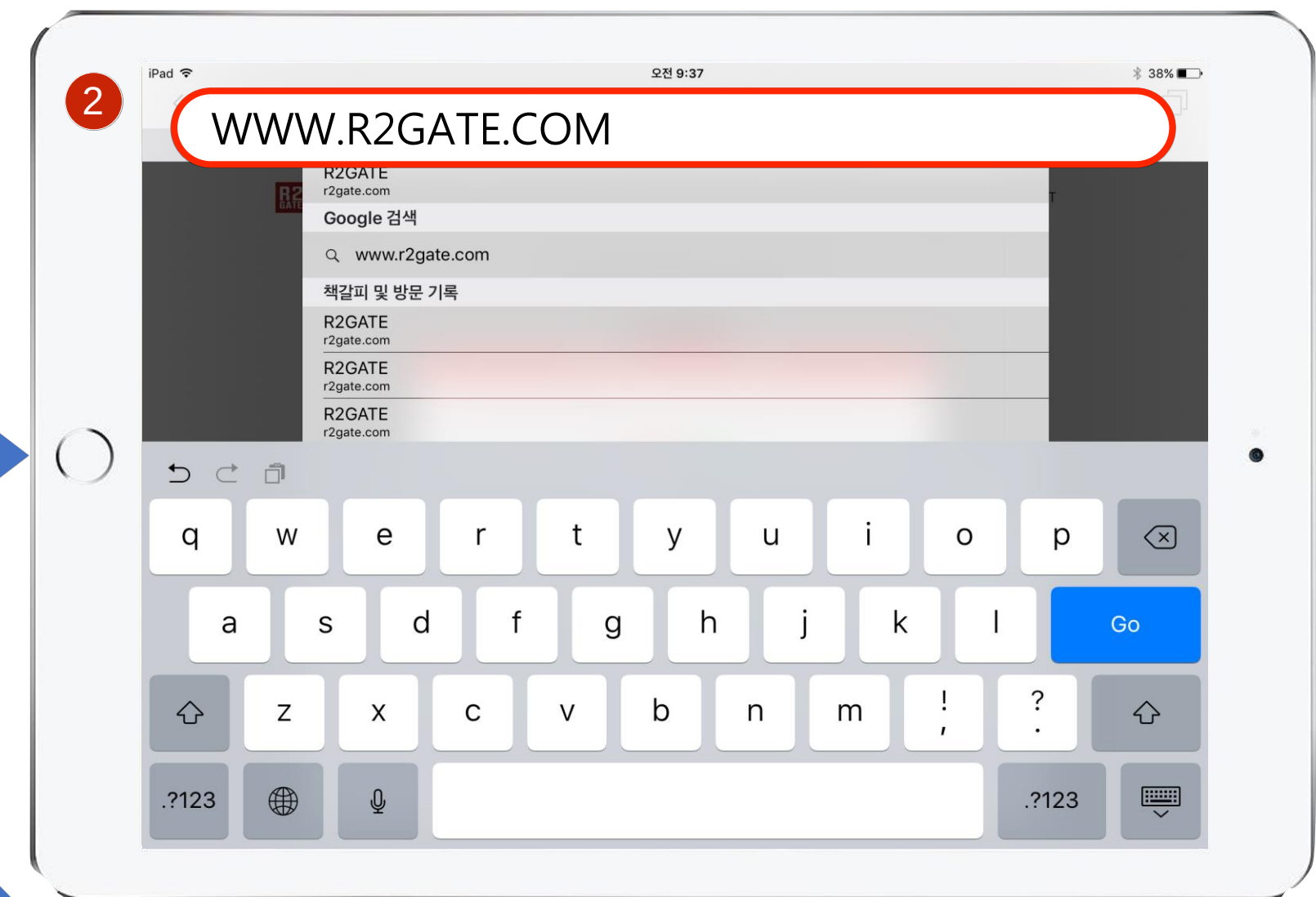
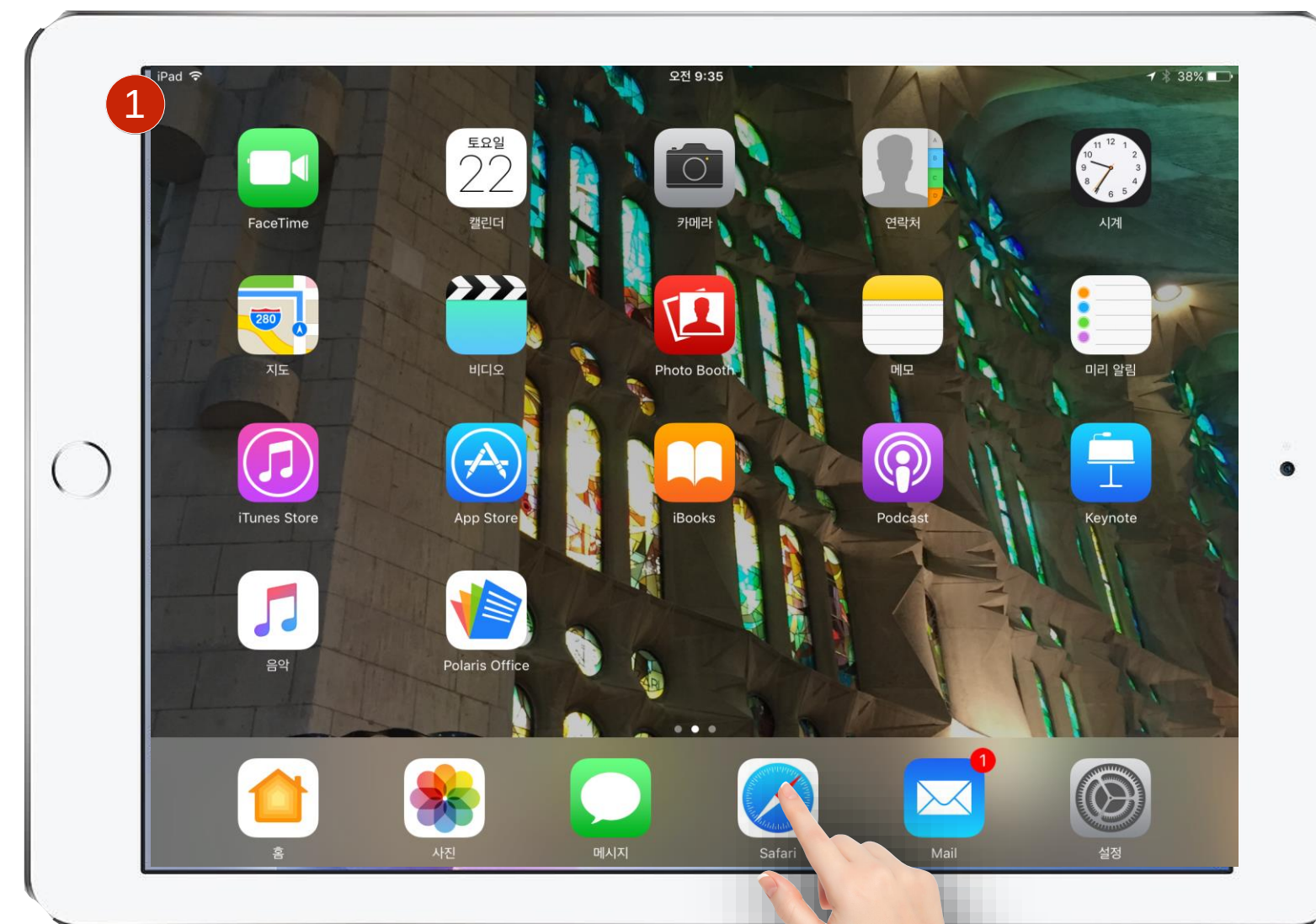
R2  
GATE

R2GATE 2.0  
Apr. 2019

## R2GATE Lite™

### Download & install on iPad

- 1 Choose web-browser application
- 2 Go to [www.r2gate.com](http://www.r2gate.com)
- 3 Select preferred version
  - ! Official version requires subscription for activation code
- 4 Click **INSTALL**



# 3.2 R2GATE Lite™ Download & installation



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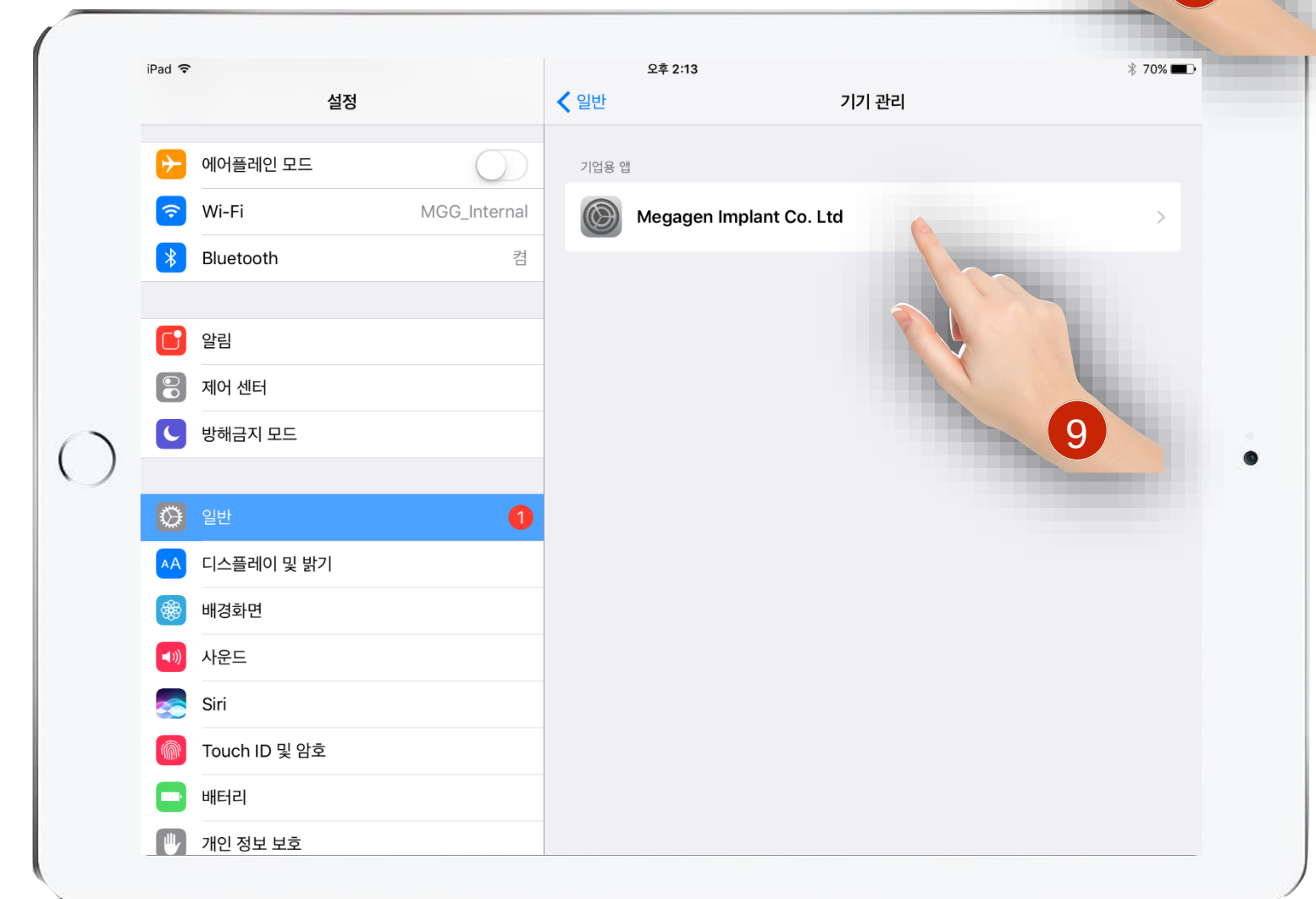
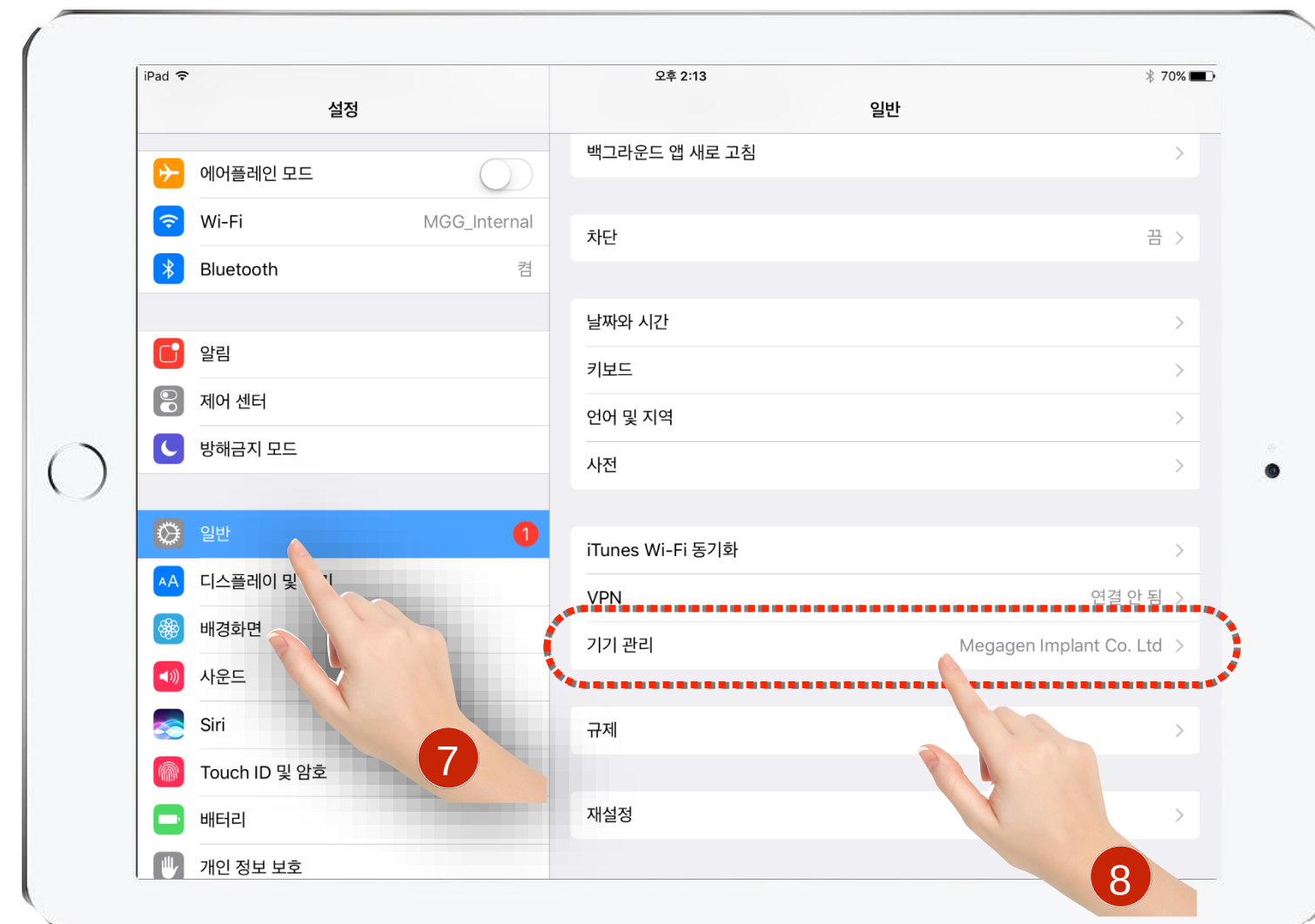
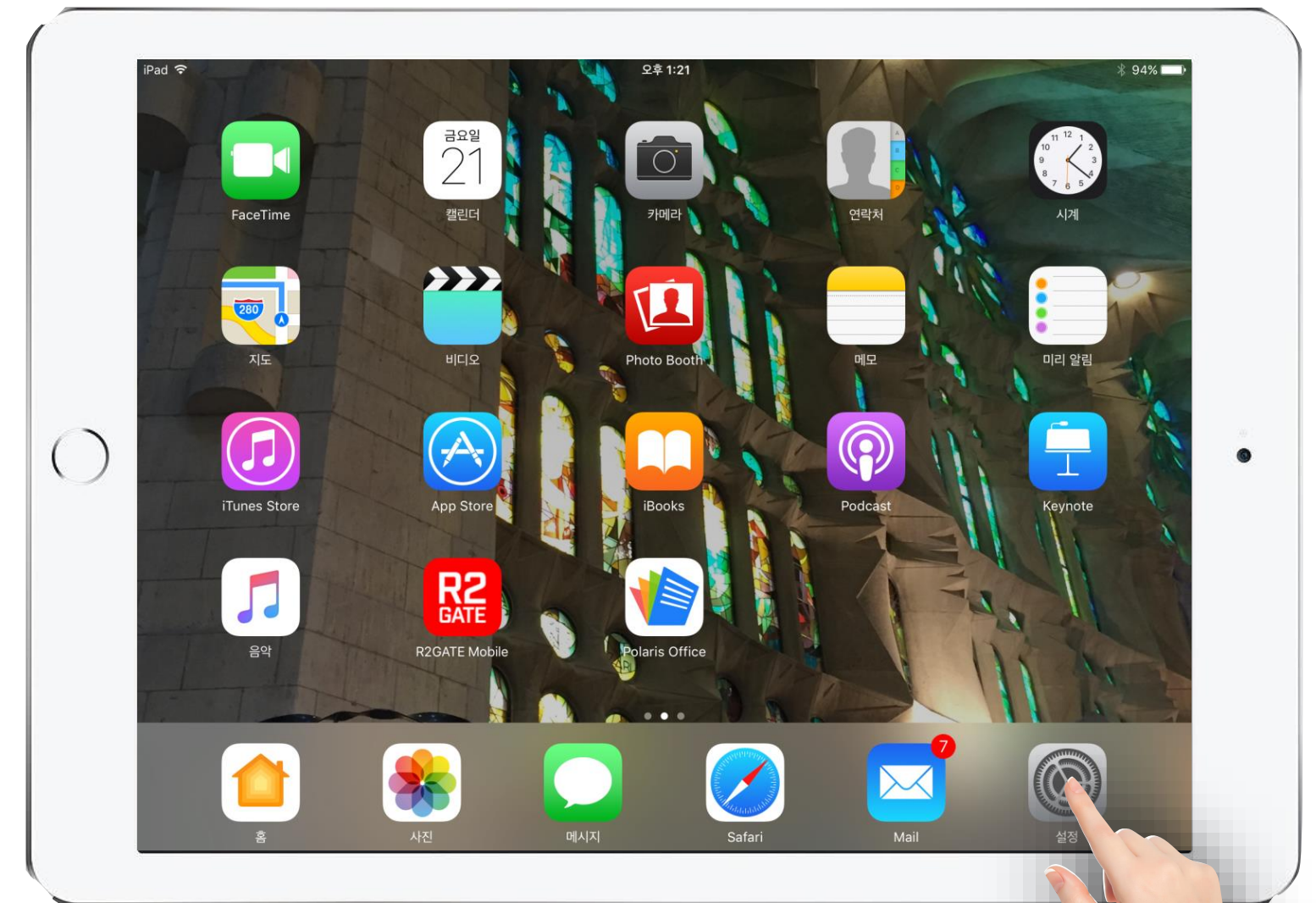
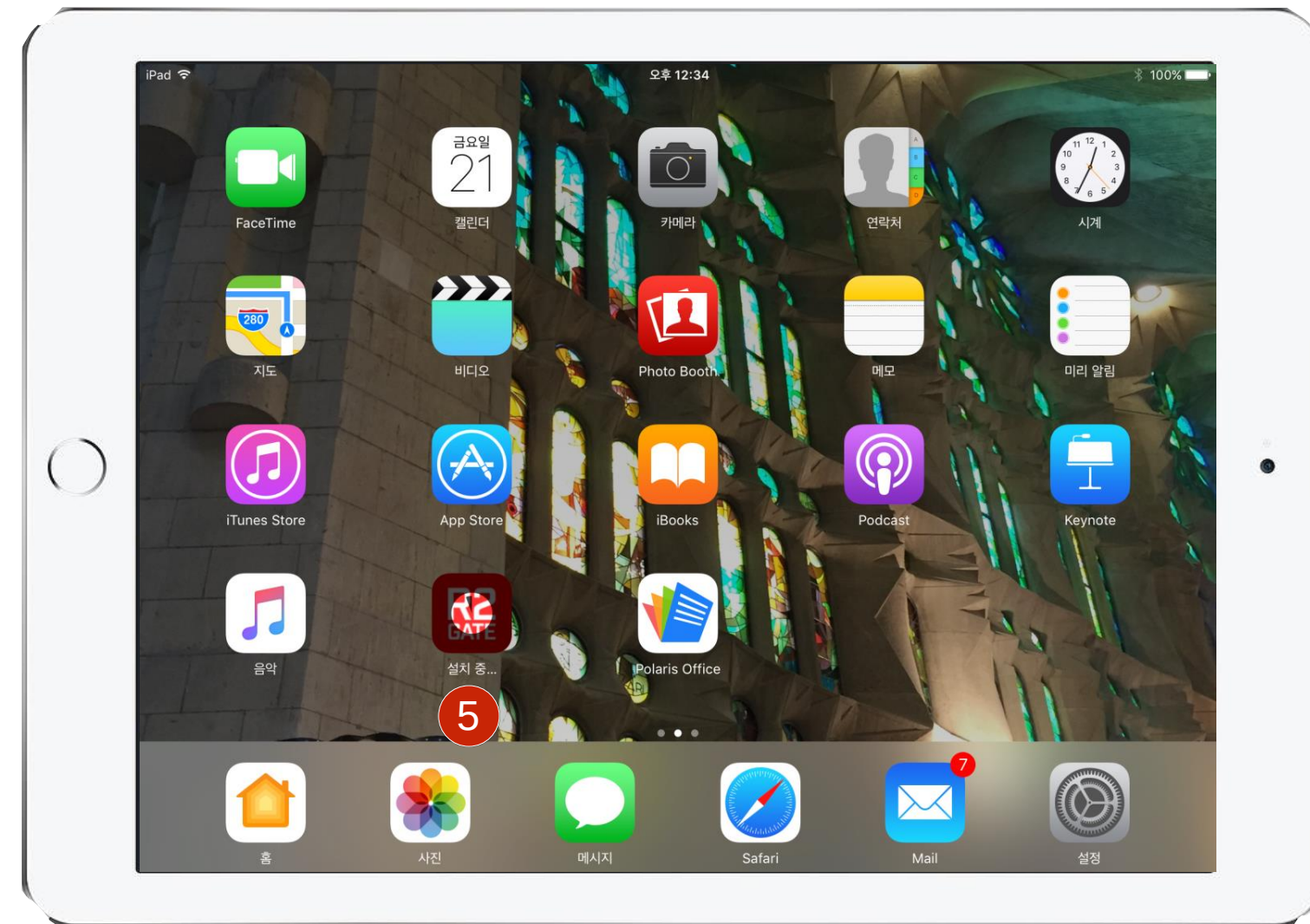
R2  
GATE

R2GATE 2.0  
Apr. 2019

## R2GATE Lite™

### Download & install on iPad

- 5 Wait for installation
- 6 Go to system settings
- 7 Select **General**
- 8 Select **Device Management**
- 9 Select **Megagen Implant Co.,Ltd**



# 3.2 R2GATE Lite™ Download & installation



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R2GATE 2.0  
Apr. 2019

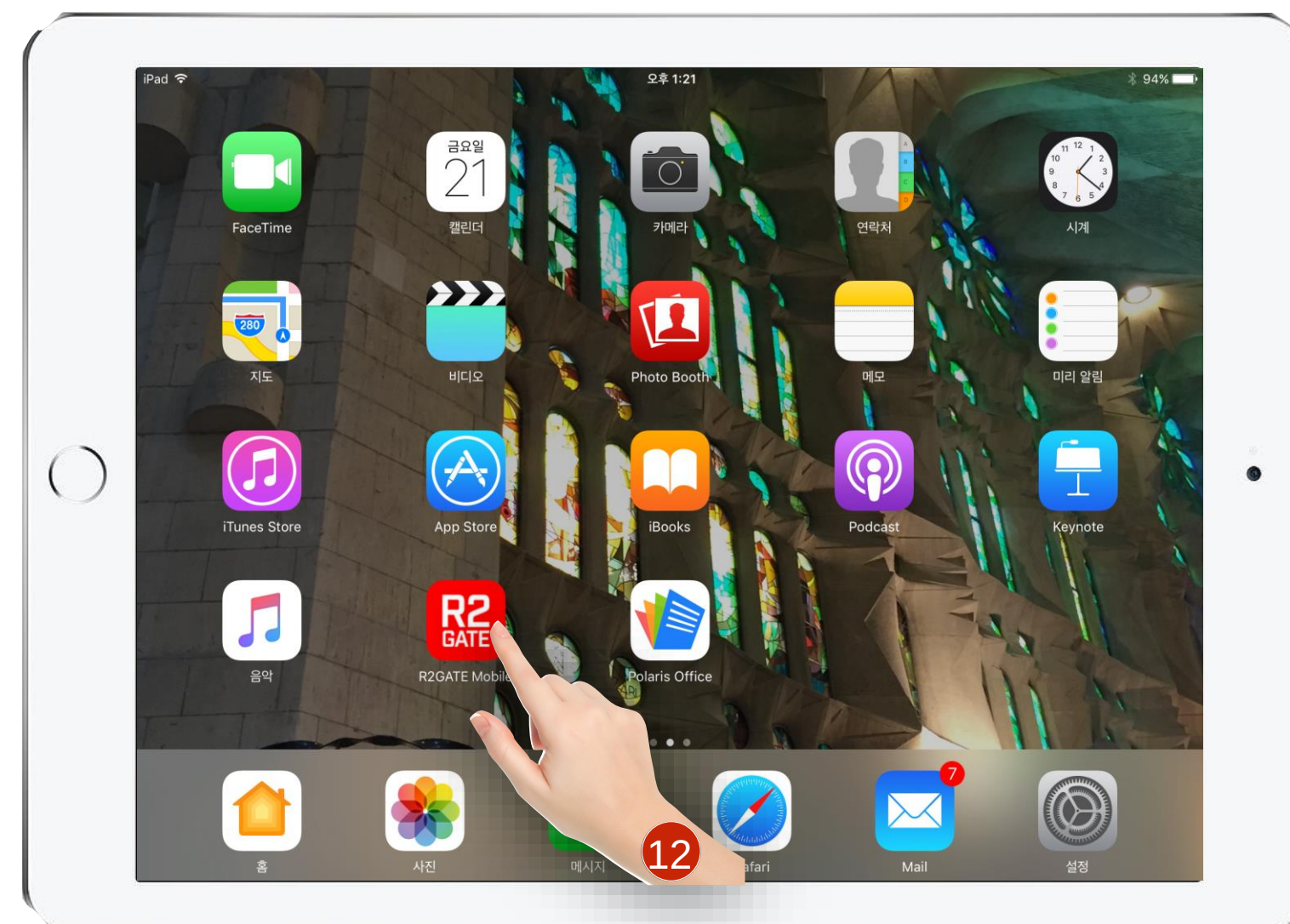
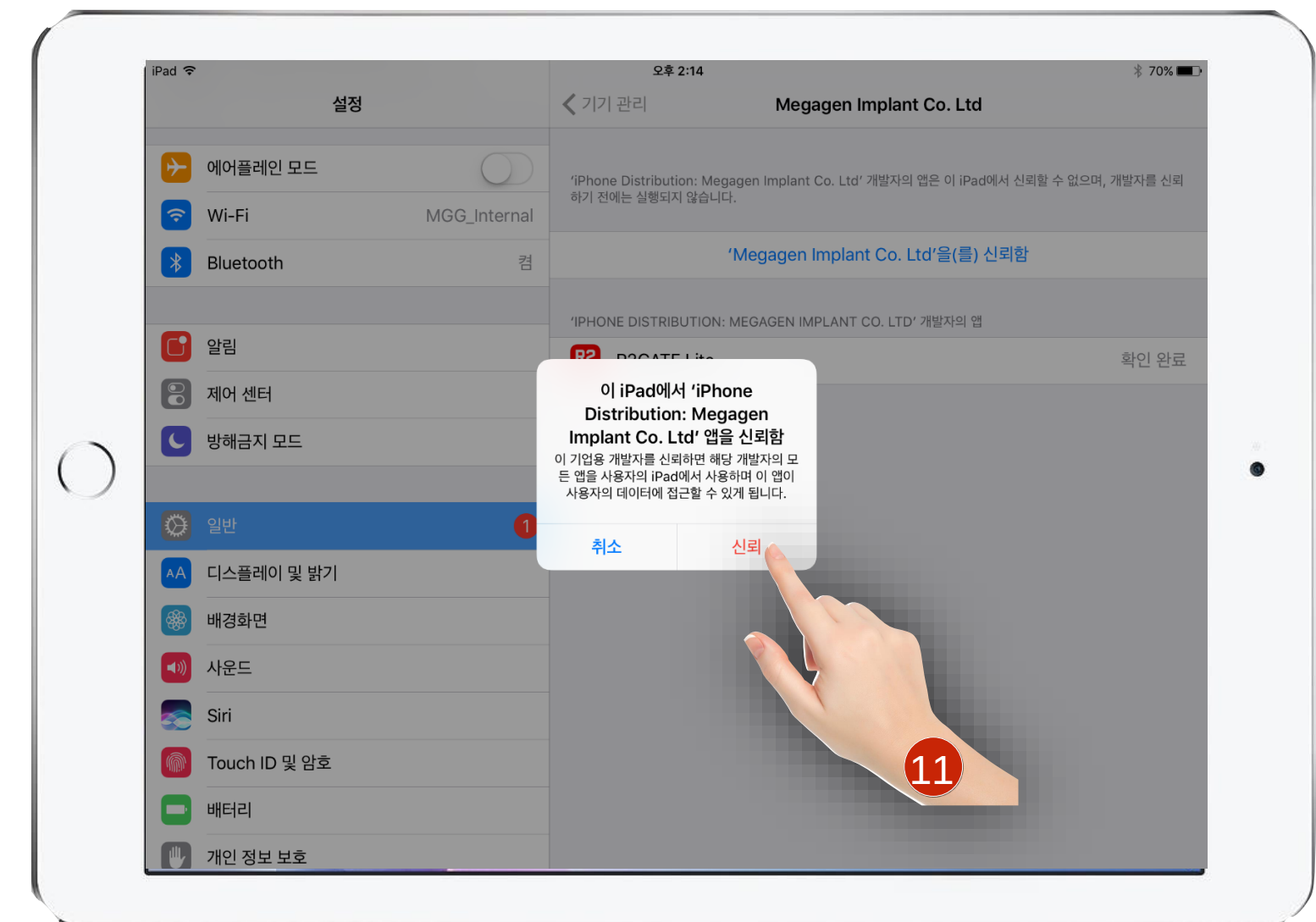
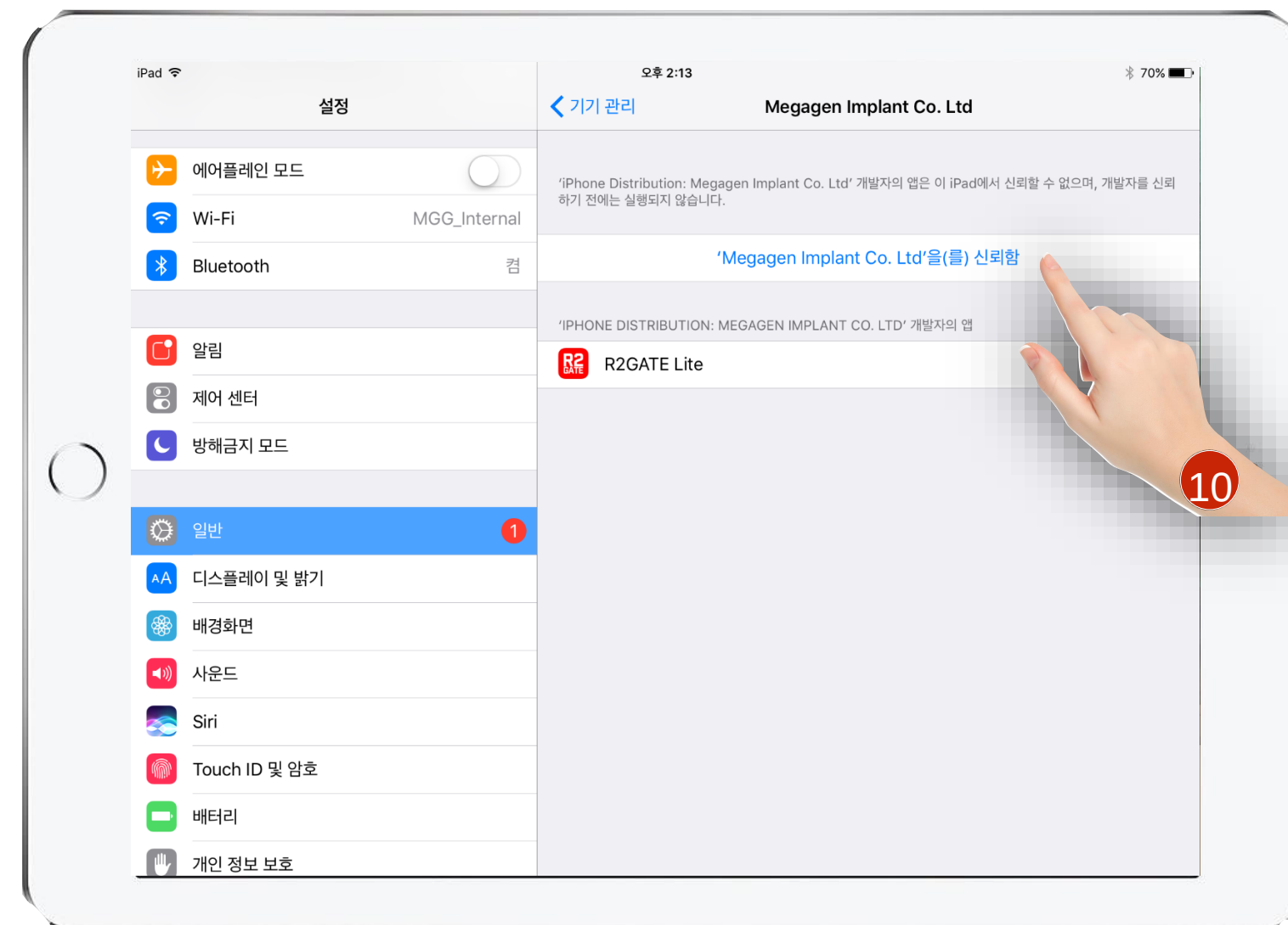
## R2GATE Lite™

### Download & install on iPad

10 Tab "Trust Megagen Implant Co.,Ltd"

11 Tab **Trust** one more time

12 Tab **R2GATE Lite** App



# 3.2 R2GATE Lite™ Download & installation



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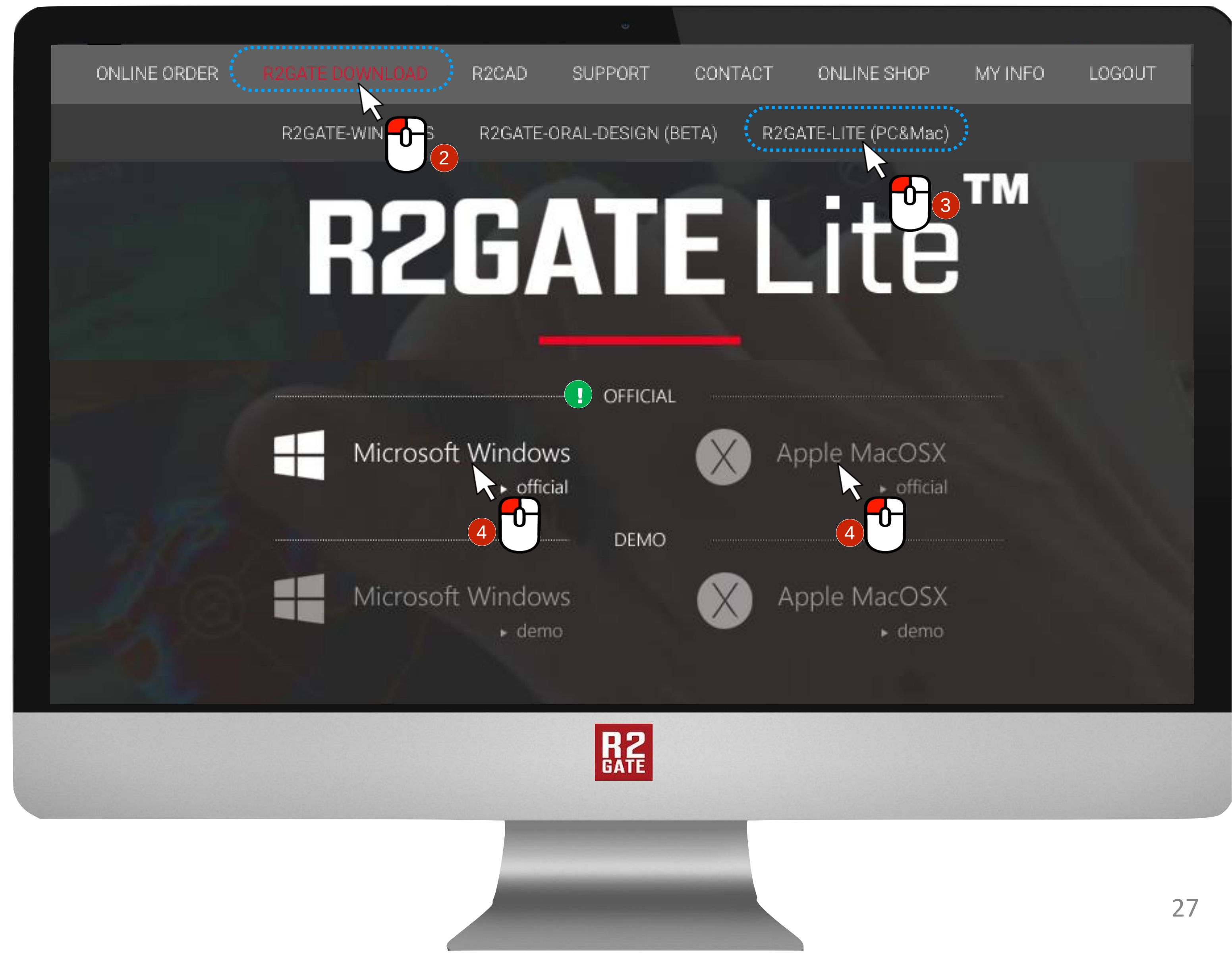
R2  
GATE

R2GATE 2.0  
Apr. 2019

## R2GATE Lite™

### Download & install on PC & MAC

- 1 Visit [www.r2gate.com](http://www.r2gate.com)
- 2 Click **R2GATE DOWNLOAD** (top menu)
- 3 Select **R2GATE-LITE (PC&MAC)**
- 4 Click Windows or MAC version
- ! Official version requires subscription for activation code (Purchase from R2 online shop)
- 5 Download & install **R2GATE Lite**



# 3.3 R2GATE Lite™ How to use



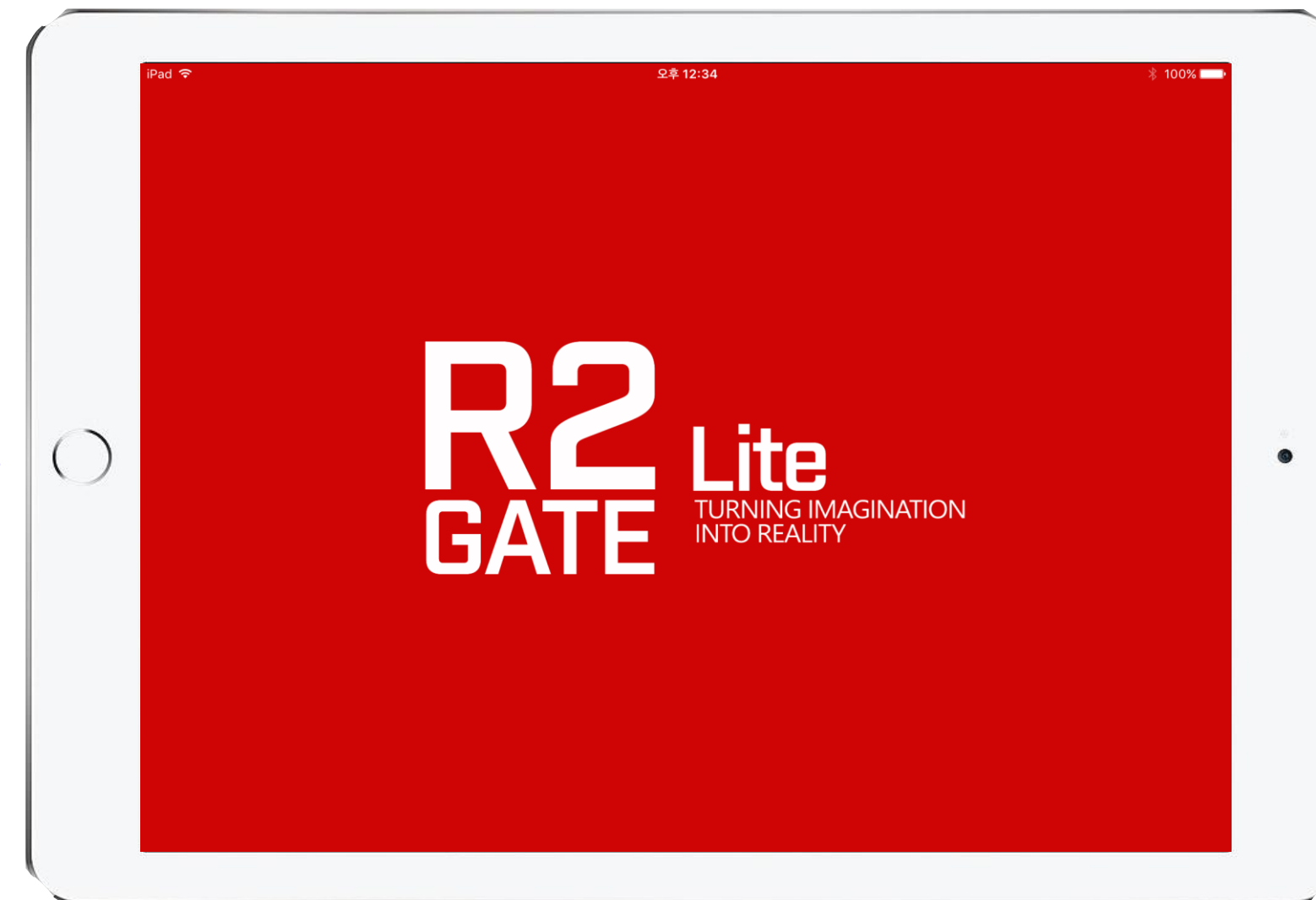
**R2  
GATE**

R2GATE 2.0  
Apr. 2019

## R2 Lite operation

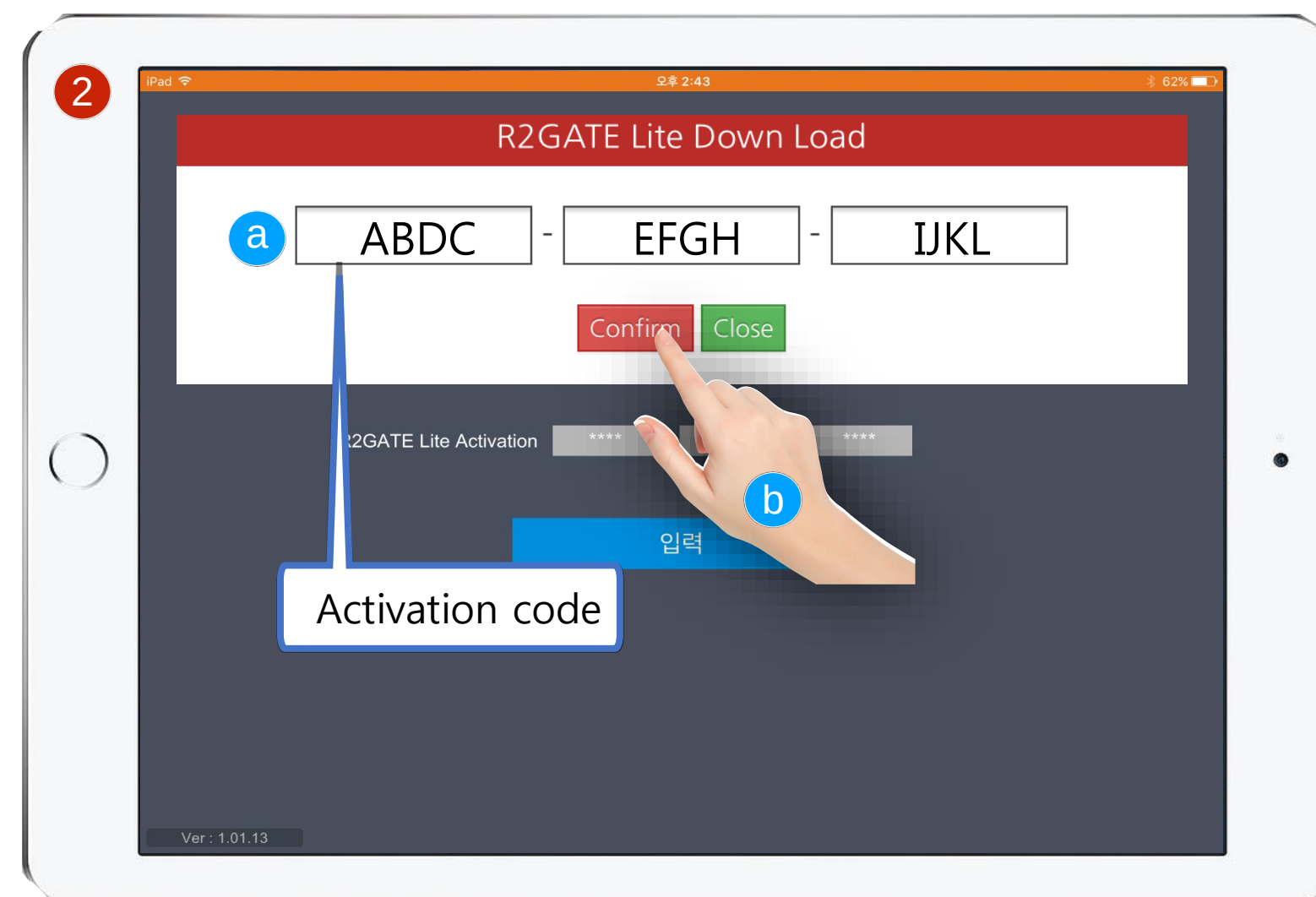
### 1 Log-in with ID & password

- a ID
- b Password
- ! ID & password are same as for [r2gate.com](http://r2gate.com)
- c Log in
- d Register (If not yet registered, touch & complete)
- e Choose language



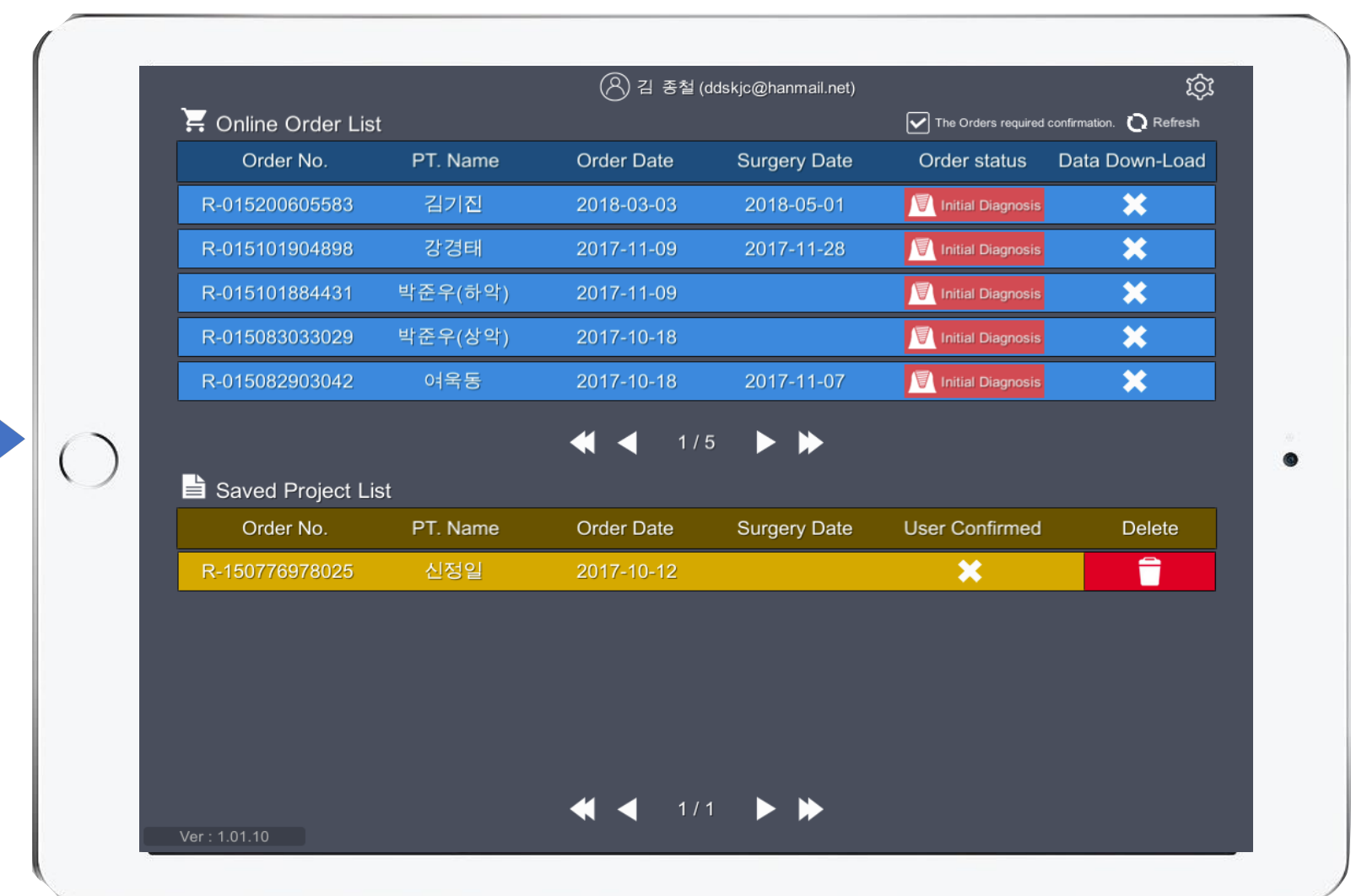
### 2 Go to system settings

- a Activation code  
(Purchase from R2 online shop)
- b CONFIRM



### 3 Check order list

- ! Mouse option is also available for PC version



## On-line order list

- 1 Online order list  
Displays user orders collected from web order system
  - a General order information
  - b Order status
  - c Mobile data download status
  - X Not downloaded
- 2 Filter options for order data
  - ☒ Display orders requiring confirmation by clinician
  - ☐ Display all orders
- 3 Refresh order list
- 4 Saved orders, where data are already downloaded from web
- 5 Confirmation status
  - X Awaiting confirmation
  - ✓ Confirmed

Confirmed status can NOT be changed without contacting R2 Center
- 6 Tap order to download data & open

1 Online Order List

2 Search option

3 Refresh

4 Saved Project List

5 User Confirmed

6 Tap order to download data & open

Ver : 1.01.10

# 3.3 R2GATE Lite™ How to use



**R2  
GATE**

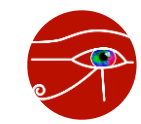
R2GATE 2.0  
Apr. 2019

## View implant mode



### R2GATE Lite interface

R2GATE analyzes & shows condition of bone & gingiva, plus possible prosthetics for best treatment plan



### Digital EYE™

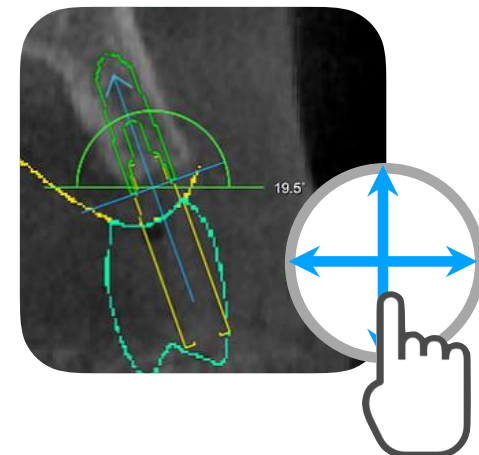
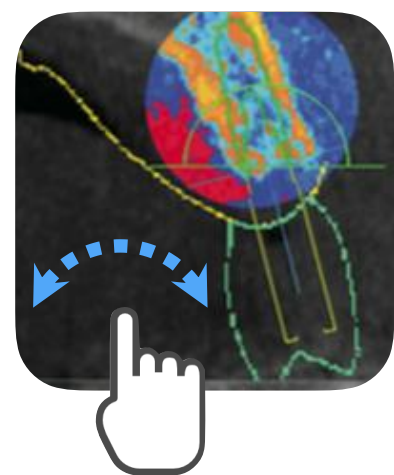
Digital EYE provides clear colour-coded analysis of bone morphology, which is essential for planning immediate loading & ONE-DAY IMPLANTS



### Easy to use

Easy touch-screen control for selecting, zooming & modifying implant position, plus angulation

- **Rotation:** Touch screen & drag with one finger
- **Movement:** Touch MOVING icon & drag it
- **Zoom in & out:** zoom in & out using two fingers



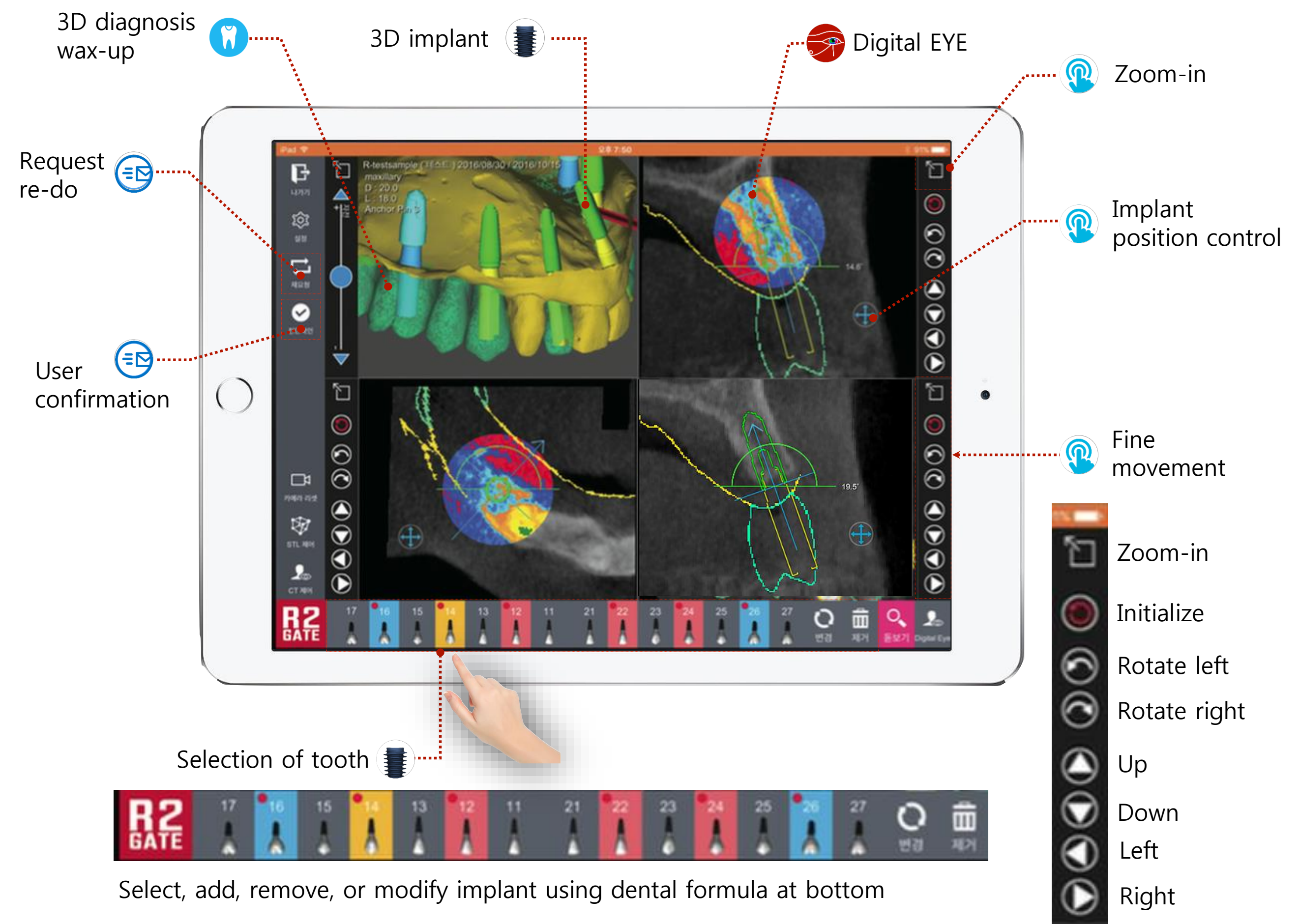
### Click for confirmation

Click confirmation & amended data is automatically sent to R2 Centre for immediate action



### Auto recording

All revisions are automatically tracked and saved



Select, add, remove, or modify implant using dental formula at bottom

- Pink represents implant already placed by R2 Centre
- Yellow indicates currently displayed implant
- blue represents implant created by user
- Red dot indicates user has made changes

# 3.3 R2GATE Lite™ How to use



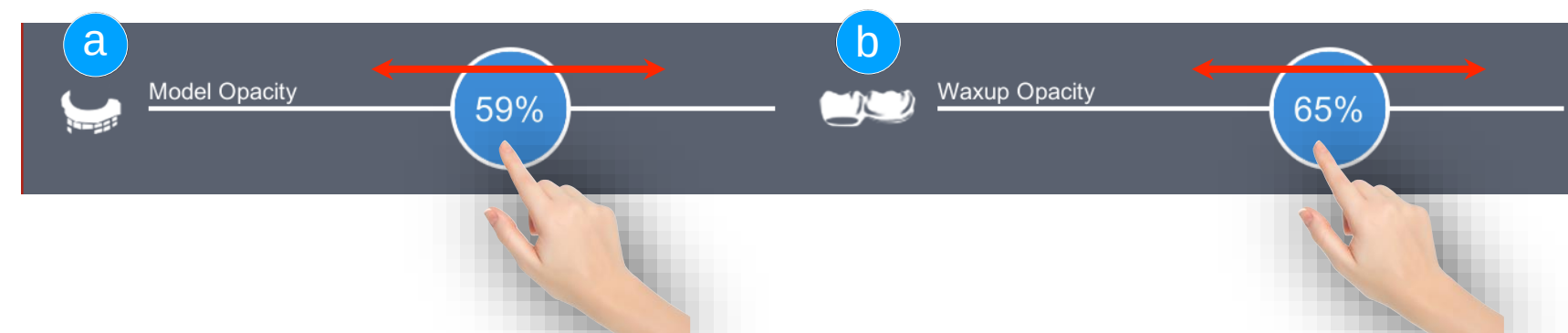
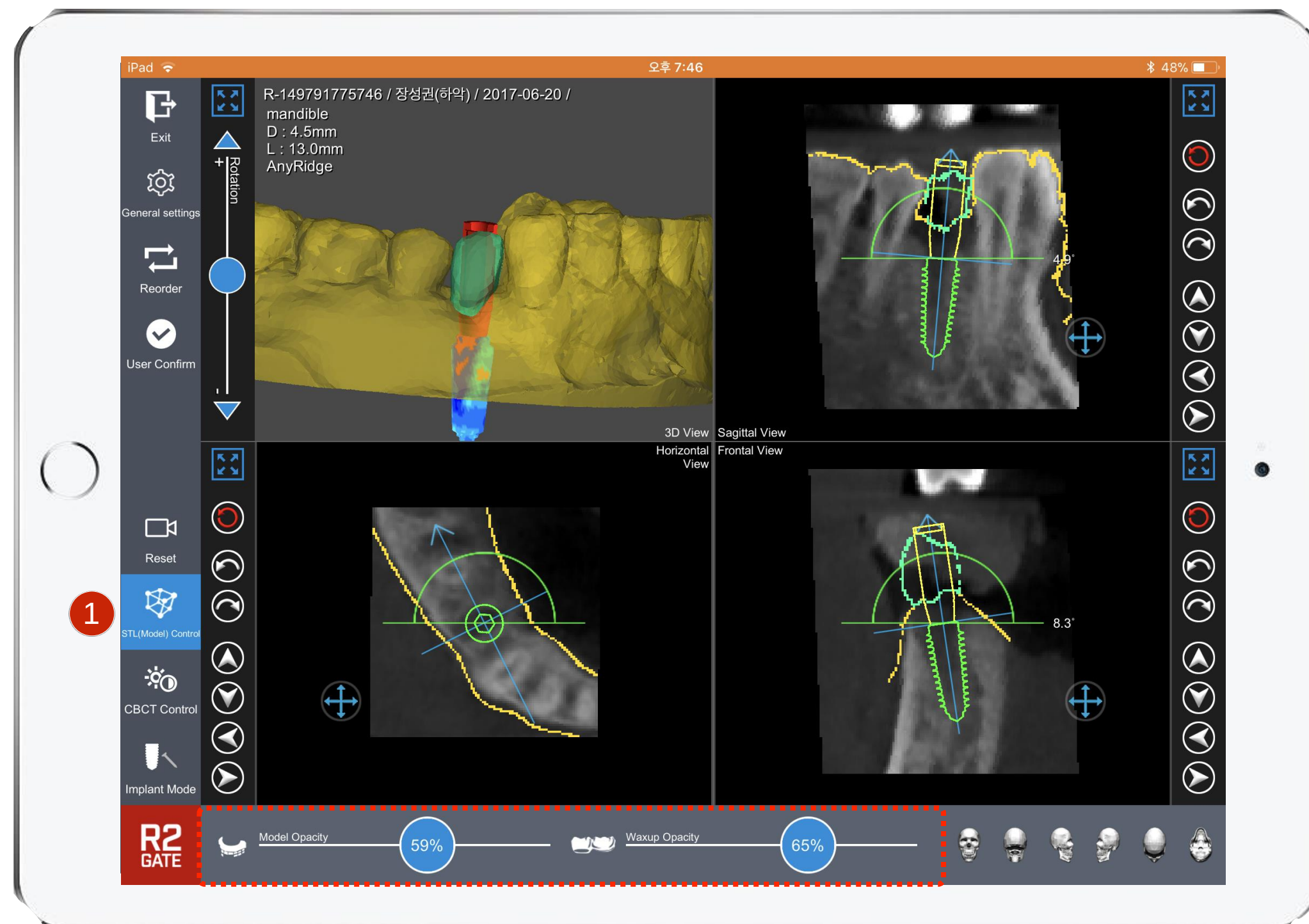
**R2  
GATE**

R2GATE 2.0  
Apr. 2019

## CBCT & STL controls

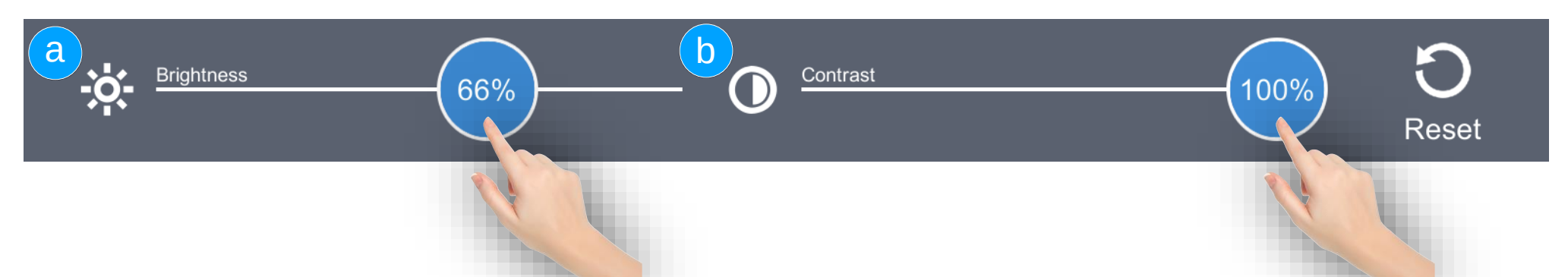
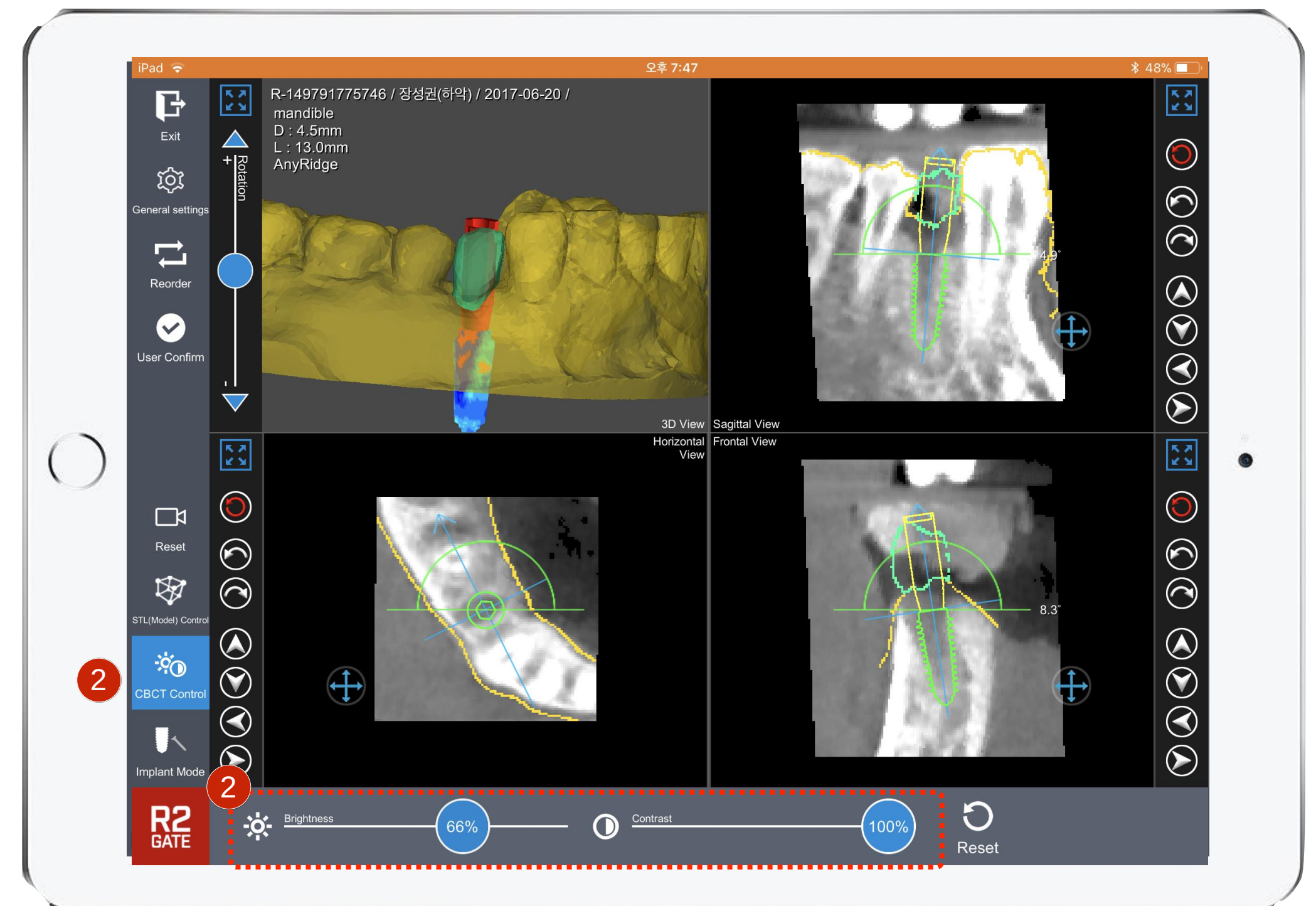
### 1 STL controls

- a Model opacity control
- b Wax-up opacity control



### 2 CBCT controls

- a Brightness control
- b Contrast control



# 3.3 R2GATE Lite™ How to use

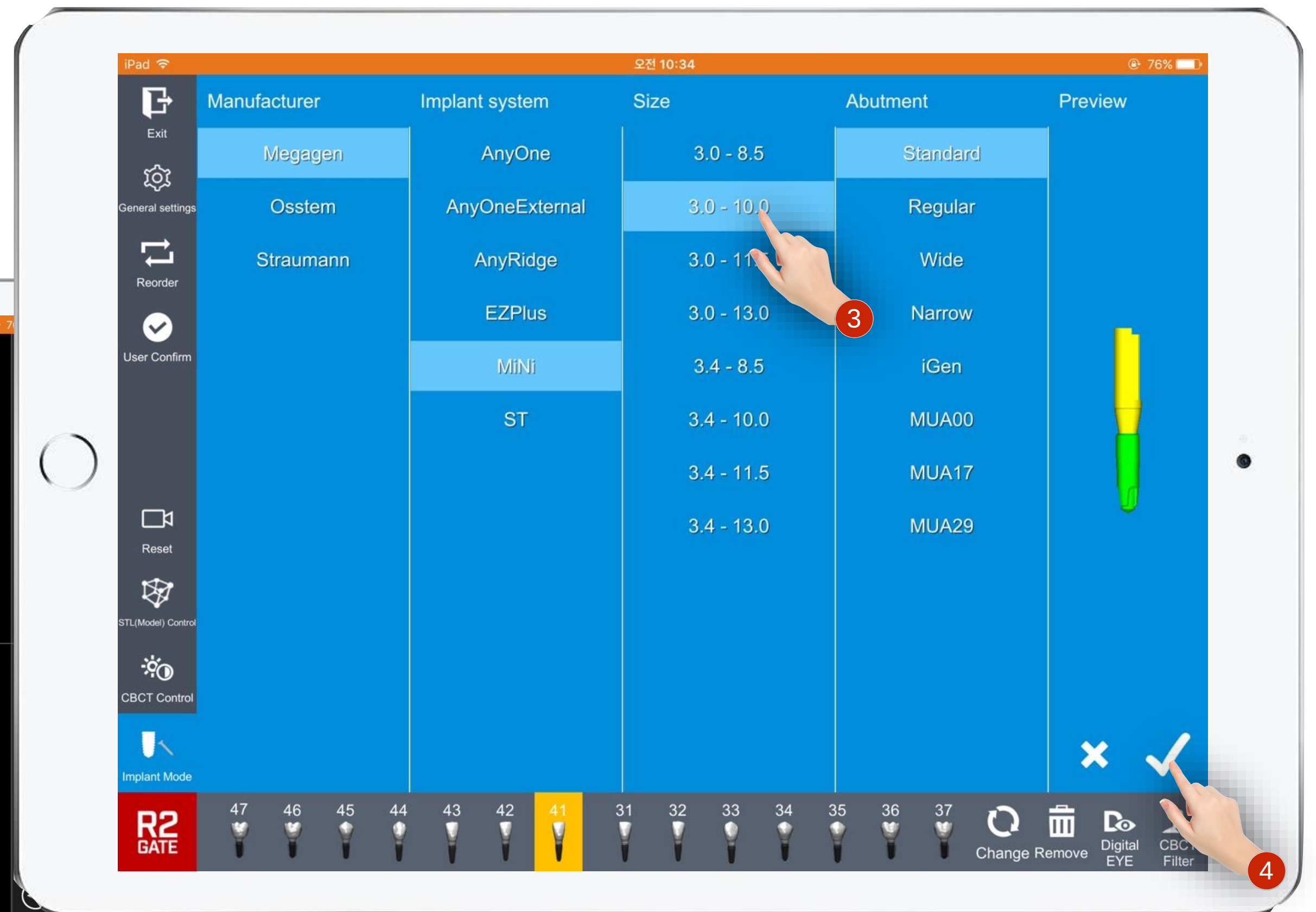
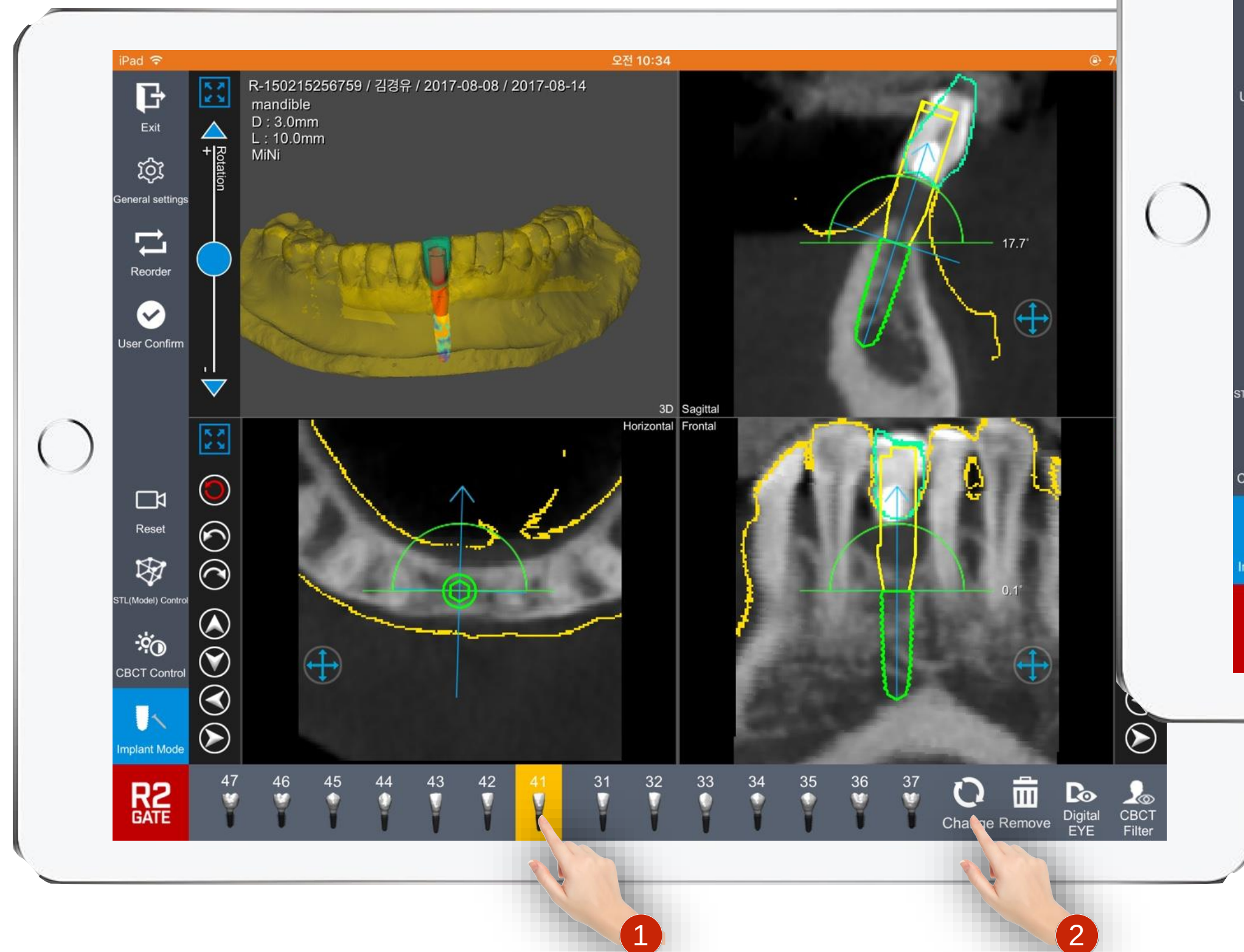


**R2  
GATE**

R2GATE 2.0  
Apr. 2019

## Changing implant

- 1 Select implant
- 2 Tap **CHANGE** icon
- 3 Select implant system & size
- 4 Tap ✓ icon



# 3.3 R2GATE Lite™

## How to use



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Backup



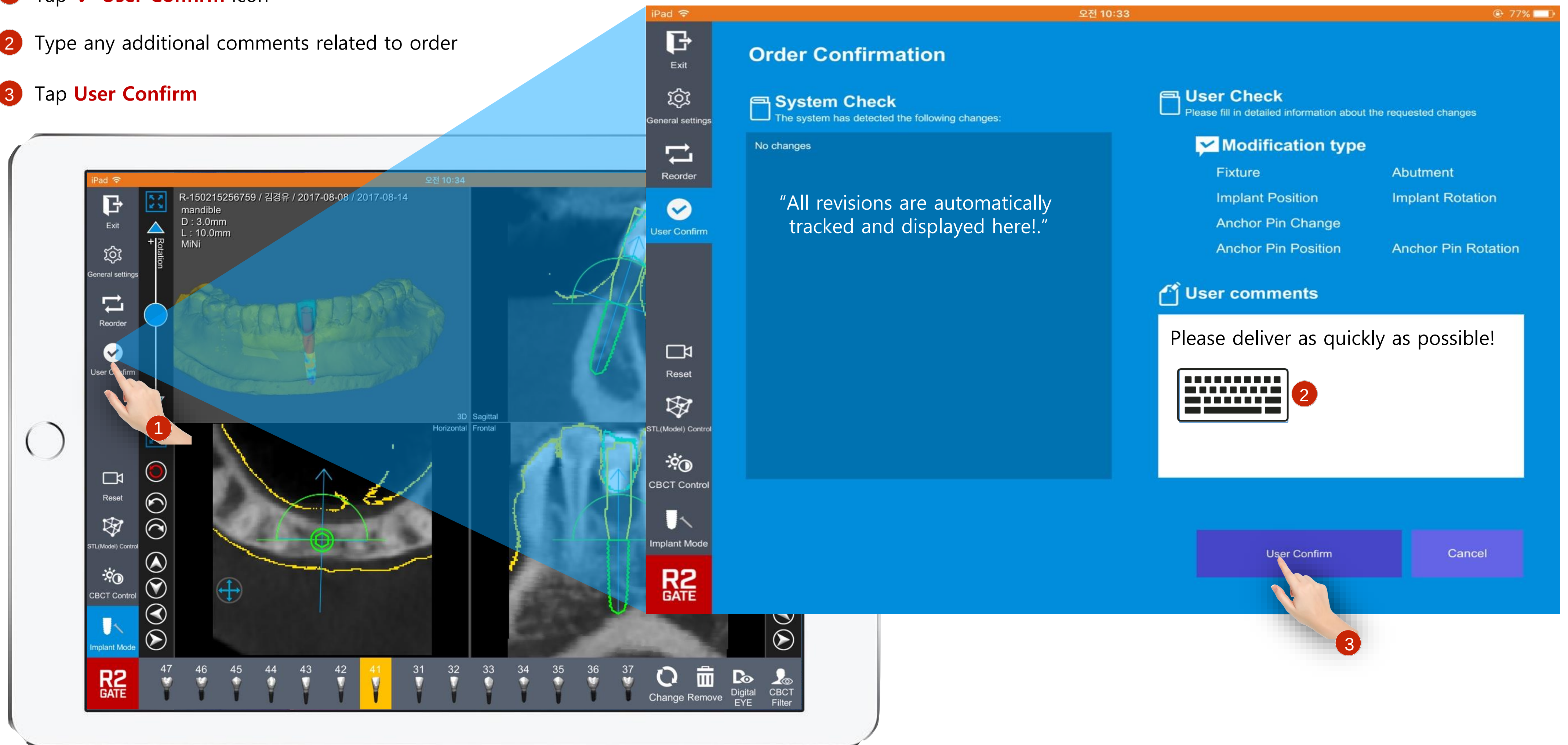
Restore

R2  
GATE

R2GATE 2.0  
Apr. 2019

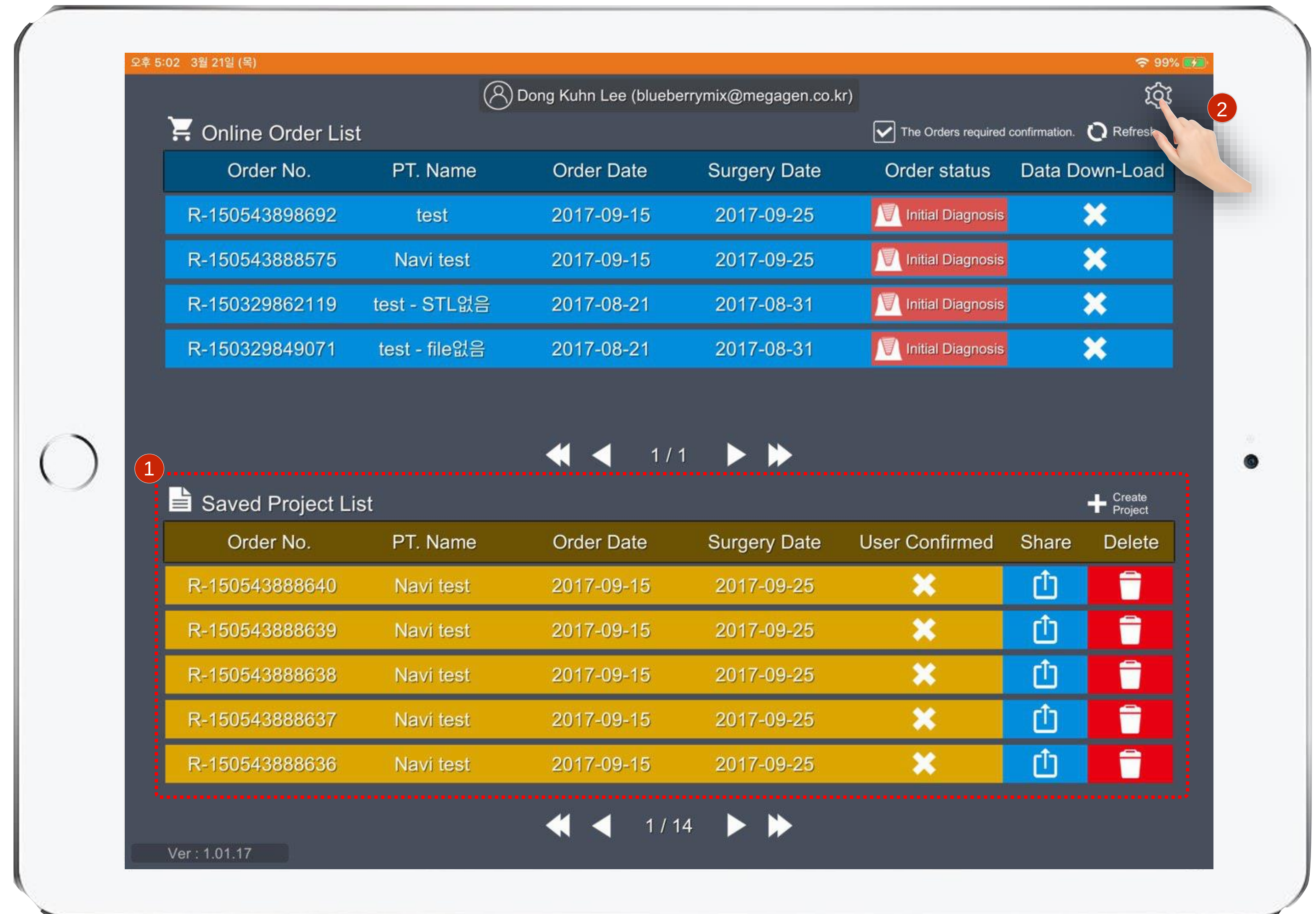
## User confirmation

- 1 Tap ✓ **User Confirm** icon
- 2 Type any additional comments related to order
- 3 Tap **User Confirm**

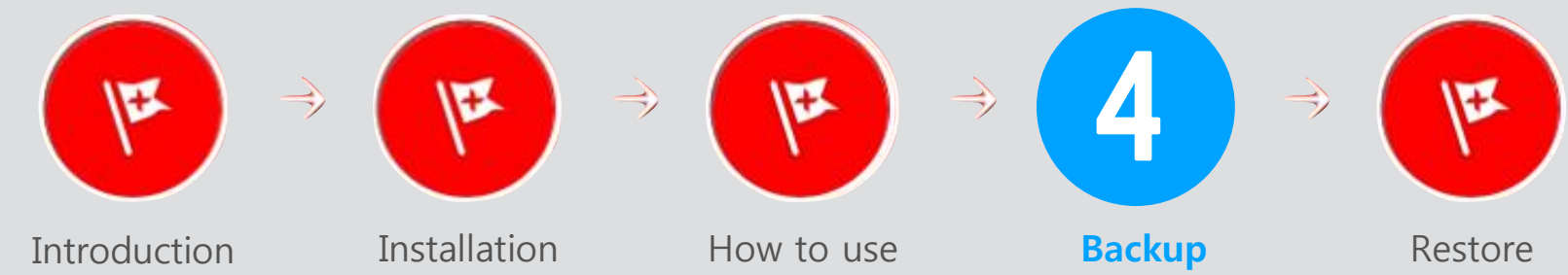


## Backup

- 1 Check backup file list.
- 2 Select the option button to open the **option** menu



# 3.4 R2GATE Lite™ Backup

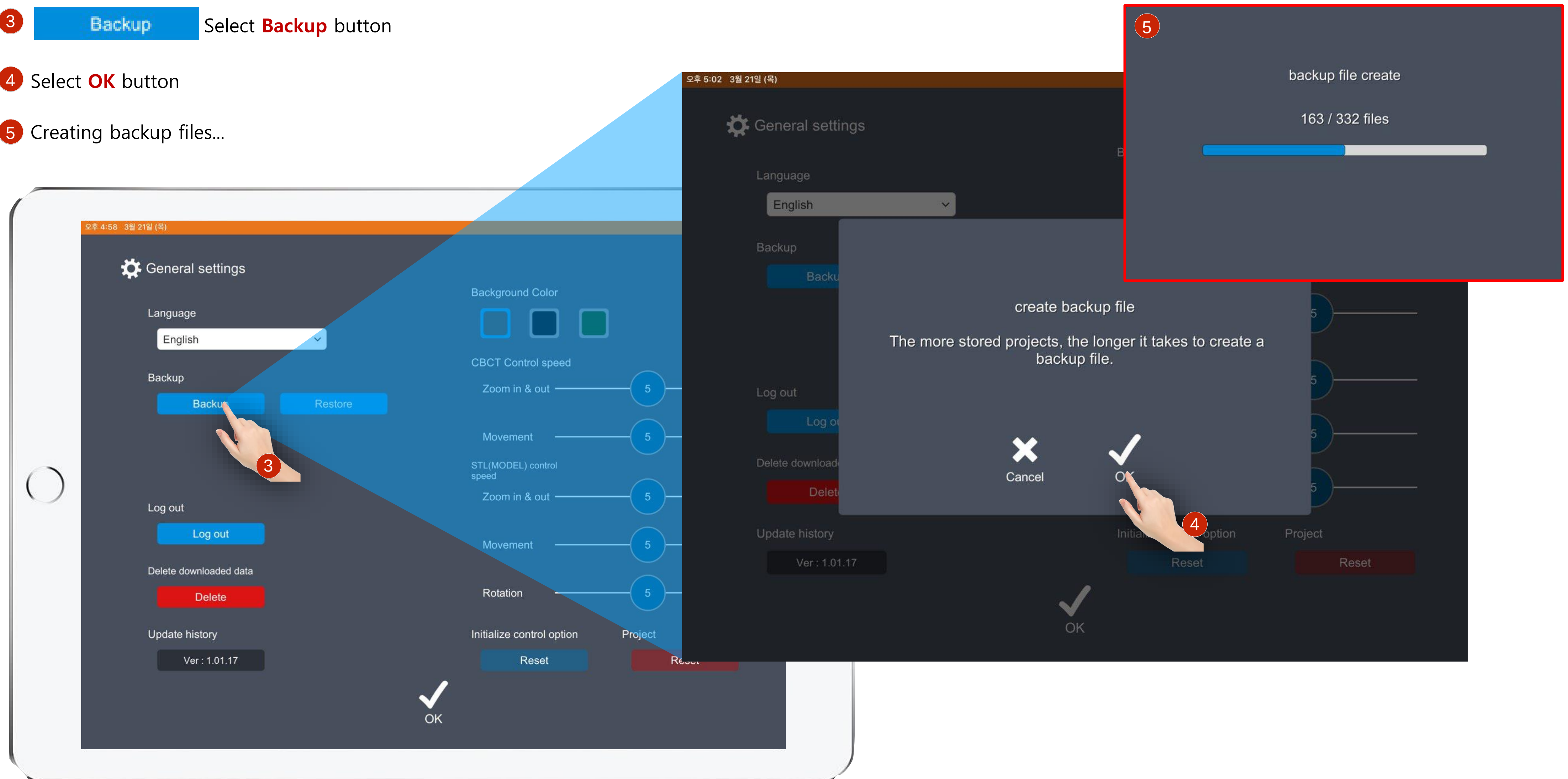


R2  
GATE

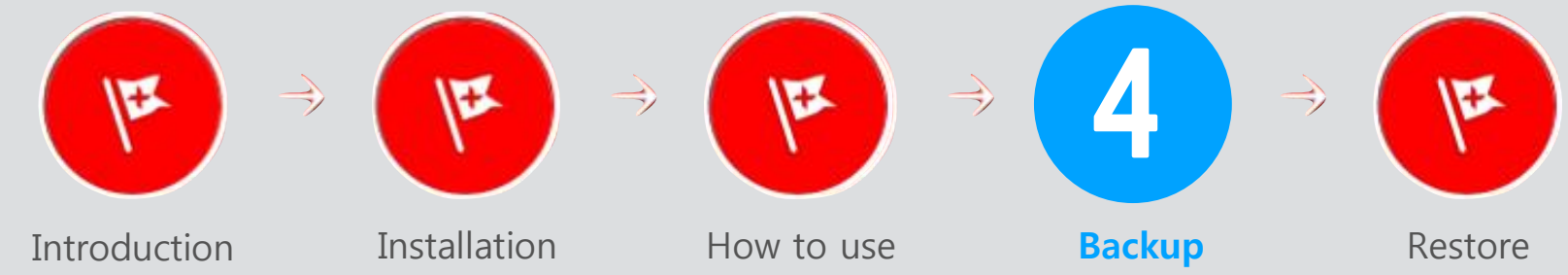
R2GATE 2.0  
Apr. 2019

## Backup

- 3 **Backup** Select **Backup** button
- 4 Select **OK** button
- 5 Creating backup files...



# 3.4 R2GATE Lite™ Backup

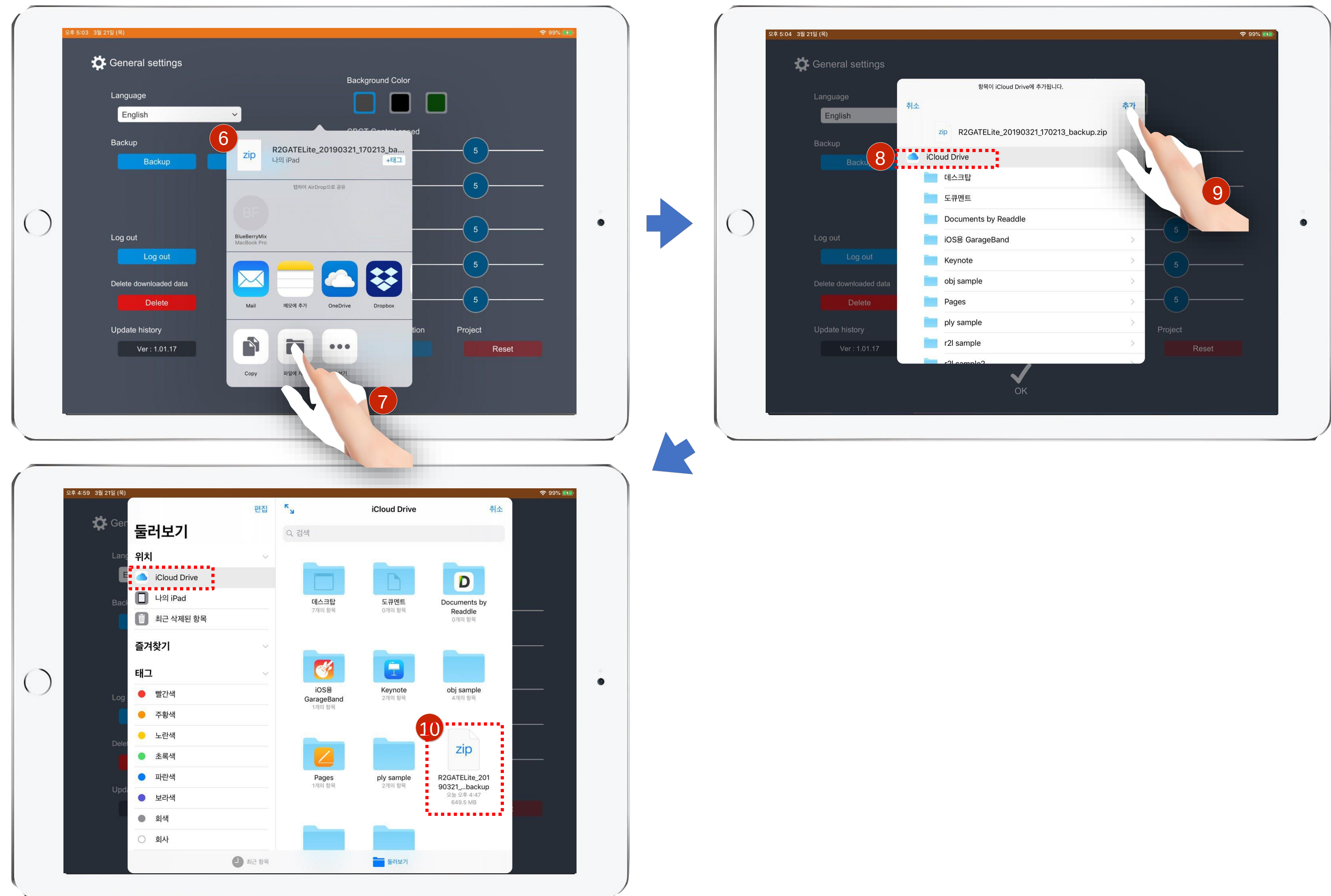


R2  
GATE

R2GATE 2.0  
Apr. 2019

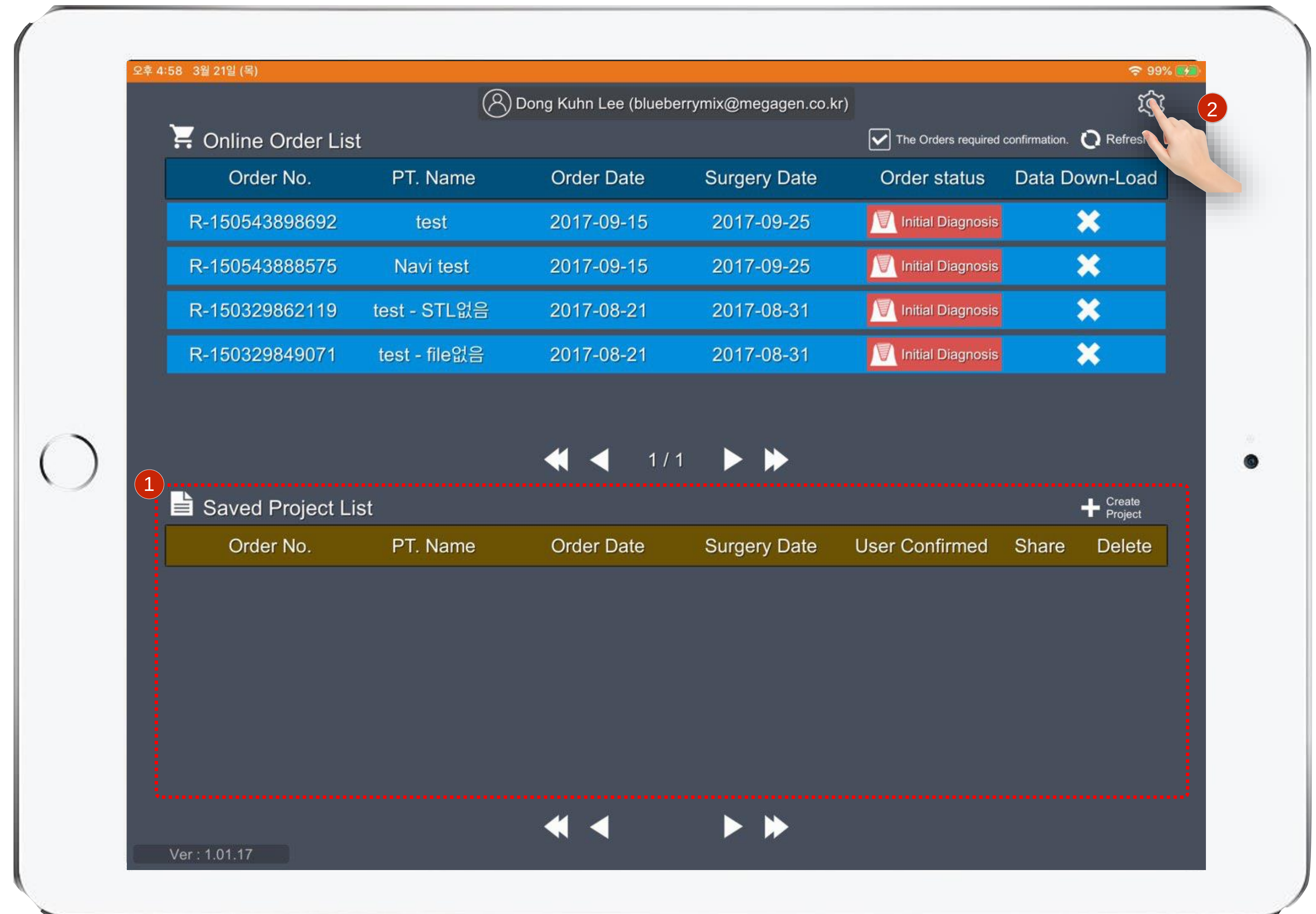
## Backup

- 6 When creating backup file is complete, sharing menu is displayed
- 7 Select **Save to file**
  - ! Other option AirDrop is accesible
- 8 Selection menu for storage location is displayed  
Select iCloud Drive(storage location).
- 9 Press **Add** button to save the backup file to the selected location
- 10 Backup file saved in iCloud Drive
  - ! Save as R2GATELite\_DATE\_TIME.zip format



## Restore

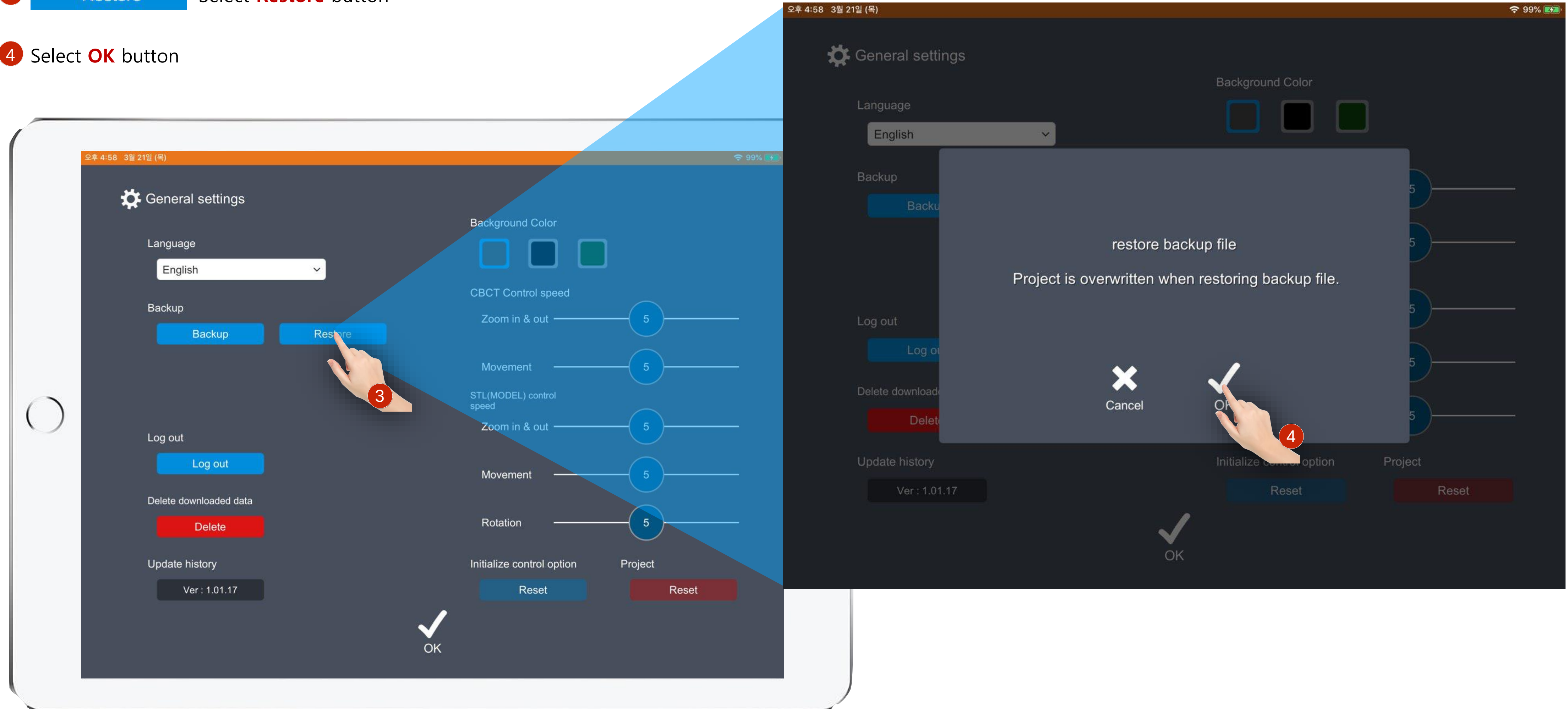
- 1 List before restoration
- 2 Select the option button to open the **option** menu



## Restore

3 **Restore** Select **Restore** button

4 Select **OK** button





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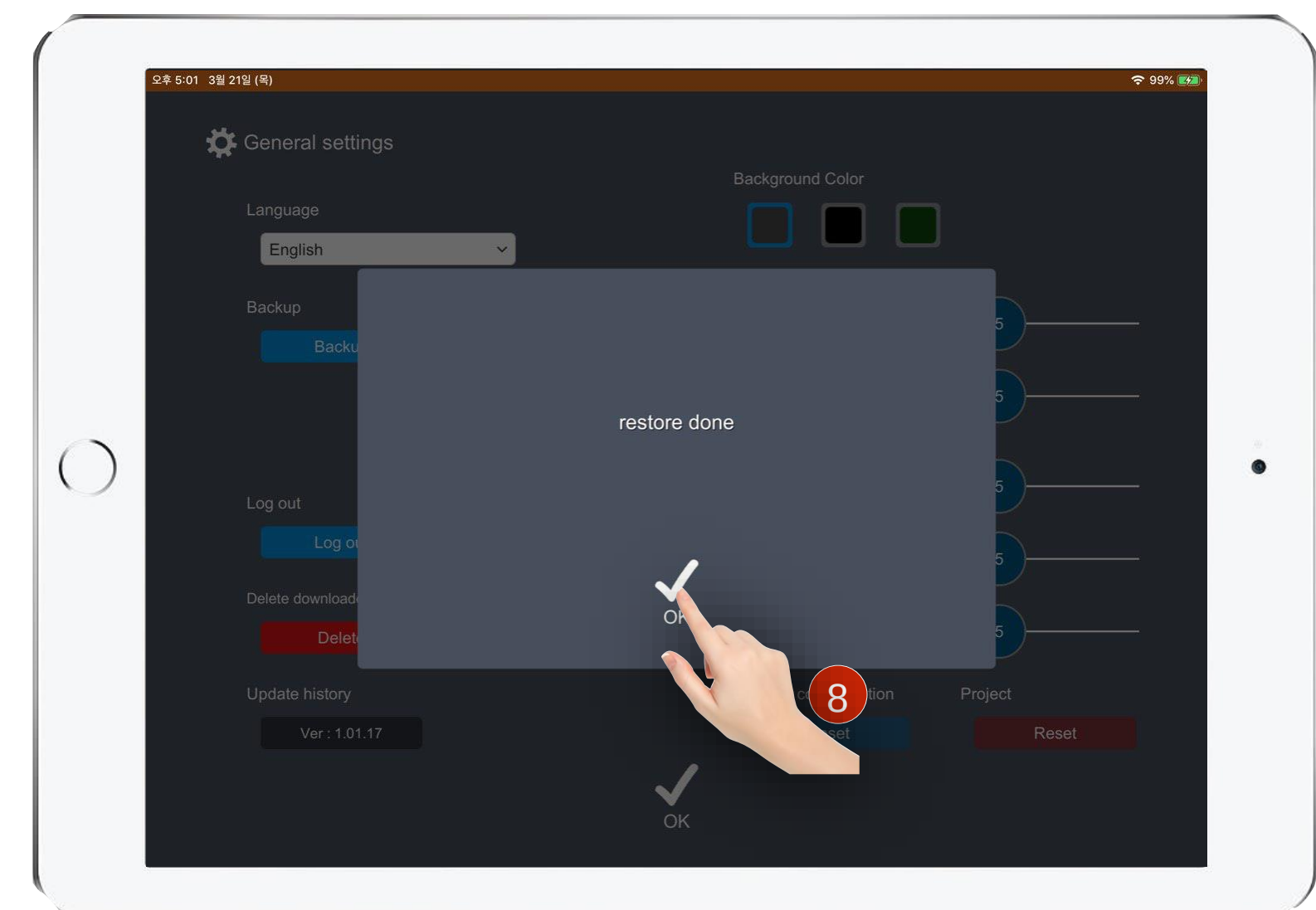
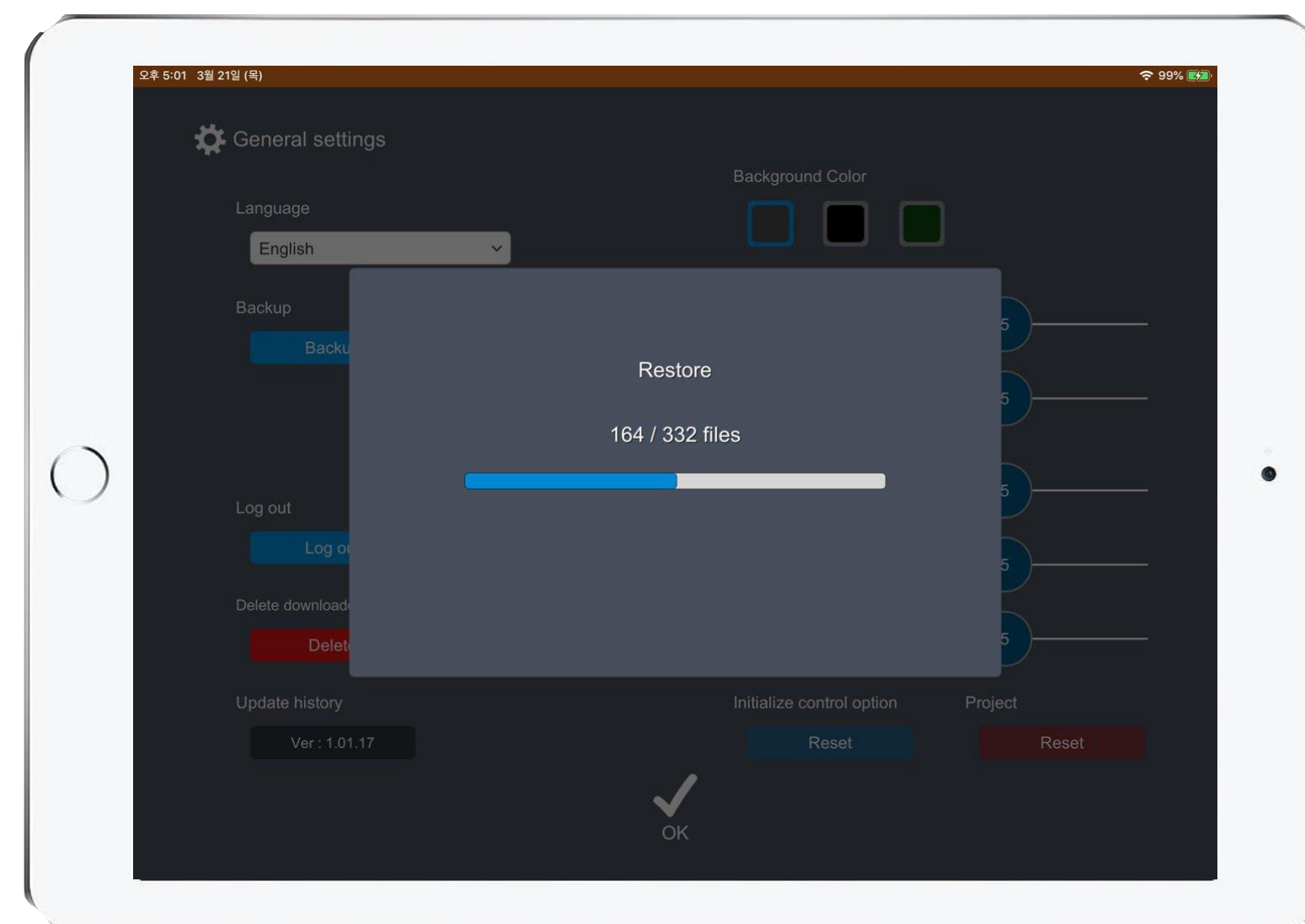
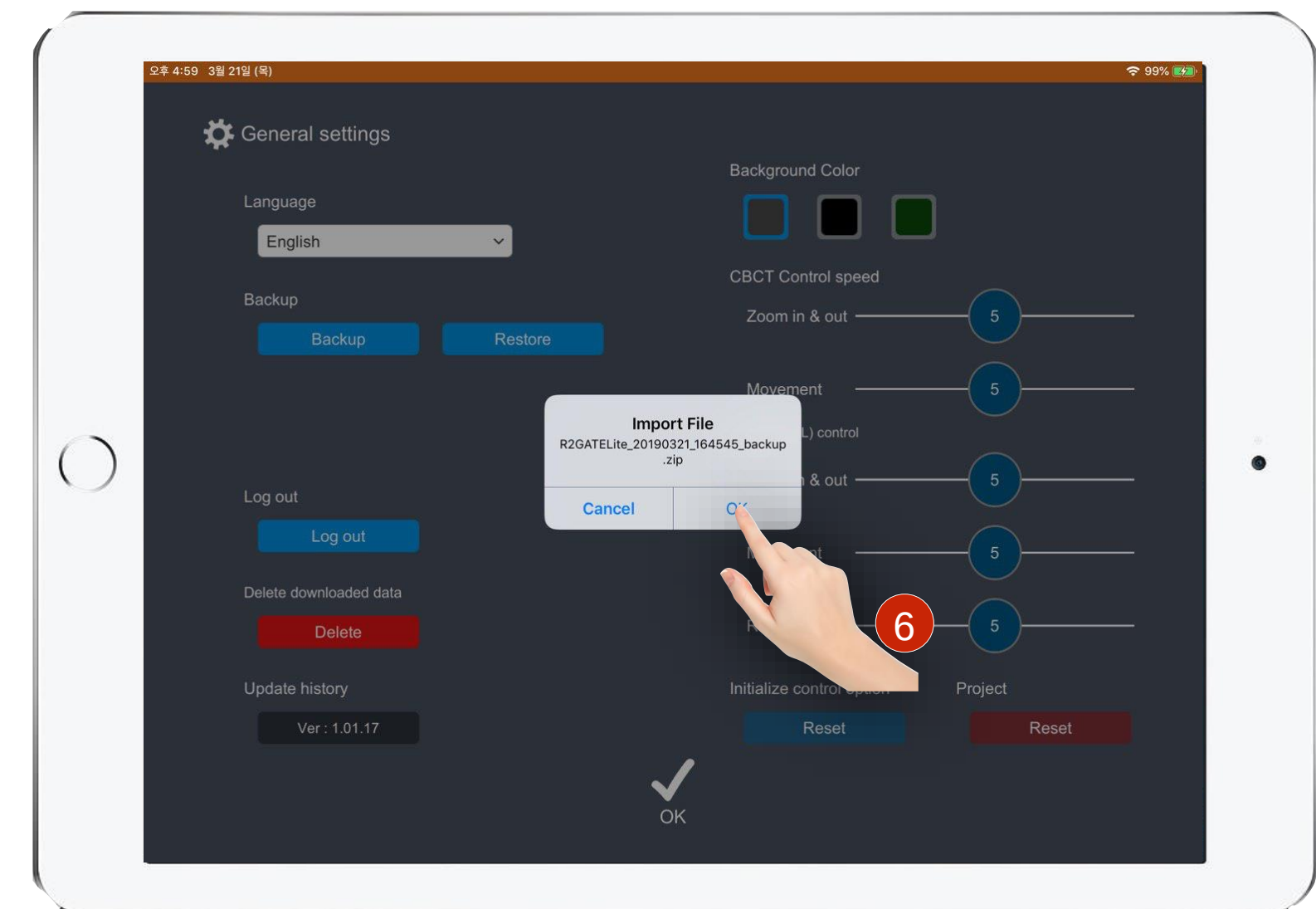
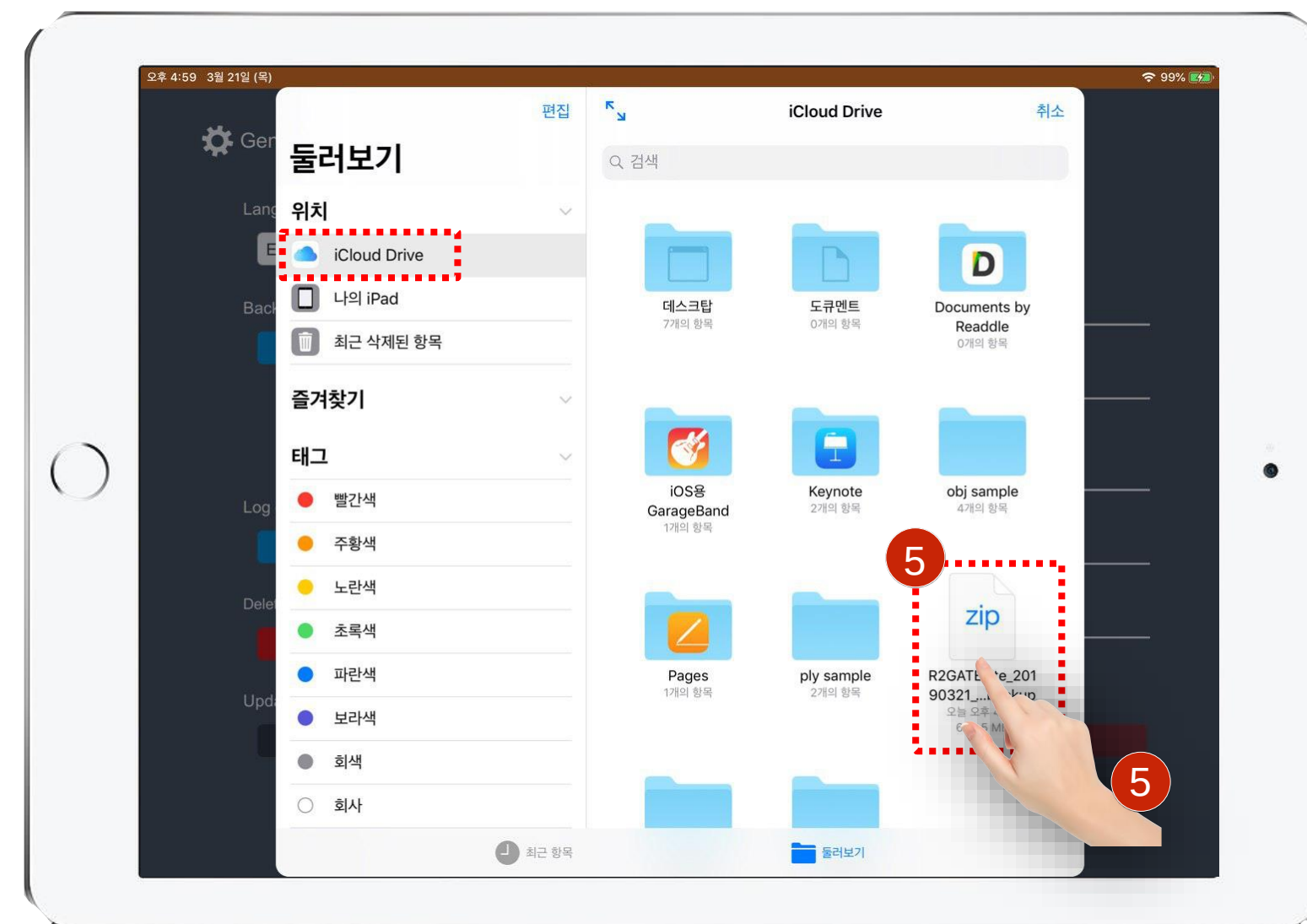
Backup



Restore

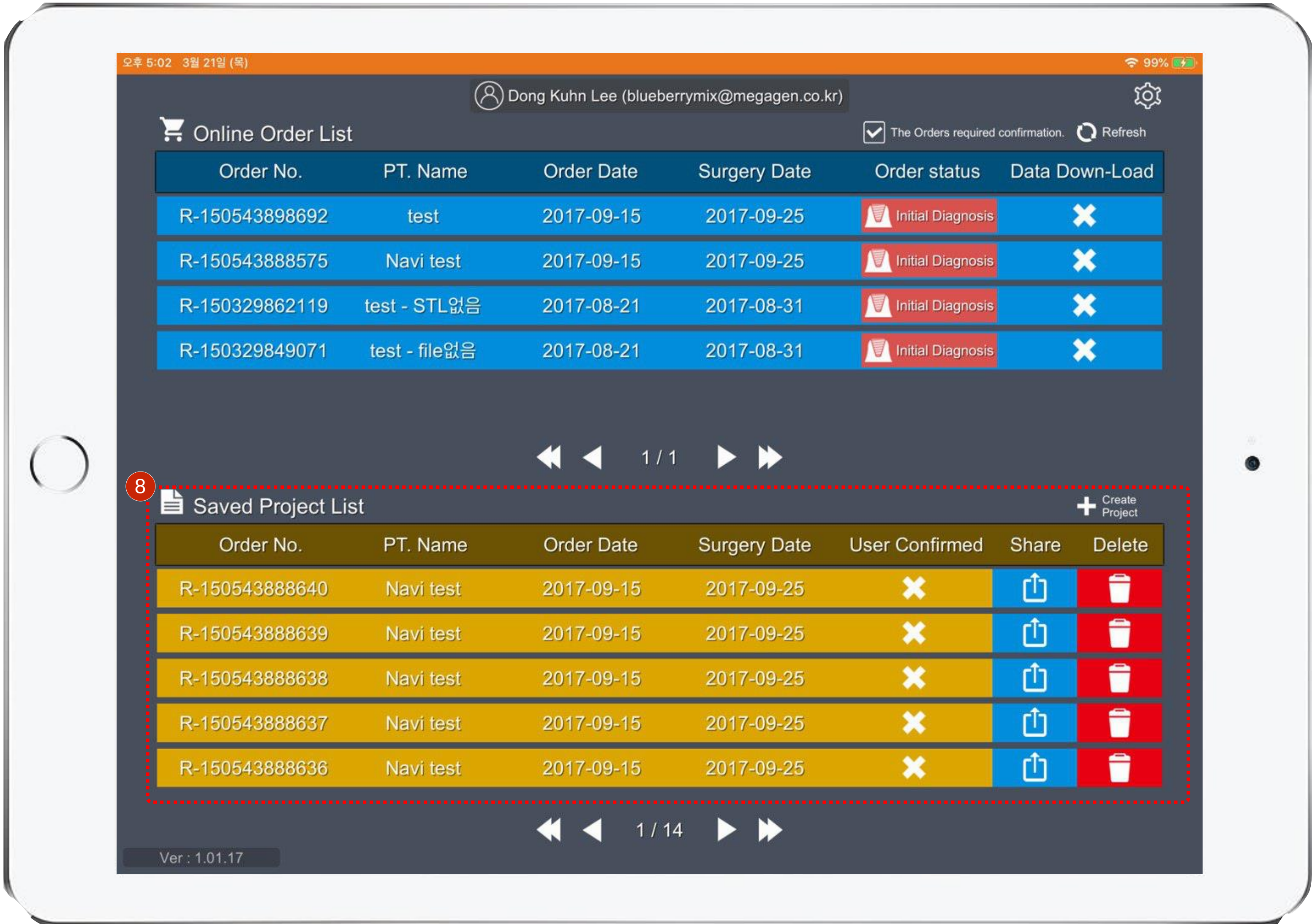
## Restore

- 5 Backup file saved in iCloud Drive
  - ! Save as R2GATELite\_DATE\_TIME.zip format
- 6 Select **OK** button
- 7 Restoring...
- 8 Restoration is done



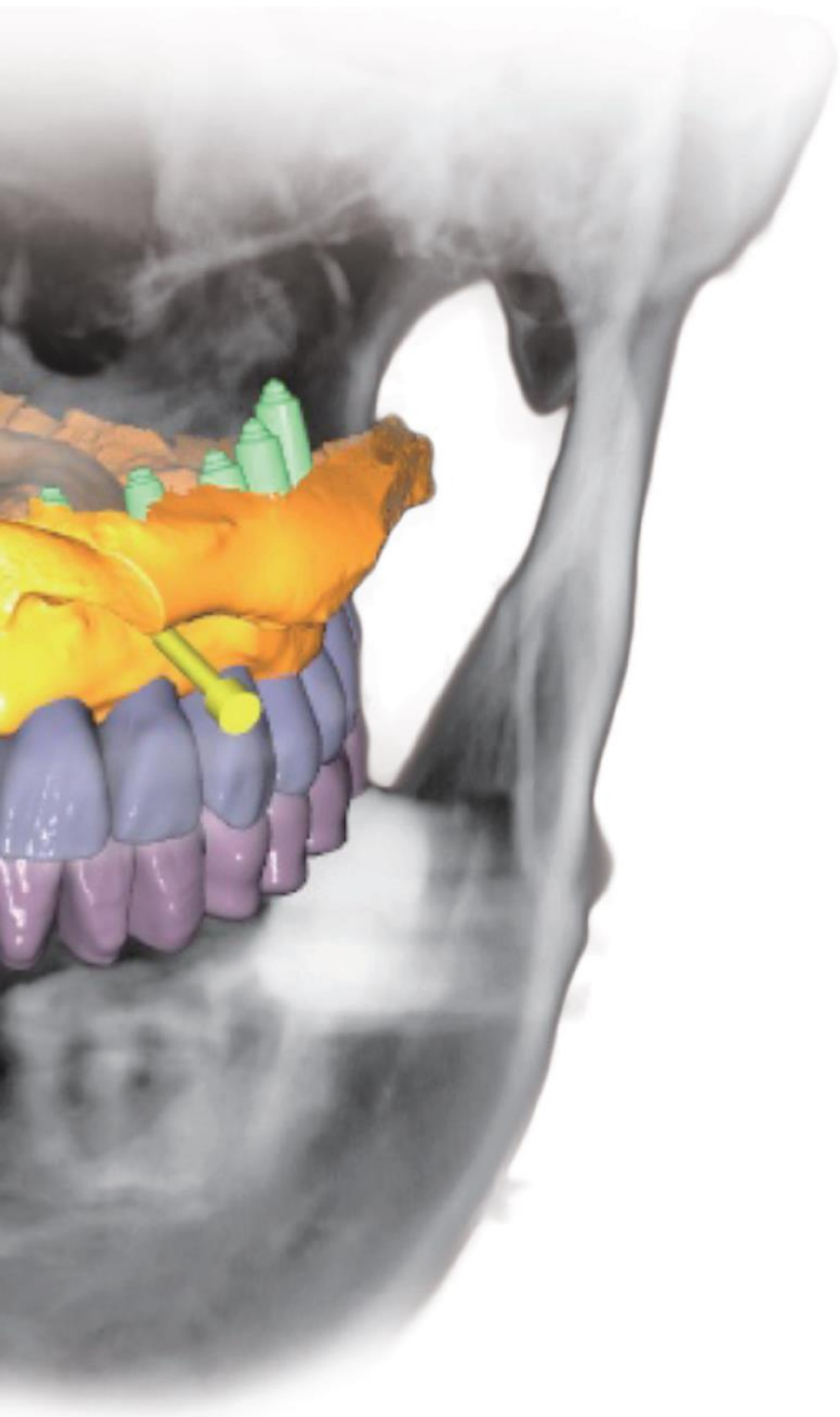
# Restore

8 Restoration complete



**R2GATE™**

Turning imagination into reality



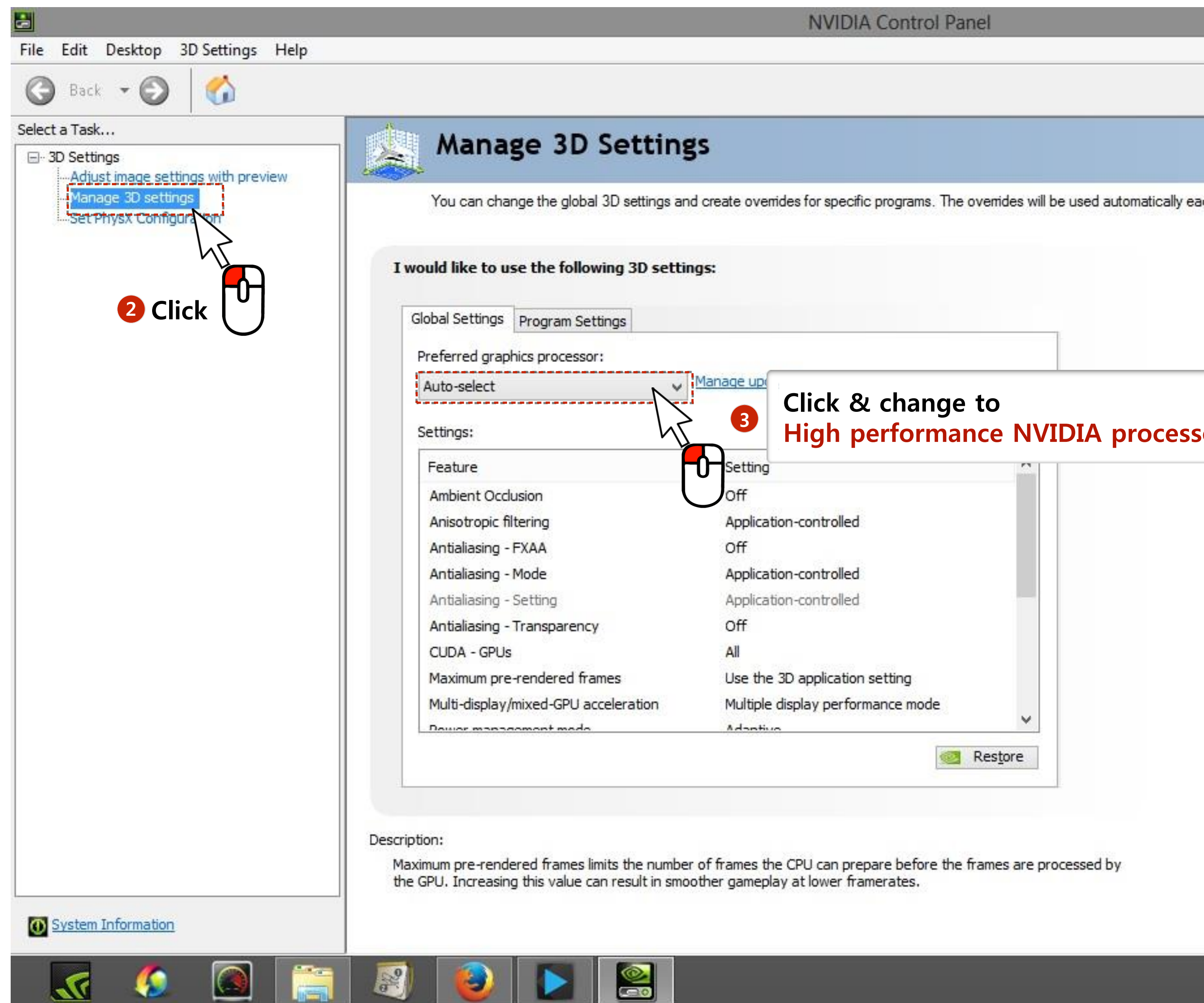
# 4 Appendix

# 4.1 Troubleshooting NVIDIA graphic card setting

## R2GATE is not working properly or slow?

Use NVIDIA graphic card setting for R2GATE

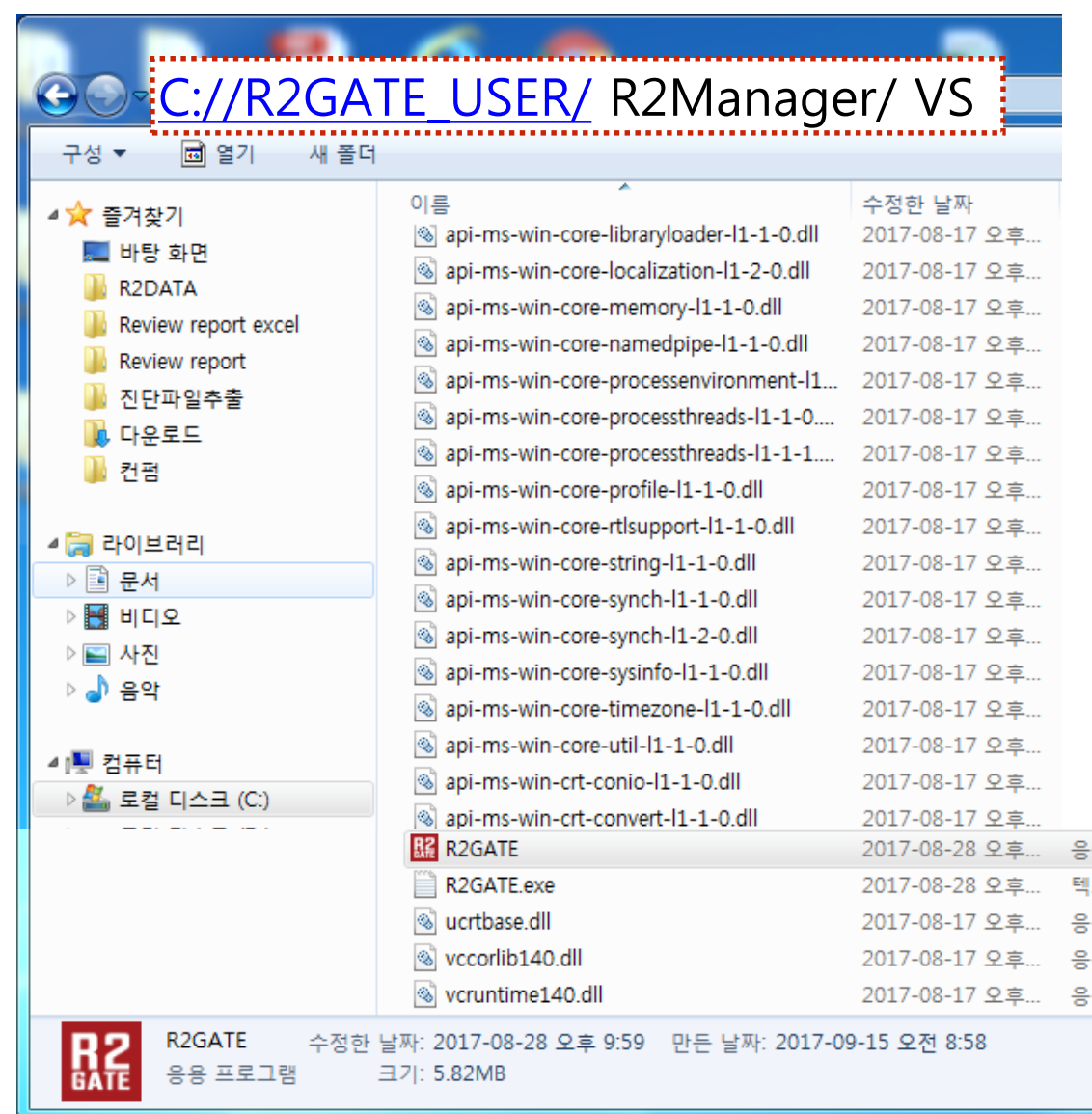
- 1 Find NVIDIA Control panel in control panel menu or start menu
- 2 Run NVIDIA control panel & choose **Manage 3D Settings**
- 3 Change preferred graphics processor to **High performance NVIDIA processor**



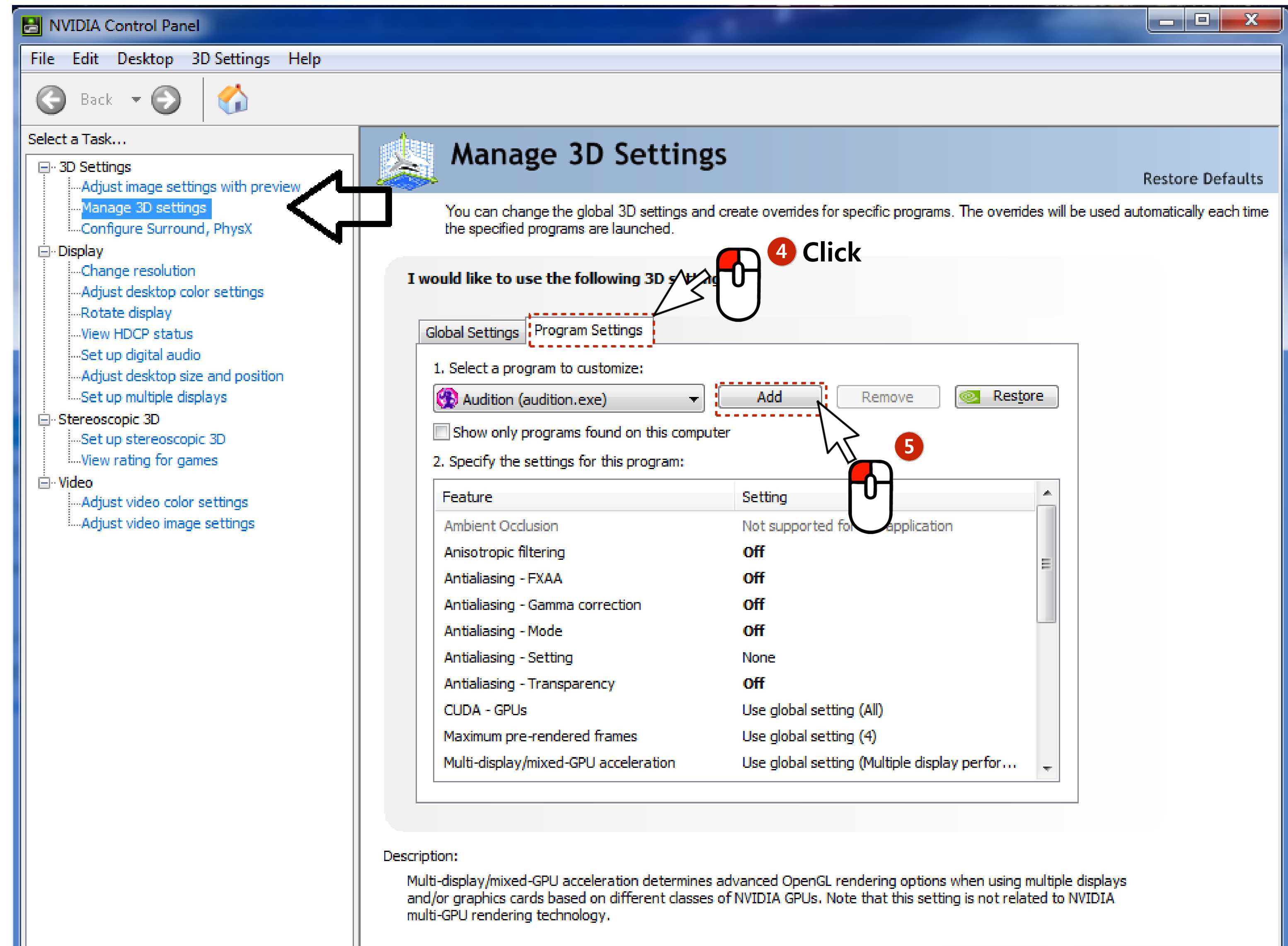
# 4.1 Troubleshooting NVIDIA graphic card setting

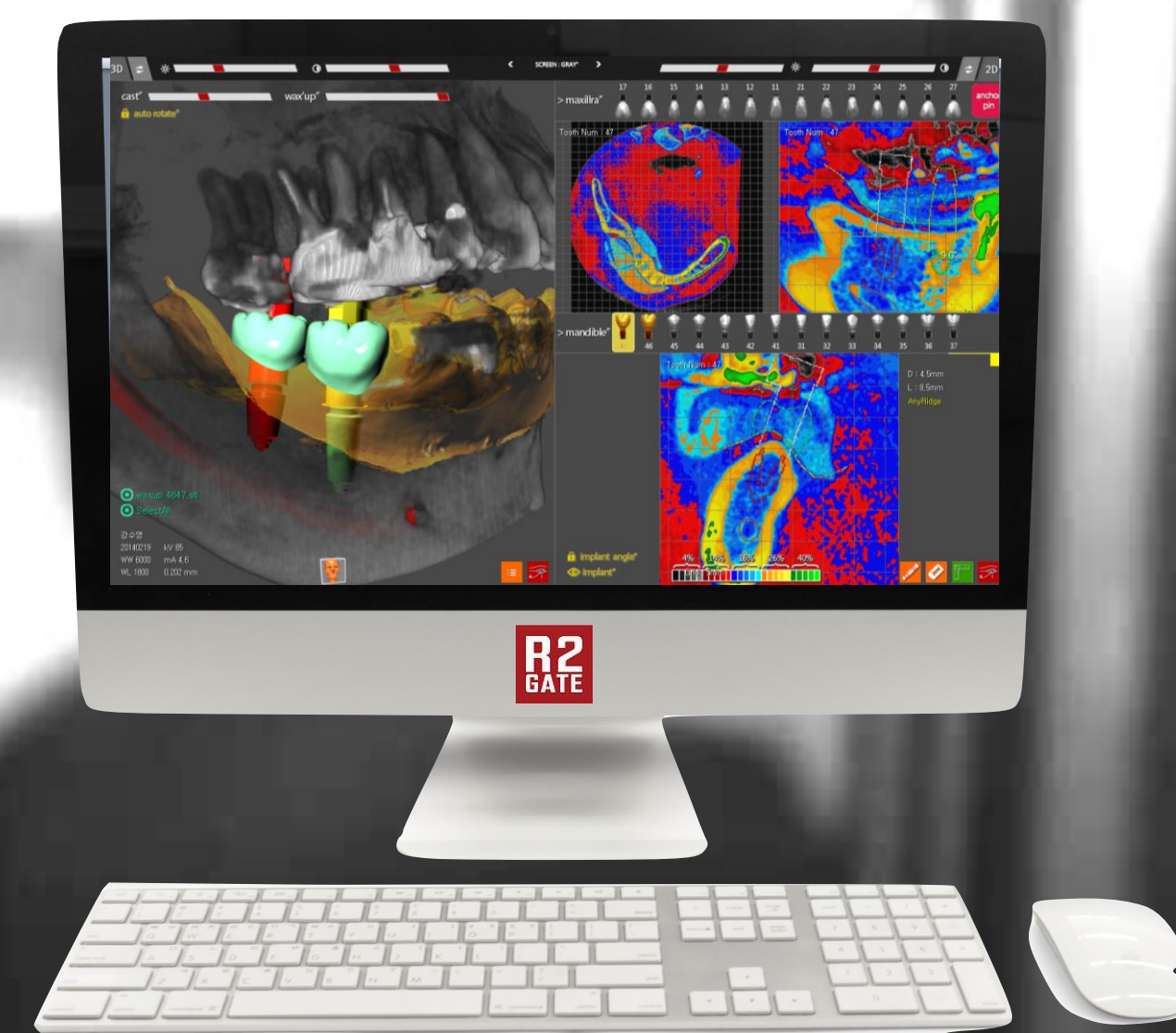
4 Click **Program Settings** tab

5 Click **Add** & choose  
**R2GATE.exe** file in system folder



6 Click **Apply**





**Any questions,  
we are here to help!  
Contact us...**

## Experienced Expert R2 Online Support Team

### R2 Digital Business Division

Contact:

- KOREA(HQ): +82-53-222-3200
- EU zone: +370-6874-9650

Email:

- Order & Service: [service@r2gate.com](mailto:service@r2gate.com)
- Web registering & Troubleshooting: [ts@r2gate.com](mailto:ts@r2gate.com)
- Business opportunities: [r2b@r2gate.com](mailto:r2b@r2gate.com)



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- Main website: [www.r2gate.com](http://www.r2gate.com)
- Mobile : [www.r2s.r2gate.com](http://www.r2s.r2gate.com)
- Facebook : [www.facebook.com/r2gate](http://www.facebook.com/r2gate)
- Instagram : [www.instagram.com/r2gate\\_](http://www.instagram.com/r2gate_)
- YouTube channel : R2GATE