

exocad DentalCAD 3.2 Elefsina – Public Prototype Release Candidate Changelog for OEMs and Resellers

The software version is labeled **DentalCAD 3.2 Elefsina** and marked as a **Prototype for Testing**.

This version is a **public prototype for testing purposes only**, e.g., to allow resellers and partners prepare their testing and system integration until the final DentalCAD 3.2 Elefsina release version will be available. Once the final DentalCAD 3.2 Elefsina version has been released, this public prototype version will not be allowed any more. Like with all prototype versions, a software dongle license with a running update contract is mandatory even for perpetual licenses, and internet may be mandatory to start the software in some environments.

This changelog is intended for OEM customers and resellers of exocad DentalCAD.

The changelog describes changes for DentalCAD 3.2 Elefsina Public Prototype 2023-10-17 EngineBuild 8690 using the previous official 3.1 Rijeka Service Release from 2022-11-10 EngineBuild 8349 as a basis for comparison.

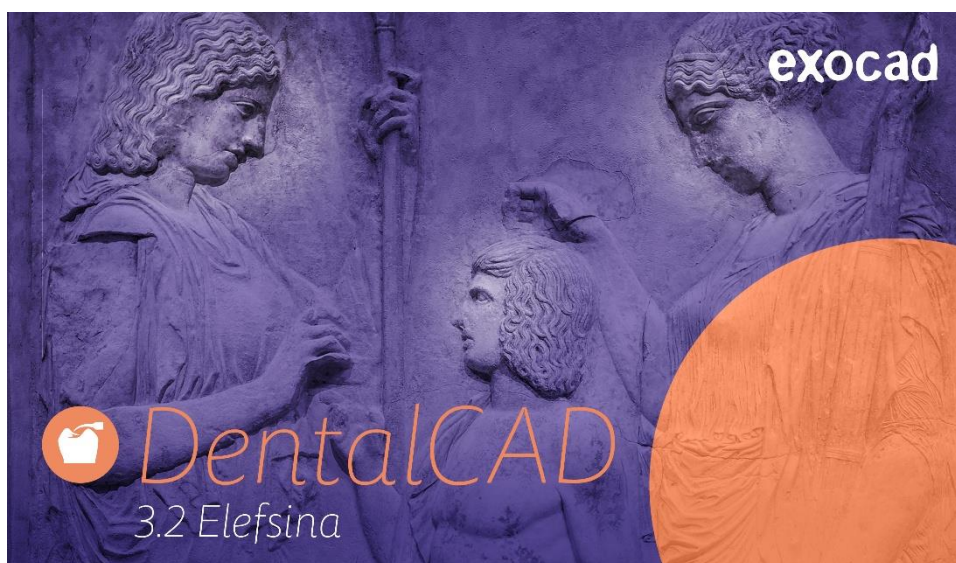


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General Information

- The DentalCAD Release is labelled as “DentalCAD 3.2 Elefsina”. This specific software version is a **public prototype for testing purposes only**.
- The underlying software architecture has been upgraded for better performance, see section Software Architecture and System Requirement Changes

Highlights

- DentalCAD single tooth workflows even more optimized with new “Auto Articulator” feature for automatic dynamic occlusion in digital impression workflows, known from ChairsideCAD. Also, the IN-CAD Production workflow can now be enabled for testing on selected milling machines.
- A new scan data preparation margin repair tool is available. It allows users to repair problematic scan data, which appear quite often in practice from intra oral scanners. The tool has the possibility to elevate or extend it together with the preparation margin, and to repair the scan data in the vicinity of the preparation margin. The repaired scan for the individual tooth is also saved into the project folder, which allows distributed workflows where one technician repairs scan data, and the other one designs.
- For selected workflows with full-arch scans, a new semi-automatic “Multi-Tooth Segmentation” feature is available, where the software allows to segment all teeth and the gingiva from the scan data, e.g., for visualization purposes or for direct usage as restorative design. A more automated user experience in those workflows is enabled through usage of the “exocad Cloud” feature.
- Many updates for the Smile Creator to allow a better visualization and pre-operative treatment planning where now the Smile Design can also visualize individual healthy patient teeth separated from its gingiva in adjustable colors and shadowing effects to match the visual environment in the patient’s mouth.
- The Bite Splint Design can now run in simultaneous design for upper and lower jaw, and has a new “Multi-Tooth-Segmentation” enables semi-automatic workflows for copy of existing teeth and where also the bite splint curve can be created by selectable parameters, which saves a lot of time especially when using the “exocad Cloud” based segmentation.
- The Full Denture module now has a Duplicate Denture workflow to copy existing dentures, enables design on stock-abutment libraries (e.g. for ball-attachments and also with immediate load from exoplan), and it has been updated with interactive adjustments of the preset-position in the library/preset selection

- The Partial Framework and Flexible Denture workflows have been improved with new optimized integration support for the PartialCAD 3.1 Quick-Snap workflows.
- For Abutment Design the user can now select to have screw holes also in the super-structure with one click from the user interface, there is a new workflow to work with re-scanned abutments for the super-structure in the same case
- For Abutment Design there is a new interactive feature for Ti-base libraries that are specifically designed for screw channel angulation, where a standard pre-angulation can be used from the library and then interactively modified with a new optimized support-surface generation, and with the possibility to rotate the whole Ti-Base platform in that step according to the degrees of freedom of the underlying implant. To best fit with the desired exit point, screw channel and Ti-base automatically reposition to respect both the Ti-base physical opening and its connection geometry type.
- New Virtual Articulator support has been added, e.g. for "Gamma Dental Reference SL, Kavo PROTAREvo 5B" and a special one called "In-Skull" for the use case of a nice show-effect of pure mean-value articulators where the lower jaw moves.
- In Model Creator, new automation and configuration features have been added e.g., automatic text attachments coming from the model type library, per-tooth parametrization, and improved 3d-printer-preset support.
- First functionality is made available directly in DentalCAD through a new "exocad Cloud" backend, see separate section: About "exocad Cloud - Cloud Integration in DentalCAD.
- Many UI/UX improvements in all areas e.g., a new Settings menu that can even be searched, and a new Show/Hide Auto-Hide function to automatically hide the opposing jaw in the 3d viewer.
- A Post & Core test-prototype feature is available for testing to our partners
- In DentalDB the new myiTero Connector 2.0 Client is integrated (depends availability on iTero side), which enables bi-directional status update with iTero doctors and sharing of a 3d design preview (similar to dentalshare workflow)

Software Architecture and System Requirement Changes

- In DentalDB, as usual, with every software upgrade, the first start of DentalDB may upgrade the database scheme, create indices etc. and may be very slow. Please be patient and wait until it is fully started. Later starts will be faster again.
- Windows 10 (21H2 - 22H2) and Windows 11 (21H2) are the supported operating systems.
- The modern and faster Microsoft .NET 6 is now required to be installed additionally to the old Microsoft .NET 4.8 Version. DentalDB and DentalCAD require at least .NET 6 to run the software and the latest security updates of .NET6 should be installed. The exocad software is configured to use .NET 7 or .NET 8 if it is installed on the operating system (Microsoft calls that RollForward=Major strategy). The software was tested with a .NET 8 preview to start successfully but it may not run on future versions after .NET 8. When the user wants to use a newer unsupported .NET version on their PC, they will need to update the software.
- The Microsoft Visual C++ 2022 redistributable package are now required to be installed in its latest version.

- The core of the software has been modernized with Visual Studio 2022 with latest C++ standards for higher performance.
- Make sure to install the new exocad Framework 2023 before using the software (<https://download.exocad.com/delivery/exocadFramework2023.exe>)
- The DentalCAD has an optional new connection to an online-backend (“exocad Cloud”) which allows more automation in some specific features by analyzing and processing data, see section: About “exocad Cloud - Cloud Integration in DentalCAD.
- Remark: exocad R&D spend a lot of time this year to migrate its development workflows to a new modern commercial system, to enable a more agile and more secure development:
 - Source code system from svn to git with BitBucket with a guaranteed 100% Code review process for the new developments
 - Ticket system from trac to Jira
 - Automatic CI/CD integration with a Jenkins based system.
 - Added static code analysis on all projects (currently powered by Checkmarx) to automatically detect cyber security issues in the code.
 - Migrated to Microsoft .NET6 to take advantage of new more secure internet technology.

We expect that this new system will enable faster release cycles in the future, and enable more and more modern cloud driven development.

About “exocad Cloud*” - Cloud Integration in DentalCAD

- The DentalCAD 3.2 has a technical feature that can enable running data processing, calculations or even AI calculations in the cloud.
- The “exocad Cloud” will come with separate new Terms & Conditions that user implicitly agree to when they start using that feature. They may come as update of the my.exocad T&Cs and/or as separate in-software T&Cs.
- Access to these cloud-based features can be available to End Users having a valid exocad License Agreement, with entitlement to recent software updates, and only with the latest software version at a point in time, and your use of these features shall be subject to such exocad License Agreement unless otherwise provided in these T&Cs. These features may not be available to End Users (or their use may be restricted) in some regions. By using the cloud-based features, End User represents and warrants that End User has all necessary and appropriate patient consents to transfer to and process that patient’s data within the Cloud.
- The “exocad Cloud” is only available in selected markets, regions, countries, software configurations, local network, firewall and routing settings, and for selected users’ groups. The availability of the individual features of the “exocad Cloud” also depends on such criteria. The https with http2 network protocol standard is required. The connected remote cloud address can be seen in DentalCADApp Tools->Settings->System Information (see “Cloud” or “RPC”) and users can enable/disable the cloud in this settings menu.
- A valid my.exocad login is always required and the user must be logged in
- To use “exocad Cloud”, always the latest software versions must be used and the software license must be under a running contract with exocad (update contract or rental contract).

- The usage of the “exocad Cloud” implies that data is transferred to the exocad Cloud, its affiliated mother and sister companies and the respective cloud providers (e.g. Amazon AWS, Google Cloud or Microsoft Azure, depending on the type of data sets and the feature). Also, for each cloud operation all required data related to traceability, error handling, accounting, and to allow future software improvements is collected. **WARNING:** Users of the software who do not the required patient consent to allow such data processing and data storage in the cloud **MUST NOT** use the exocad Cloud features. Also, when using it as a user, the described data about the user and their activity is stored.
- The “exocad Cloud” backend connection is established through Microsoft .NET 6 with GRPC which requires a http 2.0 compatible network infra structure and the
- The first feature that will be available is an automatic tooth detection as part of the new “Multi-Tooth-Segmentation” that is available in a variety of workflows. More features will follow over time with the next software updates.
- Some cloud features (especially AI but also large data processing) will create significant costs in the cloud and requires ongoing maintenance in the backends, which is why some of the features are offered on “fair usage” policy (as part of the yearly license fees) whereas others may come with additional costs, e.g. payment per usage of the feature. exocad will make the related information available at the relevant points in the future.

Known Limitations

- Although, most of the functionality is almost finished for a release, this software version is still a prototype and should be used for testing and system integration purpose
- The known limitations of DentalCAD 3.1 and previous version still apply, unless they appear as fixed in the Detailed List of Changes Below
- “Multi-Tooth-Segmentation” features can currently work on only one scan per upper/lower jaw, and the scan must always be unsegmented and fully connected without any ditched dies or segments or cuts. These scans typically appear from patients that have been scanned for a restorative plan before tooth extraction and before preparation. Only use that feature on scans where most patient teeth are still present. When a tooth is not present in the scan, the user may need to define it in the tooth bow as not present manually to allow a correct workflow. This is the first release of the feature, and the quality and reliability of the semi-automatic segmentation results are expected to improve in future updates of the clients and/or cloud backend.
- The legacy C++ DentalScanner plugin system has been removed from the build due to compatibility reasons with latest Microsoft and Intel MKL technologies.
- This list of known limitations is selected and not exhaustive.

Detailed List of Changes

Detailed list of Changes
01. Overall Changes
B. Optimization
exocad software since .NET 6 uses the .NET RollForward=LatestMajor strategy (see learn.microsoft.com/en-us/dotnet/core/compatibility/sdk/8.0/tool-rollforward) which can be seen in the .runtimeconfig.json for each .exe file. This means, that all latest security patches by the Microsoft Windows Update are being used and if a newer .NET version is installed on that Windows PC, it is used to run the software. exocad already briefly tested the software under a .NET 8 preview version but can NOT guarantee that the software will run under future major .NET releases that are not published yet. If required, users can change the RollForward settings.
If a slider has a default value that one can reset it to, the right-click context menu of that slider shows the default value now.
Optimize line breaks for long texts that appear on buttons.
Overall Material UI style improvements, e.g. to make input fields more recognizable
The Settings Window has been modernized and one can now search for settings by name
UI/UX improvements regarding style of multi selection message boxes
ErrorReporting: The long text of "Tools->Settings->System Information" text can now also be saved to a file by a button
ExoNotifications: For expert users, it is now possible to deactivate the repetitive display of the Notifications that provide information, by changing the setting "ExoNotificationFocusMode" to true (default false). Error and warning notifications will always be shown, regardless of the state of the flag.
Notifications: If the main window is minimized then save new notifications until it is reopened to avoid potentially disturbing the user
Notifications: If there are tabs in the notification history, it can now show the number of new notifications for each tab e.g. for number of cases in DentalDB "Import" tab.
Notifications: The display of the timestamp of notifications is now improved where older notifications will now display the full date.
Notifications: The name of the scene file and the time it is loaded to the application will be displayed in the history window.
Notifications: The number of displayed notifications is now limited to 100 (configurable by setting ExoNotificationCount)
General UI Improvement: The message box style was changed to not block the whole screen any more (ongoing transition from older Win8 to Win10/11 UI-style)
General UI improvements: The style of the text and icons of the Message boxes has been reworked and improved.
General UI optimization: The visibility of the objects that belong to both jaws, will not be affected by the use of "X" and "N" hotkeys.
Microsoft Windows: If the WMI Management cache is broken or not accessible in Windows, the DentalCAD Software will now report that as error report instead of later failing with unclear subsequent errors. If an error related to "WMI" occurs, please see wiki.exocad.com/wiki/index.php/How_To_Repair_Broken_WMI_Repository

System Information: The Tools->Setting->System Information now indicates with a new variable "AreLongPathNamesSupported" if the operating system is configured to allow long path names and filenames. For further information and how to enable that in Microsoft Windows, see online learn.microsoft.com/en-us/windows/win32/fileio/maximum-file-path-limitation?tabs=registry
System Information: The Tools->Settings->System Information feature and error crash report now shows more information about the .NET versions and .dlls that are used during compile-time and runtime. This may be different as we use RollForward=Major strategy for always using the latest .NET version on the PC [OPTIMIZE] About Box: Removed the "64-bit" label from the About Box etc. because the software is always 64-bit
Settings Menu: In the Settings Menu, the users can now import/export user settings in a convenient way (setting to disable that new feature: EnableImportSettings, EnableExportSettings, EnableEditSettingsManually)
C. Change in Behavior
exocad 3.2 Software is now build with Microsoft Visual Studio 2022 and requires a respective Microsoft CRT Runtime Update, e.g. install exocadFramework2023
D. Bugfix
ErrorHandling: After an internal software crash, the DentalCAD might crash to Desktop without exocad ErrorReporting Window since 3.1 versions due to CRT invalid_parameter_handler which should be handled
Microsoft Windows: Fix issue where the Windows Hotkey Win+Arrow hotkey was not compatible with some of our Main Windows
my.exocad Integration: Fix rare issues where the the software might have get stuck in a deadlock and later the user must log in again unexpectedly, e.g. due to a timing issue when two exocad software programs were running at the same time on the PC
ExoNotifications: Duplicate notifications with ForceShow flag are no longer removed from the HistoryWindow.
H. Known Limitations
Microsoft Windows: In multi-monitor set-ups with different dpi settings, the font size of some tools menus (based on Windows Forms) might be too small. This is caused due to an issue in some Microsoft .NET versions (see github dotnet winforms issue 4898)
02. DentalCAD Standard Functionality
A. New Feature
Allow Chairside like INCAD-Nesting Production workflow for DentalCAD. To use that, configure the DentalCAD similar to ChairsideCAD, enable INCAD-Nesting and related Machining modules, and set the two settings NestingProductionProcessorAllowWithoutChairside=true and also ProductionBlankAlwaysUseProductionBlankLibrary=true and use all NestingProduction* processors from wizard-chairside.xml, contextmenu-chairside.xml, buttons-chairside.xml for non-chairside version. Also NestingExocam may be configured to "exocam-chairside". Then the NestingProductionProcessor should appear for a guided workflow of single crown milling inside the CAD. Warning: This feature is only applicable and tested for chairside indications and will not work for lab indications.
When user works with myItero Connector 2.0 integration of DentalDB, a new "Share 3D Preview with iTero Doctor" feature is available similar to dentalshare web export. This allows to share the current 3d scene with the iTero doctor (setting ShowScanImport01Share3DPreview, default=true)

<p>MultiToothSegmentation: On unsegmented and unprepared jaw scans or denture scans, the software can now automatically detect the center of teeth in the new multi-tooth segmentation step, based on the definition of available teeth in the .dentalproject. This feature requires an exocad-cloud connection and related limitations apply.</p>
<p>PDF-Export: The screenshots from the Screenshot and Image Manager can now be included when a PDF-Export from DentalCAD is created with a new checkbox</p>
<p>Scan Data Margin Repair Tool: The preparation margin step now has a button to repair the scan data near the preparation margin e.g. by lifting the preparation margin. Setting to Activate the feature: <code>PreparationMarginRepairTabEnabled</code>. The repaired scan data is also re-saved to the project folder where the original scan data is when user continues with Next/Accept after repairing (setting <code>PreparationMarginRepairAutoSaveToToothScanFile</code>, default=true) Further settings: <code>PreparationMarginRepairMarginCutterMaxDistance = 1;</code> <code>PreparationMarginRepairMarginCutterArtifactScale = 0.0625f;</code> <code>PreparationMarginRepairHelperPlaneRadius = 1.5;</code> <code>PreparationMarginRepairEnableVisualMeshClipping = true;</code> <code>PreparationMarginRepairInputSimplificationMaxError = 0.005;</code> <code>PreparationMarginRepairInputSimplificationMaxErrorAtScanartefact = 0.25;</code> <code>PreparationMarginRepairUseAreaErrorForSimplification = true;</code> <code>PreparationMarginRepairDefaultSnappingRadius = 0.5;//choose value in slider range</code> <code>PreparationMarginRepairDefaultDragRadius = 1;//choose value in slider range</code> <code>PreparationMarginRepairNumberOfSmoothingIterations = 3;</code> <code>PreparationMarginRepairColorMapInterval = 0.1;</code> <code>PreparationMarginRepairAutoSaveToToothScanFile = true;</code> <code>PreparationMarginRepairAutoSaveToToothScanFileOverwriteExistingFiles = true;</code> <code>PreparationMarginRepairAutoSaveToToothScanFileOverwriteExistingFilesAskUser = true;</code> <code>PreparationMarginRepairEnableInteractiveDeformation = false;</code></p>
<p>ShowHide: The Show/Hide menu now has a "Auto-Hide" toggle button that automatically hides parts of the opposing jaw when they are blocking the view. It also automatically hides 2D images if they do not fit to the current view. The hiding/showing is not instant but happens in a configurable time span, configurable with the new user-setting <code>GroupSelectorAutoHideOpposingJawAnimationTimeMilliseconds</code> (default=1000).</p>
<p>CorrectJawRelation: Allow to keep restorations in a fixed place relative to the opposing jaw while correcting a jaw position. This enables workflows like in full-denture where the bite was not taken correctly and shall be fixed after a restoration has already been planned/designed in occlusion: To enable that feature, set the setting <code>CorrectJawRelationAllowToKeepRelativeToothPlacementFixed = true</code> . Also configurable is the opacity of the gingiva with the setting <code>CorrectJawMovementKeepToothPlacementFixedGingivaOpacit</code> (default = 0.5).</p>
<p>An expert mode feature exists to convert generic visualization meshes to tooth models in the right-click context menu. This is an expert feature only where one has to make sure that it is actually a suitable tooth model with all requirements that apply to e.g. <code>toothmodel_cad</code> files (it is <code>ConvertGenericVisualizationMeshToToothModelProcessor</code> in <code>contextmenu.xml</code>)</p>
<p>SingleToothPlacement: A new feature for generating abrasion facets into the surface is provided. It performs the IATM feature preserving adaptation on static antagonist, followed by a IATM cutting on a dynamic antagonist. Thus, for it to be active the virtual imprints from virtual articulator or auto articulator should have been generated. A slider, with default value of zero, can be used to select different abrasion strength.</p>

<p>Waxup: A new multi-tooth segmentation feature is available to segment the teeth in a waxup scan (new setting WaxupMultiToothSegmentationAllowed, default=true). This function is currently only works for exactly one Waxup-Scan per jaw and only in expert mode. Note that for automatic segmentation the exocad-Cloud* functionality may be required.</p>
<p>Correct Tooth Placement: New interactive Library Switch in Correct Placement step for all currently loaded tooth models (new feature is activated by default). The switch is done per single/individual tooth, i.e. keeping the current tooth setup in place. Reset and update buttons provide additional switch options. Hint: After switching, users can go to Chainmode to bring teeth back into approximal contact.</p>
<p>B. Optimization</p>
<p>Allow to customize the window title and include the patient name by default. New settings available: WindowTitleFormatString, (default="%j %d") , WindowTitleFormatStringWithPatientName (default="%l, %f - %j") where the latter is used when the setting WindowTitleShowsPatientName is true. Hint: To always show the title bar even when it is maximized, use WindowTitleBarVisibleInFullscreen = true . To hide the patient name in the UI, user can also "Activate Incognito Mode" in the user settings.</p>
<p>Fix issues such that the tooth library selection tool should not show identical libraries (e.g. ZRS where some teeth for some tooth numbers are always the same)</p>
<p>If the current 3d scene view directions matches a Custom-View view orientation, then show it as "selected" (e.g. in orange). This allows users to see if their current view is exactly like the saved custom view. (setting CustomViewUpdateSelectionFrom3DScene, default = true)</p>
<p>Improved display and layout of various message boxes e.g. on startup when a required module is not activated</p>
<p>Minor UI improvements in Load Custom Tooth Model dialog</p>
<p>Standalone/NO-CAD licenses can now also use the features from contextmenu-wizard.xml while the wizard is running like the full licenses</p>
<p>The .NET 3.51 framework is no longer required at all to run the software</p>
<p>The Align Mesh mesh registration tool now has a Cancel button to Undo all changes that have been done since the dialog was opened. WARNING: This Cancel-feature may Undo also changes of other tools, so users shall avoid to use that feature at the same time with other tools</p>
<p>The base function that zooms to an object has been improved regarding its numerical stability. This may lead to better initial views and zoom factors.</p>
<p>The info-box in the merge dialog now distinguishes between the states if files are saving or have been saved</p>
<p>The Preparation Margin UI was optimized and now a button to reset the "Adjust light" back to the standard is available</p>
<p>The right-click context menu now contains an entry to switch to "Expert Mode for more options" (setting AllowToSwitchToExpertModeFromContextMenu, default=true). This will help beginners to understand that there will be more options available once they close the Wizard</p>
<p>Various UI optimizations where the mesh registration tool is used or placements are corrected (e.g. Correct Situ step)</p>
<p>When Wizard ends, it will now always show the "Select Next Step" step, also in NO-CAD/Stand-Alone environments (setting SelectNextStepAlwaysApplicable, default=true)</p>
<p>Crown Bottom: When bullnose milling compensation is enabled, allow block-out of preparation margin when bullnose blockout is used with protected zone of preparation margin being zero, which is now consistent to standard crown-blockout</p>

<p>CrownBottom/Bullnose: Improve UI regarding the bullnose-slider for cases where the parameter MillingDiameterBullnoseToolCompensationMode varies in the project definition between teeth (In case where MillingDiameterBullnoseToolCompensationMode is -2 for some but not all cases, initialize the Bullnosecompensation slider only for those teeth where MillingDiameterBullnoseToolCompensationMode>=-1 to allow mixed cases where some teeth require bullnose and some teeth shall not use bullnose. Also avoid that if MillingDiameterBullnoseToolCompensationMode=2 (i.e. "enforce") it can be turned off accidentally in the UI. Hide from the UI the Bullnosecompensation slider when for all teeth ConstructionParam.MillingDiameterBullnoseToolCompensationMode<=-2 or when for all teeth ConstructionParam.MillingDiameterFlatToolRatio=0 and even the maximum of ConstructionParam.MillingDiameterFlatToolRatio =0)</p>
<p>Freeform: Disc cutter minor UI/UX improvements when designing upper and lower jaw at same time and using the disc cutters</p>
<p>Freeform: Minor improvement of behavior (better isolation of free-forming areas), when user locks some parts from freeform e.g. "lock equator" and then moves the with mouse on or surface near the equator</p>
<p>Freeform: Minor optimization when exclude selected parts is used in combination with the Disc Cutters</p>
<p>Freeform/Scaling: Try to avoid that user can re-scale an object to a very small planar object when they apply extreme mouse movements</p>
<p>Renderer: improved visualization of selection on textured meshes</p>
<p>Renderer: shadow outline intensity can be modulated by the rendered object's alpha value (e.g. with Plain2D effect)</p>
<p>Single Tooth Placement: The single tooth placement feature is now also available in cases where there are multiple separated teeth in the same jaw e.g. a single crown on left side and a single crown on the right side. This new feature can be controlled by a setting also by the user in the settings menu (LoadSingleToothmodelProcessorUseForMultipleSingleTeeth, default=true)</p>
<p>SingleToothPlacement: Fix issues regarding the new feature regarding minimum-thicknesn special handling to allow the old parameter " MinThicknessReducedValue" again</p>
<p>Free-forming / Paint & Pull: Hotkey O can be now used to swap between Paint parts and Pull parts.</p>
<p>GroupSelector: Improved snapping behavior by visualizing the area of the "snap zone" as well as better click handling for a smoother experience. Snapping now happens at 0%, 50% and 100% values.</p>
<p>GroupSelector/ShowHideAll: The Show/Hide-All button now looks at hotkeys CTRL and SHIFT. If SHIFT is pressed, it always acts as Show-All button, and if CTRL is pressed, it always acts as Hide-All button. That saves time for users that want the opposit. Additionally there is now also a setting that makes the button to be more like a Hide-Button in mixed visibility-situations instead of being the Show-All button (GroupSelectorShowHideAllButtonPrefersHideInsteadOfShow, default = false). Together with that, also fixed a rare issue where the Show-All/Hide-All button would show the interchanged text (Show instead of Hide or vs. versa)</p>
<p>LoadBridge: Minor improvement regarding usability of load bridge model feature by allowing smaller distances between click points</p>
<p>MeshEditor: When mesh editor is used to close holes but the mesh has topological errors in the hole, it now tries to repair these topological errors. New setting MeshEditorCloseHoleForTopologyErrorMode (default = 1) where 0 means never, 1 means ask user after standard mode failed, 2 means always without asking. New setting</p>

MeshEditorCloseHoleShowTopologyErrorNotification, where true means notifications are shown when robust hole closing is used, and notifications disabled when set to false.
ProvisionalCrown: Improved algorithmic stability for provisional crown top generation
Scan registration: Improvements when extracting meshes from textured scans by copying vertex color and texture to extracted mesh components e.g. for multi-die registration, jaw registration and transfer surface feature. Also fix issue where the extracted part would sometimes become black on the screen e.g. if the source mesh doesn't have colors or a texture it will use the diffuse color of the target part.
Show/Hide: The "touch screen buttons" for SHIFT/CTRL can now be disabled with a small toggle-button from the Show/Hide menu to allow the Show/Hide menu to take more space on small touch screens (new setting TouchScreenButtonCanBeToggledFromGroupSelector, default=true)
Show/Hide: The right-click context menu of colored/textures objects now have a new menu entry that allows changing the texture light influence for parts that aren't jaw scans (e.g. face scans) and more easily to enable/disable colored scans
Show/Hide Menu: The entries in the show hide menu now display the tooth number first for objects that have only two teeth or less to allow to distinguish them better. This feature can be disabled by setting GroupSelectorShowPartNameToothNumberFirst to false. If GroupSelectorShowPartNameToothNumberFirst is set to true, this will be applied to all objects independent of their number of teeth.
ShowHide/GroupSelector: "Show/Hide All" button is now always accessible even when the list of groups is very long (in the past, user must scroll)
Tooth placement: The Load bridge model feature can now work with special combined tooth libraries that only have anterior in one library but molars in the other library if their short-name matches according to a list. This makes it possible to use for example "psarris-elderly" with "psarris" for molars vs. anteriors.
ToothSegmentation: Improved behavior in a special case where the target click mesh itself is already something like a segmented tooth
Veneer Adaptation: Change veneer adaptation regarding initial deformation for minimum thickness to be much more shape preserving now regarding the mesial/distal and occlusal deformation of the top-parts the veneer. This change should avoid large unexpected deformations of the Veneers at the beginning of the adaptation and also improves the behavior when the center point of the margin is actually outside of the veneer or outside the min-thickness shape (e.g. in complex onlay cases)
Viewer: Improved display of vertex-colored meshes with light effects
Virtual Gingiva: In Freeform the "Shrink gingiva" checkbox has been replaced with a button to immediately open this step
Adaptation of pontics to gingiva may now be more precise (but slightly slower) by increasing the triangle resolution
Tooth placement for multiple teeth with instant anatomic tooth morphing starts faster now by initializing teeth in parallel
Freeform: When changing parameters for occlusal or approximal adaptation (DistanceToNeighbor, DistanceToAntagonistDynamic, DistanceToAntagonistDynamic), the software will now remember the change of these values in the parameters (Setting AdjustingOcclusionsModifiesConstructionParams, default=true). In the special case of reduced crowns, a new internal parameter DistanceToAntagonistForShrunkedDesigns has been introduced to remember the change of the values.

<p>Tooth Placement with Instant Anatomic Tooth Morphing (IATM) cutting, deformation and abrasion now works also when designing full anatomy on upper and lower (lower has priority over upper)</p>
<p>Viewer: The setting "WarnUserThatUseIntelGraphicsCardWithNvidiaOrAMDChip" has been added to the application settings window, with the term "Show Intel GPU warning on startup" (default true). It allows to turn off the warning, in case an Intel GPU is used while at the same time the PC has a dedicated graphics card with better performance.</p>
<p>In MockupTooth restoration cases when the new MultiToothSegmentation had been done for the mockup teeth, the "Load bridge model" step can be replaced by automatic tooth model placement. This can be configured by setting MockupToothToothSegmentationUseForToothPlacement to true (default=true)</p>
<p>When manually right-click saving an object as file, the software will now suggest as default file-name the previous file name when the object already had one (setting SaveToFileDialogSuggestOldFilenameForNonCriticalObjects, default=true)</p>
<p>Show/Hide: When segmented teeth are present for teeth to be restored and for teeth to not be restored, then show two additional groups where one can easily hide those segmented teeth that are to be restored, and those that should be restored (setting GroupSelectorShowTeethWhereAreNoRestorationsPlanned, where the new default null means that it only happens when it makes sense). This allows users to easily hide the segmented teeth where restorative teeth are planned</p>
<p>Viewer: The advanced transparency mode that visualizes multiple overlapping transparent objects much better but requires much faster GPUs and which was BETA in the last 3 years and available in the user-settings menu, is now enabled by default (setting ActivateAdvancedTransparencyByDefault, default=true). If performance issues occur, user can disable it in their settings menu. To forbid that feature for use, one can also set ActivateAdvancedTransparencyForbidden to true (default=false)</p>
<p>Show/Hide Menu: If some teeth are selected in expert mode e.g. with CTRL+Click on the 3d objects, then there appears a dynamic group "Currently not selected parts" which allow user to easily hide all parts of the not-selected teeth. This feature can be controlled with setting GroupSelectorSupportToothFocusModeForSelectedTeeth (default=true)</p>
<p>Correct Tooth Placement: Chain Mode is now available for copied restorative tooth models when they were copied using the new Multi-Tooth-Segmentation which often can create compatible tooth model shapes (setting ChainModeAllowForMultiToothSegmentationCopiedRestorations, default=true)</p>
<p>C. Change in Behavior</p>
<p>Broken .ply files with invalid topology and duplicate vertices may have lead to crashes or unexpected behavior. Now these cases are filtered and loading of such .ply file triangles may be blocked completely.</p>
<p>Migrated from the Microsoft .NET Framework 4.8 to .NET6, also with RollForward=Major strategy that means that also newer .NET versions are used. It has been tested by exocad extensively with .NET 6 and .NET 7 and preliminary with .NET 8 preview. A new exocadFrameworkInstaller2023 is available that also triggers installation of .NET 6</p>
<p>Show the window title now even when the window is maximized to make sure that user see more information (setting WindowTitleBarVisibleInFullscreen , default=true)</p>
<p>The AntagonistType "DigitalImpressionScanRegisteredJaws" and "RegisteredJawsDigitalImpressionScan" are now supported to work with Digital Impression Scan Workflow but they avoid the manual jaw registration and adjust scan data steps.</p>

The default path for the temporary folder that used to be in %TEMP% is now in "%TEMP%\exocad" (The application setting TEMP can still be changed to a different path if required)
PrimaryTelescope: The triangle resolution of the primary telescope is now configurable with application settings TelescopeDesignArcResolution=0.3, TelescopeDesignArcResolutionSubdivisionFactor=1.0, TelescopeDesignHeightResolution=0.15 and was slightly tweaked. Be aware that making triangles smaller or larger may lead to unexpected artifacts or slowdown, precision issues or of the software. [CHANGE] BarDesign: The triangle resolution of the bar pillars is now configurable with application settings BarPillarDesignArcResolution=0.3, BarPillarDesignArcResolutionSubdivisionFactor=1.0, BarPillarDesignHeightResolution=0.15 . Be aware that making triangles smaller or larger may lead to unexpected artifacts or slowdown, precision issues or of the software.
ShowHideMenu/GroupSelector: The order of groups has been adjusted using a newly introduced configuration file config/groupselectororder.xml
Situ/Preop: In the dedicated Correct Preop-Placement step it now allows to correct ONLY the pre op scan position and it should not be possible to select any other mesh for the registration
Viewer: Right-click context menu removed Opacity entries for 10% and 90% in right-click Context Menu, configurable by new settings ViewerShowContextMenuObjectTransparency_10Percent (default=false), ViewerShowContextMenuObjectTransparency_90Percent (default=false)
exoskull articulator renamed to In-Skull Articulator
Auto Download Server address was changed to https://addons.exocad.com/v4 (DynamicUpdateServerPrefix)
Correct Tooth Placement: Chainmode scale mode Shift vs. Ctrl+Shift behavior is now interchanged and configurable (setting OnTheFlySpecialScalingSwapShiftVsShiftCtrlOptions, default=true)
D. Bugfix
Avoid potential rare crashes or issues when user presses a hotkey while the respective window is not enabled, e.g. due to currently running operation.
Fix a crash when the default view direction of the case cannot correctly be determined, e.g. when the user sets a very wrong sideways direction for the insertion direction of a bite splint bottom
Fix display issue where the background gradient was influenced by a textured scan data objects in the 3d viewer
Fix possible crash when loading incompatible .dentalCAD files from software versions that are newer than the current version and have not-yet supported data-types
Fix potential crash when an operation is just started or running but then the user closes the whole software in Main Window with the X
Fix rare issue where an exocad software in multi-monitor situations would not remember its last used screen
Improve the use of hotkey "S" when Prosthetic mesh is available (as jaw). Now if only one of the jaws is visible, it will turn both jaws visible, then toggle the visibility for both jaws.
The "Brush inverse" checkbox feature may sometimes not work e.g. in exclude parts for preop adaptation
The software user interface e.g. Wizard may appear blocked when the user locked their Windows and later come back after a few minutes. This is due to a known bug in Microsoft WPF. This software version has a workaround for that issue. An alternative workaround is to try to open another window e.g. the Tools menu (Microsoft Bug reference see github dotnet wpf issue 2158)
The viewer display might get incorrect when a case is loaded with an invalid unsupported .matrix4 file (e.g. that has -1 in the _33 component)

When scan data is automatically re-saved e.g. after mesh editing or freeform-scan data with the old resave file feature FreeformAndEditScandataResaveToFile it now avoids an issue where matrix was wrongly applied (setting for the new behavior FreeformAndEditScandataResaveToFilePrefereOriginalTransformation, default=true)
When working with mush-bite antagonist type and reconstructions in upper jaw, the default-view buttons may have behaved inconsistent to all other situations
Renderer: Clip Plane intersection line visualization fixed depth fighting issues
Correct Tooth Placement: Fix an issue in chain mode behavior when switching between simple and chain tabs that could have lead to unexpected chain displacements
Correct Tooth Placement: When automatically mirroring a tooth model into a pontic model, the internal bottom may have not been marked correctly which could have created subsequent issues in adaptation to neighbors or gingiva
Correct Waxup Scan: The parametric position adjustment with the slider now also works for x-Axis and y-Axis and not only for the z-Axis
CorrectAntagonist/CorrectJawRelation: Undo/Redo may not work with some type of textured scan data (that require a texture atlas) and may cause strange problems afterwards with the mesh
Freeform: Fix issue where the preparation area was not marked correctly any more on the scan data after the feature to not adapt teeth near the preparation margin has been used. This may have caused strange deformation e.g. when approximal adaptation happened.
Freeform: Fix potential rare crash in when executing Undo/Redo while or after closing and reopening freeform using Wizard-Back->Next
Freeform: The visible touch screen buttons for CTRL/SHIFT were sometimes missing in Freeform due to a timing issue
Freeforming: Fix for adapt to adjacent with blocked-out neighbor for an implant-restorative case with missing neighbor where the segmentation may go inside the tooth resulting in broken geometry
Renderer: Fixed multisampling not disabled when selecting "off" in the settings window.
Single Tooth Placement: Fix rare crash when user removes the antagonist in Add/Remove-Mesh after succesfully running the virtual articulator
SingleToothPlacement: Fix issue with free hanging pontics which are now visualized opaque but were sometimes not loaded
SingleToothPlacement: Fix issues regarding use of Undo/Redo in combination with integrated adaptation features
SingleToothPlacement: Fix issues regarding use of Undo/Redo in combination with Mesial/Distal segmentation
SingleToothPlacement: Fix rare crash when closing the tool through the Expert mode button
SingleToothPlacement: Minor fix regarding Undo/Redo steps in the on-the-fly freeforming
SingleToothPlacement: Undo/Redo behavior issues fixes
FaceScan: The Free Form Paint & Pull Brush size for face scans is now correctly initialized with its higher values from the ConstructionParam FreeformPaintAndPullBrushSizeFaceModel
Mesh Editor: Fix issue where the Divide-Parts button may calculate a very long time after pressing the "Undo" button due to problems in Undo restoring wrong brush mark selections
Offset Coping: Lingual band step on offset copings would sometimes wrongly scale the mesial axis that would for example cause very long displayed arrows in the show/hide tooth axis tool
ProvisionalCrown/ToothSegmentation: Fix possible rare failure cases in tooth segmentation due to not clearing a temporary array

Screenshot Editor: The screenshot feature can now also capture the secondary view in the Add/Remove Mesh load scene tool
Show/Hide: The transparency slider may have displayed a slightly wrong percentage when the transparency was changed programmatically by the software (due to applied snapping)
Virtual Gingiva: Fix crash when shrinking the virtual gingiva a second time again while TruSmile is enabled for the gingiva
Virtual Waxup: In some rare situations the merging of a virtual waxup may fail due to a user interaction issue of the mouse or when the Tooth Cut View is enabled due to a caching issue. It would work when the user simply retried it without moving the mouse and closing all other tools like the Tooth Cut View.
"Adjust Scan Data Orientation" may have crashed when the whole scene was completely empty
The function for opening a directory of file in the windows explorer from within DentalCAD may not have worked correctly when the directory path contains spaces
Shrink/Pre-Reduced-Library: During Anatomic Reduction, step and while using a PreReducedLibrary, if the shrinking step is still open with the "exclude selected parts" activated, it is also possible to use the tooth placement on the library part. With this fix, the brush drawing feature can be still used for the part with the normal reduction, but it the tooth placement tool is now restricted only on the PreReducedLibrary part.
AdaptToPreOpScan: Remove obsolete Exo-warning message when "Exclude selected parts" were selected on a new project.
ChangeReconstructionType: Allow switching from AnatomicInlay to Veneer again which may not have worked in 3.1 Versions as intended
Thimble bridge merging may wrongly put all individual crowns above the thimble merged substructure into one bridge part even though they were not connected with a connector, caused by when user created a Virtual Anatomic Waxup in Expert mode before merging
GroupSelector labels of "Show all", "Hide all" and "Auto-hide" Buttons will no longer overlap the treeview anymore in German
E. Test prototypes / Beta Features
A new setting or command line parameter /SaveFileToProductionDisabled is available that disables all automatic calls that save files for production purposes (e.g. during merging), and subsequently also disable automatic calls to write .constructionInfo (similarly also for Models and SurgicalGuide). If that mode is enabled, the DentalCADApp-Main-window title is also adjusted to contain "[SaveFileToProductionDisabled]" to warn the users. The user can also continue in merge parts in Wizard (new setting SaveFileToProductionDisableReturnSuccessInsteadOfIgnored=true), and will get a notification that parts were not saved. Also user will not be asked to delete existing files (SaveFileToProductionDisableReturnSuccessInsteadOfIgnored=true). This mode may be useful for testing workflows on existing cases without overwriting output _cad files in the wizard workflow. Warning: As of now, not all automatic output has been disabled e.g. tooth model files may still potentially be written.
Undo/Redo buttons can automatically grey out when there is no further Undo/Redo step. This is by default disabled because it can slightly increase CPU usage and requires setting UndoRedoControlAllowEnablingOrDisablingButtonsDependingOnAvailableBackups, default=false.
BridgeSplitter: The bridge split step can now be made available from within the wizard as well as the wizard's context menu (if applicable). To enable that feature, set BridgeSplitAvailableInWizard=true in the settings menu. The bridge split feature will then also consider non-3d-optimized bridges as applicable in the wizard and upon the usage of the processor the part will automatically 3d-optimize them similar to when freeform in final step is used.

<p>Renderer: Allow Microsoft WPF-Direct3D based display mode which may help in some environments or GPUs where WPF may create issues . To test this new mode, set setting /UseD3DInterop to true such that it applies to secondary views, and /UseD3DInteropForMainViewer such that it even applies for the main 3d view. In some cases for issues with WPF, software fallback can be activated with /UseD3DInteropSoftwareFallback</p>
<p>MeshEditor: The mesh editor close hole feature now allows to bridge open gaps between two parts of the meshes, i.e. users can draw the polygon to close a hole on the screen and then connect open boundaries for closing that hole. New setting MeshEditorCloseBoundaryGapsEnabled is required, and must be enabled by setting to true.</p>
<p>Post&Core: A post & core feature is available for early prototype testing on request in selected markets for test partners (requires a separate module activation and a setting).</p>
<p>The Adjust Scan Data Orientation feature can be available in later stages of the workflow. This is still beta and requires setting TiltProjectIsAllowedLaterDuringProjectDesign to be changed to true</p>
<p>Viewer: 3D Face scan perspective slider: A prototype for perspective view is available in the Tools menu when the setting FieldOfViewControlEnabled is changed to true. The user can then choose a perspective “field of view angle” that makes 3d face scans look more natural e.g. typical values between 30 and 90 degrees. The standard display method in the software uses an angle of 0 degree which is called “orthogonal rendering” whereas angles above 0 are called “perspective rendering”. The feature is by default limited to only scenes where a 3d face scan exists (setting FieldOfViewControlEnabledOnlyWithFaceScans, default=true). Due to its prototype status, the tool shall not be used in combination with any other tool e.g. for visualization (and it may automatically close itself when user starts other tools or saves)</p>
<p>F. Configuration Options</p>
<p>A set of alternative tooth models can now be loaded together with the .dentalproject file for each tooth, additionally to the existing toothmodel_cad. They can also be loaded automatically with the project with <project>-<text>-<toothnumber>-toothmodel_cad file scheme where text must be a description for the alternative tooth model (setting DentalProjectLoadToothModelsAllowToothModelAlternative, default = true). A new expert mode feature then also allows users to switch between those "Tooth Model Alternative" and the current design (The new "ConvertGenericVisualizationMeshFromToothModelProcessor in contextmenu.xml). The DistanceToAntagonist tool also allows visualization on these objects to enable fast comparision of the better occlusion. The TruSmile-RenderEffect is always the same as AnatomicCrown. Also, for fast checking, added a mechanism where if user clicks in Show/Hide on the checkbox of a part with CTRL to make one tooth model part in the tooth visible and the others invisible. With CTRL+KeyUp and CTRL+KeyDown also allows user to toggle with Keyboard between the models (users must make sure that Keyboard has focus in the Show/hide click at least once with CTRL on the checkbox or use the transparency slider)</p>
<p>Added new mode when saving tooth models to project folder with new setting SaveToothModelsSaveInInitialToothLibraryCoordinateSystem (default=false) such that if enabled then the tooth models are not saved in the scan data coordinate system but in their tooth library coordinate system, and the .obj file will contain in its header as "ToothModelExportToScanDataMatrix" the required transformation to the scan data coordinate system. This may help in some situations, e.g. when tooth model libraries are designed</p>
<p>Added setting /ViewerVisualizeDisableAllHighlightEffects to disable all visual highlight (and darkening) effects e.g. for marketing videos</p>
<p>Allow to configure Emmision as color in (default-)colors.xml and load it when the application setting LoadColorEmissionFromFile is activate (default=false). This allows to configure object</p>

<p>colors that are always brighter and light-source-independent. This new setting is similar to the old setting LoadSpecularAndAmbientFromFile which is also default=false).</p>
<p>For generic visualization meshes that have a custom name, allow to set the show/hide-group color and the opacity from colors.xml based on the name of the generic visualization mesh with the scheme <PartType>.<CustomName></p>
<p>Crown Bottom: The setting CrownInsertionDirectionOpacity can now be used (again) to configure the opacity in the Insertion Direction step (default=0.5)</p>
<p>Freeform: Regarding what type of neighbor adaptation shall happen, a new setting is available AdaptApproximalBlockoutNeighborScan_NeighborsOnlyForbidden which can be set to true to enforce that only block-out-neighbors can be used for approximal adaptation, e.g. to make sure automatically that the crown can be inserted</p>
<p>SingleToothPlacement: The default mode for adaptation to antagonist is now configurable by new setting LoadSingleToothmodelDefaultAdaptToAntagonistMode (0=No adaptation, 1=Morph, 2=Cut)</p>
<p>MultiToothSegmentation: When the DentalCADApp writes or reads a .scanInfo file it now also writes and reads the click points that are used in the new "Multi tooth segmentation" feature (new settings ExportScanInfo_ToothSegmentationClickPoint ImportScanInfo_ToothSegmentationClickPoint, MultiToothSegmentationAutoStartAllowUseScanInfo default=true, ExportScanInfo_ToothSegmentationClickPoint, ExportScanInfo_ToothSegmentationClickPoint_InDuplicateDentureCase)</p>
<p>The estimated direction to front teeth is now also exported to the .scanInfo file for each ScanFile section and reloaded from it (setting ImportScanInfo_AxisNasalFromDirectionToFrontTeeth, default=true). For traceability, each ScanFile section now also contains this optional information: DirectionToFrontTeeth (in scan data coordinate system), DirectionToFrontTeethDefined , DirectionToOppositJaw (in scan data coordinate system), TransformationHasArticulatorOrientationAssumed</p>
<p>In the .constructionInfo each ConstructionFile can have a section for drilling holes "DrillHoles", e.g. for guiding the CAM software for drilling an additional screw channel like hole into a superstructure (A 3D vector Axis, three 3D-points Center, CenterOfBottom, CenterOfTop, two 3d-margins CurveTop, CurveBottom and additional information Radius (approximate), ToothNumber (optional integer), HoleType (string)). By default, this information is only exported when a superstructure has an additional optional screw hole (new 3.2 feature), but it can also be enabled for all implant-based design with the setting ConstructionInfoWriteDrillHoleInformationForEveryImplantScrew (default=false)</p>
<p>03. Visualization, Measurement and Tools</p>
<p>A. New Feature</p>
<p>SpaceRuler: For the measurement modes nearest and orthogonal, its is now possible to exchange the start/end points (setting SpaceRulerAllowExchangeStartEndPoints, default=true)</p>
<p>B. Optimization</p>
<p>Intersection lines are now always rendered opaque (setting ToothCutViewIntersectionLinesAlwaysOpaque, default=true)</p>
<p>Minor UI/UX improvements</p>
<p>Minor UI/UX improvements for the Distance tool which in the special modes like "Distance to Preop" now also indicates its mode even when its in compact mode</p>

Add/Remove mesh: Improve UI (new icons) and UX for the Correct placement and Align meshes section of the dialog.
AddRemoveMesh: Allow to load generic visualization meshes into a selected jaw using the "Choose Jaw" dropdown, e.g. such that it can move with the virtual articulator. In the past, this must have been done by selecting teeth in Expert mode before.
Annotation Tool: Minor UI/UX improvements
Distance Tool: The "Visualize Thickness" tool now allows to reverse the color scale, e.g. to visualize if a reconstruction may be too thick instead of too thin
TouchScreenButtons: Optimize display of the touch screen buttons on the 3D-Viewer.
Add/Remove mesh: It is now possible to move multiple mesh objects at once using the MANUAL option (with floating parts)
When the Distance Visualization Tool (e.g. Distance to Antagonist) is active that shows a distance also for the mouse cursor in some modes, and the Tooth Cut View is also active, now the user can move the mouse in the 2D Tooth Cut View Window on an object and also see for the respective surface point in the 3d scene the value in the distance tool
The control points can now be highlighted on mouse-over (setting SpaceRulerHighlightControlPointOnMouseOver, default = true)
C. Change in Behavior
Add/Remove Mesh: When importing merged bridges from a loaded scene into a waxup scan, the user is now warned that unexpected behavior may happen and a related crash had been fixed.
D. Bugfix
Align meshes operations are now restricted and cannot be applied on the virtual Articulator polygons.
Fix bug when the context menu appears where user can select the target mesh in case that the meshes overlap. The context menu selection did sometimes not really work, especially in modes like Thickness i.e. it would not really use that as Start-object what the user selected
Fix potential performance or stack overflow issue when user uses the dental arch slider in some rare circumstances
In the surface angle measurement tool with the "Normal Radius " visualization, the 3d visualization object may sometimes not disappear correctly when turned off
Add/Remove Mesh: Fix crash after importing 2D images from an old scene and then going to the "2D Image" feature
Add/Remove Mesh: Fix issues when cancelling while importing parts from a scene
WebView: Some textures of scans could not be displayed e.g. due to incompatible .ply or issues with iOS
The mesh registration tool in the 3.1 DentalCAD version did not allow to use jaw scans as floating parts any more which was an unintended change for that product type (settings Registration3DRestrictMovementOfScandataWithReconstructions, Registration3DForbitAlignmentToDicomData, default=false)
E. Test prototypes / Beta Features
ExplodedView: New visualization feature "exploded view" is available for early beta testing (requires setting ShowExplodedView=true). The idea of that feature is to visualize path's of insertions interactively
The distance measurement tool has a feature to do more than one measurement (setting SpaceRulerObjectSizeAllowForMultipleParts, default=false). Also the measurement font size can be configured (setting SpaceRulerMeasurementLabelsFontSize, default=5)
F. Configuration Options

The ImportedMargin color is now configurable in defaultcolors.xml (default is old color "Light Green") and the LineThickness can also be configured with new setting (ImportedMarginLineThickness, default=1.0 like before)
04. Copy & Paste Tooth / Virtual Tooth Extraction
B. Optimization
Improved the single tooth segmentation for some rare cases
In case of a single-pontic virtual- waxup-adaptation without a virtual gingiva design to a single crown bottom, now the software uses the same behavior as in Copy&Paste tooth for consistency and in both cases (setting WaxupConsiderVirtualWaxupSingleToothPonticOnStumpLikeACopyAndPasteTooth, default = true), the software will now always try to apply the minimum thickness shape to the surface directly to avoid failure cases when large areas of the original tooth are below the crown bottom or minimum thickness shape before adaptation (setting WaxupAddMinThicknessBeforeAdaptationExcludeTestDistanceIgnoredForSinglePonticOrLoadToothModelOrCopyAndPasteToothCases, default=true)
Improve the artificially generated pontic bottom shape, e.g. to make them longer and look a bit more natural. (new settings PonticBottomMinimalLengthAlongPrincipalAxis = 2.0, PonticBottomTaperingCervicalToBottom = 10.0)
C. Change in Behavior
The copied pontic teeth are now enlarged on the bottom giving them a bit of a root which can be adapted better to the gingiva in freeform step [CHANGE] CopyAndPaste/VirtualToothExtraction/ProvisionalPontics: Allow more segmentation results by disabling the old plausibility check which may sometimes have false positives. [TESTPROTOTYPE] CopyAndPaste/VirtualToothExtraction/ProvisionalPontics: Allow to define generated pontic bottom root generation direction with new settings CopyAndPasteAllowChangePonticExtensionDirection, ProvisionalCrownTopAllowChangePonticExtensionDirection both are false by default because there are known issues but it may help in some situations or use cases
D. Bugfix
Fix UI/UX issues with the popup window to select the target tooth number
The Preparation was sometimes not visible as expected when activating Copy/Mirror Tooth
Fix issue when ConstructionParam CopyInWizardMode is set to Disabled (-1) e.g. avoid a crash and it will now cause processor not showing in wizard even if setting CopyAndPasteInWizardBasedOnHealthyTeeth is true. Fix inconsistent suggestion of mirror vs. copy mode. Also fix old wizard behavior when setting CopyAndPasteInWizardBasedOnHealthyTeeth is true. Fix issues regarding Undo/Redo of the margin in cases when the tooth model generation failed. Fix where tooth selection popup would stay open when mouse-follow got enabled after switch from extract to copy. Fix position of copy is not reset when switching from extract to copy moving the copy with mouse-follow and switch back to extract. Switching between copy and Virtual extraction may sometimes not work and instead destroy scan data due to a spurious Undo call
05. Implant based Restorations / Abutment Design
A. New Feature
Add AbutmentSubstructureScanMarginProcessor that allows to import a scanned abutment into a design case that already has a designed abutment, and to define a margin on the scan to use scan

<p>as input for the crown bottom to adapt the tooth (setting <code>AbutmentRescanWorkflowSupported</code>, <code>default=true</code>)</p>
<p>Angulated screw channels on pre-angulated Ti-Base libraries that have a new "closed abutment support" filename entry can now be defined interactively with a new method instead of relying on pre-defined angulations from the library. New settings for the feature are <code>ImplantLibraryAllowDynamicScrewChannelHoleCutOutInTiBaseSupports</code>, <code>default=true</code> and <code>ImplantLibraryAllowTiBaseSupportScrewChannelAutoAlignment</code>, <code>default=true</code>.</p>
<p>Crown bottom design on top of a designed abutment now allows to show an additional blackout checkbox to allow estimated milling diameter compensation of the designed abutment with new <code>ConstructionParam AbutmentMillingDiameterConsiderInCrownBottomBlockoutMode</code>. To disable and hide that feature completely, set the <code>ConstructionParam AbutmentMillingDiameterConsiderInCrownBottomBlockoutMode</code> to <code>NaN</code> in <code>defaultparamters.xml</code>. To enable it by default, set <code>AbutmentMillingDiameterConsiderInCrownBottomBlockoutMode=1</code>. Further settings: For testing purposes <code>AbutmentMillingDiameterConsiderInCrownBottomShowDebugMarker</code>, <code>default=false</code> to visualize the blackout-surface. <code>AbutmentMillingDiameterConsiderInCrownBottomAdd = 0.2</code> to add additional spacing <code>AbutmentMillingDiameterConsiderFixedDistanceFromMargin = 0.05</code> to keep if fixed in that distance to the margin <code>AbutmentMillingDiameterConsiderInCrownBottomAlsoForCementGapAndSpacing = true</code> to also consider cement gap blackout</p>
<p>Immediate Load workflow is now available for import from new upper/lower jaw design feature of exoplan 3.1. Also, allow import of the potentially modified base mesh from surgical guide workflow if existent and requested by user as new base mesh for immediate load design</p>
<p>Allow to automatically cut screw channels through the superstructure designs on top of abutments or screw retained thimble bridges during merging. The behavior is configurable with a new <code>ConstructionParam.AbutmentCutScrewChannelAlsoThroughSuperstructureMode</code> (<code>default=0</code> i.e. fall back to application setting which is <code>AbutmentCutScrewChannelAlsoThroughSuperstructureModeDefault</code> and defined to <code>-1</code> i.e. disabled. Allowed values: <code>Forbidden = -2</code>, <code>DisabledByDefault = -1</code>, <code>Default = 0</code>, <code>EnabledByDefault = 1</code>, <code>Always = 2</code>).</p> <p>Also, an additional offset for the screw channel can be configured with <code>ConstructionParam.AbutmentCutScrewChannelAlsoThroughSuperstructureOffset</code> (<code>default=0</code>). This new feature can be completely disabled by changing the new application setting <code>AbutmentCutScrewChannelAlsoThroughSuperstructureAllowedAtAll</code> to <code>false</code> (<code>default=true</code>). When the feature is possible, then in the second tab of the "Merge parts" dialog where the saved files are displayed appears a new dialog where user can set with a checkbox and slider the parameters in each case. The <code>.constructionInfo</code> file format has also been extended with that information to contain the information about the Hole cutting with a new axis <code>AxisScrewInPartAboveAbutment</code> in the coordinate system of the part above the abutment - if it has an automatic generated screw hole - and with a new structure <code>DrillHole</code> in the list <code>DrillHoles</code> which contains <code>Center</code> and <code>Axis</code> and approximate <code>Radius</code> of the Screw hole. In the <code>.constructionInfo</code> file, for screw channels in secondary structures, a <code>Tooth</code> can now have <code>AxisScrewInPartAboveAbutment</code> and a each construction can have a list of "DrillHoles" where each "DrillHole" is something like cylindrical geometry to be cut out.</p>
<p>B. Optimization</p>

Minor improvement regarding UI/UX interactivity when working with many abutment designs at the same time in the case and using buttons in the user interface
The ImplantLibrary no longer prints a warning indicating that the library directory exceeds the maximum length when long path names are supported on the current system. The previous behavior can be reenabled by setting the ImplantLibraryDirectoryMaxLengthIgnoredIfLongPathNamesSupported option to false.
The UI/UX of the screw hole design dialog has been slightly improved
User has now the ability to go back or cancel a calculation after pressing "Next"/"Accept" in the abutment design. This may sometimes help in case when the software calculates a very wrong time due to a problematic abutment design and/or scan data issue (user can then change the design).
Change Implant Type: Added possibility to drag and drop tooth to copy its implant type and reconstruction type
OffsetSubstructure/OffsetCoping/ImplantTypeSubstructureScan: OffsetSubstructure reconstruction type should be triggered when using OffsetCoping and ImplantTypeSubstructureScan and VirtualGingivaDesignMode as Wizard . In such case, the .dentalProject loader shall convert directly on project-load the OffsetCoping to OffsetSubstructure (setting OffsetCopingImplantTypeSubstructureAndVirtualGingivaRequiredConvertToOffsetSubstructure, default = true)
Immediate Load: Added better support for the new exoplan 3.1 Rijeka dual-jaw cases in immediate load workflows
When emergence profiles had been freeformed by user and user goes back to the parametric abutment emergence profile design, the warning messages will now contain the tooth numbers
The abutment marker best-fit matching is now executed automatically and the "Best fit" button does not need to be pressed manually anymore (setting AbutmentMatchingBestFitWithTimer, default=true)
Warn user when the screw channel hits the emergence profile design surface at the end of the emergence profile design step (setting AbutmentBottomDesignCheckForIntersectionBetweenScrewChannelAndEmergenceProfile, default = true, AbutmentBottomDesignForceUserToReturnToScrewChannelAngulationIfIntersectionWithEmergenceProfileDetected, default=true)
C. Change in Behavior
The part type "StockAbutmentCap" is now also automatically loaded from the implant library and added to Show/Hide menu for visualization purposes, e.g. when designing dentures on stock abutments [OEMCONFIG] Abutment Design: Added color entries into defaultcolors.xml for AbutmentSupport, StockAbutment, StockAbutmentSupport, StockAbutmentCap
D. Bugfix
Fix crash in Expert Mode when going back to "Abutment Design" when the user previously freeformed the emergence profiles and so no dynamically editable emergence profile is present anymore
When generating crown bottoms on stock abutments, avoid that the block-out direction was sometimes reset to the stock-abutment library axis even though the user may have wanted a customized or uniform block out direction e.g. in a bridge
E. Test prototypes / Beta Features

Freeform merged of a merged abutment can now also block out the abutment when the setting AbutmentBlockOutAfterFreeformingMerged for this new test-prototype feature is enabled. Warning: This feature may cause surface artifacts and is only present for early testing
F. Configuration Options
A setting exists to always trigger in Wizard the "Design Supra Structure Now" button when it is available (MergePartsDesignSuprastructureRequiredAutoNext, default=false)
06. Virtual Articulator / Jaw Motion
A. New Feature
A new articulator type is now possible where the lower instead of the upper jaw is moving, e.g. for the new "In-Skull" articulator by changing the new parameter MoveLowerJawByDefault=true in the articulatorparameters.xml for the articulator library (folder name "exoskull"). The new "In-Skull" articulator is available for selection for pure visualization purposes
Added support for Gamma Reference RL Articulator
Added support of articulators with front table mounted on upper part which will enable new future integration of articulator-libraries e.g. Gamma Reference SL, Kavo Protar Evo 7 etc. In the file articulatorparameters.xml the following settings must be set for that feature: FrontPlateMountedOnArticulatorUpperPart = true (new setting), ArticulatorPosition, HeightUpperArticulatorPart, HeightFrontPlate, HeightIncisalNeedle, FrontplateAdjustablePivotPoint
An "Auto Articulator" feature is now available if the selected Antagonist Type is DigitalImpressionScan, AntagonistType.RegisteredJaws or AntagonistType.MushBite. The feature can be activated in the user setting "Use auto articulator" . The auto articulator runs automatically in the "Single Tooth Placement" step allowing the dynamic occlusion adaption. The "Auto Articulator" feature tries with a simple heuristic to estimate the mean value articulator position of the scan data, and then execute a standard virtual articulator simulation with default values on it, such that a dynamic occlusion can be defined even without opening the normal Virtual Articulator dialog.
Prepared support for jaw motion movement register of type "OXO"
Support for new new zebris bite fork added (zebris_type_un)
B. Optimization
Added support for articulator movement register library "KaVo ARCUSdigma 3" (keyword JawMovementRegistrationLibrary.ARCUSDIGMA)
After the user adjusted the bite in the virtual articulator regarding the incisal needle, the software will now allow to apply that adjusted bite to the current case permanently i.e. without the necessity to keep the "Repeat articulator tool" open. That greatly improves workflows where the virtual articulator is used to do a bite elevation e.g. bite splint design . In the "Repeat articulator tool" the user can always undo this operation to get the initial bite position.
Allow articulator settings import for Kavo PROTAREvo5B and Gamma Reference SL articulators
Avoid slowdown of software when a jaw motion path has very many measured points which were displayed in the 3d viewer as spheres. The 3d viewer display has been accelerated and if there are too many points, some of them are filtered. New related settings for point radii: JawMovementAllPointsVisualizationRadiusSmall = 0.003, JawMovementCurrentPointsVisualizationRadius = 0.010, and a setting to determine how close the measurement points are allowed to be for distinct 3d display JawMovementAllPointsVisualizationMinimumDistance = 0.1 (.e. currently at least 0.1mm)

<p>For articulators with rotatoric incisal pin the physical scale value and unit does not fit to the bite opening slider value and unit. To resolve that, new tags are available in articulatorparameters.xml "IncisalNeedleScaleUnit" for display of unit on the bite opening slider and "IncisalNeedleRotationFactorUnitToDegree" for new calculation of incisal pin rotation angle which can now be configured correctly for each of such articulator library. The affected articulators are AD2, Artex CR Adjustable, Denar Mark 330, Ivoclar Stratos 300 Adjustable and Panadent PCH.</p>
<p>Improved performance and stability of simulation algorithm</p>
<p>It is now possible to load articulator settings files independent from the "coordinate_system" e.g. those that do not have the entry "axis_orbital" as "coordinate_system". It is also possible to load entries that have the entry "bite_fork" for the coordinate_system</p>
<p>Minor UI optimizations e.g. in the selection exclude brush tool</p>
<p>Minor UI/UX Improvements in the influence-selection control</p>
<p>The default view direction "cube icon" now changes to the "head icon" after the case was brought into the standard articulator system.</p>
<p>The exclude-markings by brush can now also be restored when the mesh itself changed e.g. when the mesh editor or freeform-scan data had been used in the areas where the mesh was unchanged</p>
<p>The influence of the height slider of the additional plane that can be defined can now be inverted because some expected the opposite behavior with new setting ArticulatorJawCorrectionAdditionalPlaneHeightInvertSign .</p>
<p>The software can now load jaw motion files without crash where "position" contain a "type" more than once. Additionally now the "id" is loaded to distinguish those cases</p>
<p>The virtual articulator movement slider UI/UX was improved and will now list in an info-box the movements that are disabled and will not be performed depending on the movement length sliders</p>
<p>Under the feature to rearticulate the models automatically, its is now possible to align the model on the additional plane, using the 3 point alignment options. Also the model can follow any changes done on the location and angle of the additional plane.</p>
<p>When user opens the "Rearticulate models virtually" feature the software will now remember the previously used articulator settings and values</p>
<p>Model creator attachments surface parts are now ignored when checkbox to use models in the simulation is enabled (setting ArticulatorIgnoreAttachmentsInSimulation, default=true)</p>
<p>C. Change in Behavior</p>
<p>Legacy articulator library entries will be removed with DentalCAD 3.2 version, e.g. "Type A (Legacy)", "Type S(Legacy)", "Type P (Legacy)". The articulormappings.xml is adjusted with the keyword ReplacedByFolderName to accommodate for that change regarding backward compatibility e.g. with old .dentalCAD scene files.</p>
<p>Starting the virtual articulator from expert mode will now force it to appear in the wizard, to preserve a correct wizard history and allow correct Back->Next behavior</p>
<p>The virtual imprint generation will now by default also include restorations into the virtual imprint, even tough they were not used for generating the simulation e.g. by using the exclude-brush. This allows new workflows where the guidance comes from a subset of teeth but still the dynamic cutting operation includes all designed teeth. This new behavior can be disabled with setting ArticulatorUseRestorationsInVirtualImprint (default=true)</p>
<p>When there is only one insert for selection, now a label is shown instead of a drop-down</p>
<p>D. Bugfix</p>
<p>Fix issue where mouse wheel scrolling did not work with the jaw movement slider</p>

Fix issue where re-opening the virtual articulator the second time not all insert selections were correctly preserved e.g. the "inclination_insert" and the "bennet_insert"
Fix issues regarding the additional plane placement and 3 point re-articulation on that plane for some articulators that have a tilted occlusal plane (e.g. SAM, Gamma Reference SL)
Fix potential null-reference crash in function after performing the articulator simulation when there are now articulator results generated
Fix rare crash after closing a project, opening a new project and then cancel loading the project when repeat articulator tool was active above (e.g. because Freeforming step was used)
Load digital Face bow data twice after "Undo" may have lead to wrong positioning in the articulator
When customizing the selected movement paths and re-opening the virtual articulator later on again, the selected movement paths might have been reset to the default. Now the articulator remembers the selection.
When defining annotations, the checkbox "Stick to jaw movement" may have disappeared even though it was defined on a specific jaw and jaw movement would have been possible
When using jaw movement in expert mode and generating a new virtual imprint the distance "Dynamic" button was not automatically updated or activated
With some articulators e.g. SAM_2P the automatic alignment with 3 points did produce unexpected results due to an issue how the articulator plane was handled
If the digital face bow data could not be loaded, then now the software shows correctly an error notification
Jaw to adapt first does not update together with articulator re-run tool that has been introduced in 3.1 Rijeka in the Repeat-Articulator and Freeform-Step
07. Full Denture, Partial Framework Integration
A. New Feature
A new interactive positioning during the prosthetic library selection step is now available. This enables workflows where the automatic placement based on model analysis did not provide optimal results and the user want to try different libraries with a custom adjusted position
Introduce feature to design a full denture on top for stock abutments (setting TotalProsthesisBottomConsiderImplantLibrary, default= true). The design requires to work with Stock Abutment libraries that have a closed stock-abutment support. The consideration of stock abutments is controlled by a new checkbox and a ConstructionParam ProstheticBaseBottomGenerationAbutmentMode (1 means enabled, -1 means disabled) and a new slider for an offset on top of it (ConstructionParam ProstheticBaseBottomGenerationAbutmentOffset)
Introduce ToothPartType.DentureScan that can be loaded with .dentalProject with the "-denturescan" file name tag, if SeparateDentureScan is true in the .dentalProject or if the "Duplicate Denture Feature" is available and enabled. Without the "Duplicate Denture Feature" available, this part type is merely for visualization purposes.
The Ivoclar Ivotion Full Denture Design capabilities that was presented on exocad Insights 2022 can now be accomplished with this software release when the required modules and libraries have been acquired (Contact sales or support for further information about the commercial requirements and configurations).
The model analysis is now saved inside the .scanInfo file and can be re-loaded when the .dentalProject file is loaded again. This allows workflows where for example user want to change materials in DentalDB without having to repeat the model analysis, or distributed workflows

<p>where one person does model analysis and the other person the designs . New Settings: ScanInfoWriteProstheticModelAnalysis to write the analysis and ScanInfoReadProstheticModelAnalysis to read the analysis (both are active by default)</p>
<p>DuplicateDenture: The duplicate denture feature is available which allows to copy a denture from a 360 degree scan of a denture. . For best user experience with semi-automatic segmentation, the exocad-cloud support is required.</p>
<p>Added new alternative way to generate denture bridges by directly merging them in the Adapt Prosthetic Base Step without generating dedicated bridge connectors (when user selects Tooth-To-Tooth connector and then opens in adapt prosthetic base the new parametric design tab). This feature is currently a beta feature. The important ConstructionParam is "ProstheticBridgeBottomGeneration" which can be set to "11" or "21" to trigger the new tooth-to-tooth workflow and "1" or "2" to use the feature with normal bridge connectors.</p>
<p>A new alternative way to generate the bottoms of bridges in full-denture designs is available in the Adapt Prosthetic Base step ("parametric denture bridge bottom"). This should allow to reduce milling times and will enable better duplicate denture bridge workflows. Setting TotalProsthesisAdaptProstheticBaseAllowGenerateMergedBridges and TotalProsthesisProstheticBridgeBottomGenerationAllowed=true is required for that feature.</p>
<p>B. Optimization</p>
<p>Fix such that that "Discard Basic Model Analysis" Dialog is not triggered any more when clicking on "Basic Model Analysis" and the user would not actually discard anything or the model analysis was only loaded from the .scanInfo file</p>
<p>Generating a Prosthetic Tooth PDF report is now asynchronous and does not block the user interface any more</p>
<p>Improved camera orientation iteratively during model analysis based on completed steps.</p>
<p>In cases when the setting related to restore minimum thickness of the base was disabled (TotalProsthesisRestoreMinThicknessWhenEnforcingCervicalBorders=false), the software can now still show a warning notification when it detects an issue related to such minimum thickness (new setting TotalProsthesisRestoreMinThicknessWhenEnforcingCervicalBordersDisableWarnIfCervicalBorders, default=true)</p>
<p>In ModelAnalysis improved user experience when required steps were skipped by providing the information what is missing and a way to quickly jump back to that step.</p>
<p>Prosthetic base bottom minor UI optimization and now using toggle buttons for the brushes</p>
<p>Supporting combined Quicksnap workflows allowing new values for the updated parameter VirtualGingivaConnectToNextBridgeMode in .dentalProject to control which teeth are combined in the virtual gingiva [OEMCONFIG] Virtual Gingiva: The old parameter VirtualGingivaConnectToNextBridgeMode to control the virtual gingiva step in wizard regarding the combined tooth numbers has been improved with new functionality for advanced workflows like PartialFramework QuickSnap with these new possible integer values: DoNotConnectToNextOrPrevTooth = -3, DoNotConnectToPrevTooth = -2, DoNotConnectToNextTooth = -1, Default = 0, ConnectToNextTooth = 1, // this was the old default that actually looked from the next tooth to the previous tooth ConnectToPrevTooth = 2, ConnectToNextOrPrevTooth = 3,</p>

<p>ConnectToPrevToothIfReconstructionTypeMatches = 4, ConnectToNextToothIfReconstructionTypeMatches = 5, ConnectToNextOrPrevToothIfReconstructionTypeMatches = 6, ConnectToNextOrPrevToothIfTheValuesEqualStart = 10, // starting from this value, parts are connected if their values are equal. ConnectToNextOrPrevToothIfTheValuesEqualIgnoreMissingToothNumbersIfGreaterThanThis = 999, // same as ConnectToNextOrPrevToothIfTheValuesEqualStart but then it even ignores missing tooth numbers in-between</p>
<p>Supporting combined Quicksnap workflows with a new parameter VirtualGingivaMergeWithToothMode in .dentalProject to control which teeth are merged together with the virtual gingiva and which should never be merged (current values: DoNotMergeToothWithGingivaUntilOverdentureModeStarted = -2, DoNotMergeToothWithGingiva = -1, Default = 0, MergeWithGingiva = 1)</p>
<p>The brush size in freeform "Partial Framework" in DentalCAD now has two buttons for a small and a big brush</p>
<p>The model analysis items are now accessible also in the Show/Hide menu</p>
<p>The new parametrical bridge bottom feature can also by itself generate a combined bridge with a new way to generate the tooth-to-tooth connectors directly in the "Adapt prosthetic base step", which then does the full merging. To use the workflow, enable the direct tooth-to-tooth connectors and then use the parametrical bridge bottom feature in the "Adapt prosthetic base" step. (also the setting TotalProsthesisAdaptProstheticBaseAllowGenerateMergedBridges=true may be required)</p>
<p>The Add/Remove mesh tool now allows to load a new part type "Denture Scan" for visualization purposes, or for use in the Duplicate Denture Workflow . This feature is by default only available in the Duplicate Denture Workflow. However one can make this option available for all denture cases, by setting AddRemoveMeshAllowLoadDentureScan to true.</p>
<p>Monoblock functionality can be used when partial framework adapted prosthetic base has been generated (setting TotalProsthesisAllowMergeToMonoblockWithoutProstheticTooth, default=true).</p>
<p>C. Change in Behavior</p>
<p>ModelAnalysis: In the occlusal plane step the button to select an articulator was replaced by a combobox. When a custom plane is defined instead, this is indicated by showing "user defined" inside that combobox. Also the information which articulator was selected is now persistent when loading a scene file.</p>
<p>Supporting combined QuickSnap workflows and improving Flexible Denture Workflows by slightly improving the behavior of the old parameter "PartialFrameworkGingivaAdaptToothPocketWizardMode", i.e. if PartialFrameworkGingivaAdaptToothPocketWizardMode=WizardRequired=3 then the tooth pocket adaptation for single tooth without bridge connector can now also appear before merging (new setting PartialFrameworkVirtualGingivaUseAdaptToothPocketWorkflowBeforeMergeOnlyForBridgesOrIfOverdentureModeStartedOrIfWizardRequired = true, default=true). This change is relevant when the old settings PartialFrameworkVirtualGingivaUseAdaptToothPocketWorkflowBeforeMergeOnlyForBridges, PartialFrameworkVirtualGingivaUseAdaptToothPocketWorkflowBeforeMergeOnlyForBridgesOrIfOverdentureModeStarted are true (which has been our default since 3.0 Galway). Also avoid merging teeth with virtual gingiva that have PartialFrameworkGingivaAdaptToothPocketWizardMode>=2 i.e. Wizard or WizardRequired</p>

because in tooth-pocket adaptation configurations the teeth should never be merged with gingiva (setting PartialFrameworkGingivaAdaptToothPocketWizardModesAvoidMergeIntoVirtualGingiva, default=true)
The Prosthetic Monoblock step now has higher priority in wizard.xml compared to Adapt Prosthetic Base, to allow correct workflow when the setting TotalProsthesisAllowMergeToMonoblockOnlyAdapted is changed to false and TotalProsthesisAllowMergeToMonoblockAlwaysUseUnAdapted is changed to true. Doing this changes allows to generate higher quality of the prosthetic monoblock, because it will use the prosthetic base for adaptation as input. The only disadvantage is, that it does not include/reflect any freeform changes on the adapted prosthetic base. For Ivoclar Ivotion workflows, this changed workflow shall always be used.
D. Bugfix
Avoid some rare failure cases in AdaptProstheticBase
Fix issue with Undo/Redo of the brush in prosthetic bottom step
Fixed rare cases where the monoblock would not be generated correctly, and fixed rare case where bottom side was being colored red in some cases
Generated Prosthetic Denture PDF Report teeth might be slightly cut off
In Model Analysis fix issue where the alveolar ridge line was not projected correctly when working with water tight scans that are closed on their bottom too
In Model Analysis fix issues regarding the tool where a plane is defined in 3d space
In Prosthetic Tooth Placement in the Preset tab fixed that the step would sometimes switch from filter "non scalable" to "all" on startup in some situations.
ModelAnalysis: Fix next-button after cancelling. Changed so that next-button is not only enabled if current model analysis succeeded but also when the control is cancelled and a model analysis was performed successfully beforehand
Prosthetic Tooth PDF Report can now also be generated without crashes when not all information is present yet, e.g. not all library models are loaded etc.
The Chainmode in correct placement may have caused large displacement when the tooth models were already adapted to the antagonist and/or the tooth models had some surface issues e.g. overlapped triangle. Now the Chainmode detects that situation and disables itself automatically.
When drawing denture base margin and using Undo after Clear-Button, then Clear would wrongly stay disabled
When the feature to resolve anterior intersections was used with slightly broken tooth meshes e.g. that have self-intersections or wrong tooth axes, it might have run in an endless loop that would cause freezes in the software. Now it is guaranteed to stop calculating
E. Test prototypes / Beta Features
it is now possible to move posteriors individually while the "Simple" tab is active. When enabled (setting TotalProsthesisCorrectPlacementSimpleModeAllowToUnlockPosteriorsRelation, default: false), a checkbox "Lock posteriors relation" will be visible to switch between the modes.
For single arch dentures in the prosthetic tooth library placement dialog, the "Auto Select" button did not return a result in the past due to missing information from the model analysis. A prototype with setting TotalProsthesisProstheticToothPlacementEnableAutoSelectButtonForSingleArchDenturePresets=true can be enabled to propose an automatic selection.
F. Configuration Options
DuplicateDenture: The new ConstructionParam.DuplicateDentureMode can be set per-tooth to enable/disable the duplicate denture workflow in a full-denture case with the values: Disabled = -

<p>1, Enabled = 1 and the default value =0 means that the behavior depends on application settings (DuplicateDentureMode or DuplicateDentureModeEnableIfDentureScanFileExists, both by default=false)</p>
<p>New Construction Parameters have been added to defaultparameters.xml that can be configured in WorkParams and .dentalProject that were previously only settings for customized full denture workflows, and also for reduction of the output file size (ProstheticToothPlacementPresetsUseByDefault, AdaptProstheticBaseEnableImprovedToothPocketMarginSmoothing, LoadSceneAllowCheckChangedProjectDisabled, LoadSceneAllowCheckChangedProjectForProstheticToothProjects, FreeFormProstheticBaseFreeformMergeCallsRunOnProstheticBase, FullDentureDisableOutputOfTeethInMergeParts, ProstheticMergeToMonoblockAllowMergeToMonoblockConsiderMergedBridges, ProstheticMergeToMonoblockAllowMergeToMonoblockOnlyAdapted, ProstheticMergeToMonoblockAllowMergeToMonoblockOnlyAdaptedFitToothPocketsToUnadaptedBaseOnlyForBridgeDesigns, ProstheticMergeToMonoblockAllowMergeToMonoblockAlwaysUseUnAdapted, ProstheticToothPlacementWarnIfCervicalBordersAreTooCloseToJawScanToEnforceThem, SaveToFileForProductionMeshReductionForFullDentureEnabled). These are used for example for the new Ivoclar Ivotion production process DentalDB WorkParams configurations.</p>
<p>08. Smile Creator</p>
<p>A. New Feature</p>
<p>A new segmentation step feature is now available that virtually segments teeth and gingiva from the scan to improve the 3d visualization of a newly designed smile together with the existing teeth. (Setting SmileDesignMultiToothSegmentationAllowed, default=true). In the Smile Creator Wizard, a new button exists to segment the case. If a pre-op scan is present, then this will be used for the segmentation. The semi-automatic tooth detection requires access to new exocad-Cloud* features is not available in all regions/markets/versions.</p>
<p>A virtual gingiva can now be generated from the Smile Creator. The user can choose if the virtual gingiva from the new multi-tooth scan segmentation is used, or a if a gingiva shall be generated based on the restorative and possibly segmented teeth</p>
<p>Interactive freeform functionality is now possible in the secondary views while Smile Creator is open</p>
<p>The proportion of teeth are now shown in percentage values. A new setting is added to settings window, user can switch between percentage and ratio (SmileDesignShowMeasurementRatioInPercentage, default=false). Values after decimal point for percentage is set by a new setting SmileDesignMeasurementRatioInPercentageValuesAfterDecimalPoint (default is 2, max is 2).</p>
<p>The screenshots from the Screenshot and Image Manager can now be included when a PDF-Export from Smile Creator is created with a new checkbox</p>
<p>The user can now define a "field of view" ("FOV") to better visually match the perspective of the 2d image with the 3d data in the Smile Creator, which is especially useful when the photo camera was too close to the face (setting SmileDesignEnableFovSlider, default=true). The selected FOV is now also exported/imported in .treatmentImage files.</p>
<p>User can now apply a darkening effect for the posterior teeth that shall resemble shadow/light situations in the mouth and influence it by an interactive slider to make the rendering more realistic (saturation of posterior peeth).</p>

Users can now generate virtual gingiva from the smile design preview page
<p>TruSmile: The right-click menu of the TruSmile button has a new draw mode "All Distinguished" which applies special artificial colors to the 3d objects to allow easily to distinguish their types e.g. to distinguish anatomic crowns from anatomic pontics but ignore their material. New .renderEffects can be created as "AllDistinguished" but to make it more easier, the (default-)colors.xml can have entries like <PartType>.Distinguished to only define the color of the object in that mode. Examples:</p> <pre><ColorDefinition> <Type>LibraryModel.Distinguished</Type> <Color>#FF3DA7C9</Color> </ColorDefinition> <ColorDefinition> <Type>AnatomicPontic.Distinguished</Type> <Color>#FF3DA7C9</Color> </ColorDefinition></pre>
<p>TruSmile: The right-click menu of the TruSmile button has a new draw mode "All Natural" which applies special renderEffects that are created as "AllNatural" to all objects with the goal to ignore any materials etc. (setting TruSmileAllowAllNatural, default=true). Note: Not all suitable .renderEffect files have been created yet, and users are supposed to hide those part-types while using that feature where "all natural" doesn't make sense (e.g. bars or implants).</p>
B. Optimization
Add ability to drag & drop a 3d-face scan from Windows explorer to the images page (similar to 2d-images)
Allow to use a different mouse-cursor when the "Adjust Light" feature is used. New setting SmileDesignAdjustLightChangeMouseCursor, default =true. The cursor file is configurable with the setting SmileDesignAdjustLightChangeMouseCursorFile (default = "smiledesign\AdjustLight.cur" relative to "library")
Auto hide view-obstructions for opposing jaw feature in secondary views has been optimized. The transparency animation time can be configured by SmileDesignAutoHideOpposingJawAnimationTimeMilliseconds (default = null which falls back to GroupSelectorAutoHideOpposingJawAnimationTimeMilliseconds) and the animation can be disabled by setting it to 0
Automatic scene saving after smile creator is now enabled when user enabled to save scene files after important steps (new setting AutoSaveSceneOnImportantSteps_AlsoAfterSmileCreator, default=true)
Avoid flashing effects in Main Window when PDF Report directly from "Smile Window" - Button is created, the visual setup now applies the settings on the given scene and Jaw and as a side benefit, now it is possible to apply settings on secondary views and secondary window and no need to reset the settings any more on the main screen after taking screenshots
Avoid making Smile Helper Lines visible when using the ALT-Key later in the DentalCAD-main window because they were not really helpful (especially when the view was rotated)
Entering and leaving the freeform feature will now remember if the view-orientation lock was used before or not.
If the facescan is pre-aligned with scan data the software should allow to skip the face scan alignment step
Improve visual quality of interactive Smile Rendering with a shadow-like effect in the back for teeth and gingiva

Improved initial forward/backward positioning of the tooth models (y-axis depth). Considering a distance to the scan data can be changed by disabling the new setting SmileDesignInitialToothPlacementClosestPointProjection (default=true).
In the "Smile Window" also use as default the normal visual setup of the Smile Creator's preview page's when it is opened
In the secondary "Smile Window" the mechanism to show/hide groups has been improved
It is now possible to use one face scan together with a 2d Smile Image
Minor improvements to preserve height when changing the tooth library
Minor UI improvements when starting the Smile Creator e.g. avoiding flickering in the UI
On preview page, when the user changes visual setup, the software now remembers these changes for the current scene and also stores it into scene files. When the Smile Window is opened, it also uses that preview page setup.
Preview page UI updated
Report generation UI/UX improvement, e.g. users can now select their logo there and now it is possible to cancel report generation from main window.
Slight improvement of the mouth shadow render effect in the preview page and in generated reports
The "Auto hide view obstruction" feature has been improved for the secondary views
The "Smile Window" action button on the right Tool-Bar of the Main Window now has a right-click context menu where one can execute actions to directly go to Smile Creator Preview Page, Modelling Page or generate the Smile Creator Report
The manual custom tooth color selection feature has been slightly improved. Additionally, users can now optionally define a custom gingiva color by setting SmileDesign2DGingivaColorBarEnabled=true, which is also available in the user-settings menu
The new "Segmented Tooth" parts are now included in the visual setups to allow a more consistent rendering of the "before" state and the existing neighboring teeth of the patient in relation to the new designed teeth
The Tru Smile render effects and colors from main window are now synchronized into the secondary views (except from outline)
When export to webview/.html is triggered by Smile Creator, also make the unsegmented jaw scans visible and include in export
When smile design was opened in wizard, allow also users to close it when switching to Expert Mode with the Expert-Mode button
When the new multi tooth segmentation feature is used, the software allows to copy the segmented teeth to restorations by using a checkbox in the segmentation UI, and then copying it when pressing Next/Accept in Wizard (setting MultiToothSegmentationAllowCopyInWizard, default= true). The default of the checkbox can be defined by the setting (MultiToothSegmentationAllowCopyInWizardEnabledByDefault, default = null), where null means that at least one tooth must have the ConstructionParam CopyInWizardMode.CopyAsDirectCopy to enable it by default.
When the user cancels the 2d image registration, now ask if the 2d image shall be kept or discarded. This change also fixes subsequent issues if the user keeps that image.
When the user changes a tooth library, the software now resets automatically the visual properties selection and the loaded tooth library parts are made automatically visible
TruSmile: Metal render effect improved when flat shading is active
TruSmile: Render effects for Merged Thimble Substructures updates

<p>TruSmile: The "Simple" render effect now supports intelligent/feature-preserving flat shading to show better looking sharp edges</p> <p>[TESTPROTOTYPE][OEMCONFIG] TruSmile: For Bridge splitter results, if the <code>rendereffects\SplitBridge.renderEffect</code> file exists, then the effect from that file is used for split bridges. There is also a new optional setting <code>BridgeSplitVisualizeAsMetalWithoutTruSmile</code> (default = false) where if enabled, split bridges are shown with metal effect when TruSmile is disabled.</p>
<p>Hide the retracted image in preview tab in case all teeth were segmented before to achieve an improved/more realistic rendering of the new smile. New setting <code>SmileDesignHideRetractedImageOnPreviewWhenSegmentedTeethAvailable</code> (default true) to change the visibility of the retracted image in preview tab.</p>
<p>Optimize the display of teeth when activating the special smile creator tooth render effect when the clipping at cervical margin is active or the outline effect by avoiding to see teeth from the back in those areas</p>
<p>The Smile Creator PDF Report can now directly be opened from the software after was generated e.g. by clicking the new "Open in Explorer" button notification window (setting <code>SmileDesignWindowPDFAutoShowAfterExport</code>, default=true)</p>
<p>The default view frontal direction in Smile Creator is now estimated based on the scan data (using in that order the articulator direction if defined, <code>AxisNasal</code> from the new multi-tooth-segmentation, from the scan data or estimating it automatically when it is not known). Settings <code>SmileDesignDefaultViewConsiderAxisNasal</code>, default=true, <code>SmileDesignDefaultViewConsiderAxisNasalButOnlyWhenExplicitlyDefined</code>, default=false, and for auto detection in Smile Creator <code>SmileDesignDefaultViewConsiderAxisNasalDetectIfRequired</code>, default=true</p>
<p>The WebCam window is now resizable. The default size can be configure with settings (<code>WebcamWindowMinimalWidth</code> = 420, <code>WebcamWindowMinimalHeight</code> = 365, <code>WebcamWindowDefaultWidth</code> = 560, <code>WebcamWindowDefaultHeight</code> = 440)</p>
<p>C. Change in Behavior</p>
<p>Avoid that user can go to the "Modeling Page" directly from the Smile Window when the user did not even finish the registration or do the mouth cut-out</p>
<p>Avoid that user can proceed to next step when the images are not registered yet. This may avoid other consecutive issues like way too large smile helper lines on the screen</p>
<p>Fix typo in the automatically generated smile image file names and related notifications. New image file name templates are now defined like this: <code>SmileDesignCreateNewImageName</code> = "smile_new-%t.jpg", <code>SmileDesignCreatePreviousNewImageName</code> = "smile_previous_new-%t.jpg", <code>SmileDesignCreateNewPreviousImageName</code> = "smile_new_previous-%t.jpg"</p>
<p>If more than one 3d face scan is loaded then the secondary views prefer and only use the one that has been registered for the Smile Design in the Image page</p>
<p>Improve display of the 3d face scan regarding the mouth cutout when looking from the side by tweaking visual offsets and by enabling backface culling for the face scan to hide the backside of its triangles</p>
<p>In the secondary views of the modeling page, it is now configurable if the control point shall disappear when the model is moved or when the mouse is double clicked inside the box. It is controlled by the setting: <code>SmileDesignEditFrameOnSecondaryViewsAlwaysResizable</code> (default is true).</p> <p>Another parameter is introduced to enable editing (resizing) the frames, even the orientation is changed. This parameter is controlled by the setting: <code>SmileDesignEditFrameOnSecondaryViewsAlwaysRotatable</code> (default=true).</p>

<p>Proportionate the model to the whole proportion guide instead of incisors on modeling page initial placement. With these changes, the model is now scaled using the whole proportion guide. There is also a hidden option on helpers page to change the scaling method. This option can be made visible using setting SmileDesignShowAdvancedSettingsOnHelpers (default=false). Preserving the depth can also be tested with a setting: SmileDesignToothLibraryChangePreserveDepth (default=false). If the scaling ratio is lower than a threshold (Controlled by the setting: SmileDesignForceModelScaleToThresholdValue, default value is 0.5), then no scaling is applied to the model. The initial placement behavior can be configured with a new setting SmileDesignInitialTeethPlacement with values UseIncisors = 0, UseCanines = 1, UseWholeBox = 2 . There is also a threshold for the scaling of the models that can be disabled (SmileDesignForceModelScaleToThreshold, default=true)</p>
<p>The "Adjust Light" light feature in Smile Creator now avoids unexpected specular glare effects, e.g. on 3D Face scans [CHANGE] Adjust Light: The interactive "Adjust Light" feature from the tools menu now avoids unexpected specular glare effects, e.g. on 3D Face scans</p>
<p>The rotate image buttons are now hidden when the automatic image-to-image alignment succeeded</p>
<p>When there is no image or face scan available (e.g. after deleting or canceling) then the smile design view buttons should be hidden</p>
<p>Provide option to show/hide "teeth intended for restorations" on secondary views of modeling page (controlled by an app setting: SmileDesignEnableShowIntendedTeethForRestorationsToggleOnSecViews - default value is true) Dont show "show/hide intended teeth for restorations" toggle button, if there is no segmented or ortho teeth</p>
<p>Markers for eye detection are now yellow and green for improved differentiation between both markers (the color of the markers are configured via defaultcolors.xml SmileDesign.Registration.Feature0 and SmileDesign.Registration.Feature1).</p>
<p>D. Bugfix</p>
<p>Avoid crash when the eye could not be detected in a photo</p>
<p>Avoiding rare issue when the smile image zoom factor was not correct when going into the preview page</p>
<p>During alignment, avoid that during view-panning with right + left mouse button it sometimes also accidentally places a marker</p>
<p>Fix issue on modeling page where Undo would not set the right library after Freeform and then Back->Next in Wizard</p>
<p>Fix issue where sometimes teeth would be marked as yellow and free-formable when user switches between Smile Creator steps in Wizard. Also, make sure that the "please wait screen" in the Wizard is shown immediately when smile design is startet</p>
<p>Fix issues and crashes when using the Smile Creator with Face Scans</p>
<p>Fix possibly 3.1 regression where Smile Creator could crash when started from expert mode</p>
<p>Fix rare issue where the Smile Creator Wizard Window would sometimes appear behind the normal Wizard window</p>
<p>Fix visualization issue where the yellow line of "degree of inclination" was missing or not displayed correctly</p>
<p>Fixed an issue with 3d face scan in the eye detection step where user interaction with the markers did not work</p>

Fixed outline effect which sometimes was not working due to render depth or with bigger view frustums
If a 3d face scan already existed before Smile Creator was started, it is now correctly treated in Smile Creator as face scan in the workflow too
In Smile Window, improve initial visibility sets of teeth
In the new separate Smile-Window the smile helper line for the lip may have been slightly displaced
Minor fixes with the web-cam feature, e.g. it would crash when pressing the snapshot button multiple times
PDF Report when working with teeth in upperjaw and lowerjaw simultaneously, then the tooth outline might have been overlapped in the generated report. Now, when both jaw scans are available, widths of the teeth on the upper jaw are shown above the model, and widths of the teeth on the lower jaw are shown below the model. When there is only one jaw, then it widths are shown below the model as usual.
Some Smile-Design related Render Effects (e.g. for the mouth shadow) did not respect user clip planes now correctly get clipped
The 3d-face scan was sometimes wrongly displayed in the Smile Window
The Smile Window now detects the adapted tooth models after crown bottom generation and includes them
When during image-to-jaw registration the outline feature was activated, the outline would sometimes not show correctly (related to setting SmileDesignShowOutlineJawScanAtRegistration=true)
With pre-alignment 3d face scans, the lip line detection step was skipped in the Smile Creator Wizard
2DImage/SmileDesign: When a 2d-image is saved to file with right click e.g. in then it may be saved upside down to the file
TruSmile: The "All plaster" mode that is available in the right-click menu of the TruSmile button does not change 2d images any more
E. Test prototypes / Beta Features
Added Color Picker and Color Bar for the gingiva (setting SmileDesign2DGingivaColorBarEnabled, default=false). Custom user presets can also be configured by setting SmileDesign2DColorBarCustomPresets.
Allow per setting to show the Smile Creator in Wizard for types of cases e.g. when completely separate single units exist by changing the new setting SmileDesignShowInWizardOnlyIfSingleGroup to false (default=true)
There is now a way to undo the automatic photo levelling with bipupillary line. The user can revert the levelling with bipupillary line using a checkbox (ignore eye detection) on helpers page. This option is available with a setting: SmileDesignShowIgnoreEyeDetectionOnHelpers (default is false).
TruSmile: The right-click context menu of the TruSmile button offers a "All-Ceramic" visualization feature where all parts receive a ceramic like effect as a pure visual gimmick for some possible marketing activities with setting TruSmileAllowAllCeramic, default=false. One can even include scan data which sometimes gives nice effects (setting TruSmileAllowAllCeramicIncludeScans , default=false)
F. Configuration Options
TruSmile: The .renderEffect files / path structure now do not need to contain the production-system specific postfixes any more e.g. "_AD, _MILL, _3ax, _4ax, _5ax" can be omitted. System

<p>integrations can add additional entries for that list of postfixes through an application setting <code>RenderEffectMaterialNameFolderIgnoredSuffixesOEM</code> (XML-array of "string"). Together with that change, the default delivery size of the <code>rendereffect</code> folder has been reduced.</p>
<p>TruSmile: <code>RenderEffectControl</code> can now also be activated through a normal feature-module license key <code>"RenderEffectControlModule"</code> and then setting <code>ShowDentalRenderEffectControl=true</code></p>
<p>It is now configurable if a mouth shadow shall be applied in the preview view (setting <code>SmileDesignApplyMouthShadingOnPreview</code>, default = true)</p>
<p>09. Bite Splints</p>
<p>A. New Feature</p>
<p>Introducing multi tooth segmentation feature that generates segmented teeth for bite splints and also allows to directly copy them as "Bite Splint Tooth" restorations from the scan. New setting to control if its in wizard (<code>BiteSplintToothSegmentationInWizard</code>, default=true). To enable/disable that feature also for bite splints that do not have "Bite Splint Tooth", change the setting <code>BiteSplintToothSegmentationInWizardForNormalBiteSplint</code> (default=true). To disable the feature, set <code>BiteSplintToothSegmentationAllowed=false</code>. For best user experience with a new semi-automatic click point detection, the new exocad cloud backend* feature needs to be available.</p>
<p>It is now possible to design bite splints in upper and lower jaw simultaneously in one project e.g., for designing anatomic splints with bite splint tooth and the Virtual Articulator (like with normal simultaneous cases, the user must take care to initialize the virtual articulator and its exclude brush marking correctly)</p>
<p>Automatically suggest a bite splint top curve if Segmented Tooth exist from the new bite splint segmentation feature (new setting <code>BiteSplintToothSegmentationAutoDetectCurvePoints</code>, default=true). The suggested curve can even be directly applied (new setting <code>BiteSplintToothSegmentationAutoDetectCurvePointsAutoApply</code>, default=true). This implementation creates click-points for each segmented tooth relative to the center of its cervical border, slightly moved up by this setting (<code>BiteSplintToothSegmentationAutoDetectCurvePointsUpwardPushDefault=2.0</code>). The user can adjust the behavior, e.g. by a drop-down and a slider (requires setting <code>BiteSplintToothSegmentationAutoDetectCurvePointsShowUI</code>, default=false). This feature may require the new exocad cloud* integration to work efficiently, e.g. because the algorithm will run in the cloud or its efficiency relies on the previous automatic segmentation.</p>
<p>B. Optimization</p>
<p>Show icons for brush types</p>
<p>Tooth models for bite splints are now loaded automatically in wizard to avoid the "Load Bridge Model" step when the new bite splint multi-tooth segmentation has been used (setting <code>BiteSplintToothSegmentationUseForToothPlacement</code>, default = true). The advantage is, that the user gets right away into Correct placement with chain mode without having to place manually the bridge, and there they can do the fine-tuning with the contact points etc. If required in a use case, the user can still go to expert mode to use the "Load bridge" feature.</p>
<p>UI improvements of bite splint top step to make the "Include Palate" feature more clear</p>
<p>C. Change in Behavior</p>
<p>Freeform does not show basal and approximal adaptation any more for bite splint teeth as both do not make sense for the use case of bite splints and often create artifacts with existing teeth in the scan data</p>

In the virtual articulator, the bite splint top part is now always used as part of the virtual imprint even though it may have been excluded from the simulation i.e. it will be fully used as collision object for freeform adapt to dynamic occlusion and visualization of dynamic occlusion (setting <code>ArticulatorBiteSplintTopForceTreatAsRestoration</code> , default=true).
The Bite Splint Gap teeth were not always closed pontic tooth models which may have caused some consistencies (new setting <code>BiteSplintGapsPonticModel</code> , default=true).
In Show/Hide avoid showing Bite Splint Top part in the Anatomic Part menu (setting <code>GroupSelectorShowBiteSplintTopInAnatomicPartsGroup=false</code>)
D. Bugfix
BiteSplintTop: fixed "Distance to antagonist" tool window not being disabled when switching from "Posterior Area" to "Margin" tab
10. Model Creator
A. New Feature
It is now possible to define construction parameters that affect the die geometry individually per tooth
Model Types can now include text attachments which will be added automatically at the start of the Model Attachment Processor. The same dynamic formatting as <code>ApplicationSettings.WindowTitleFormatString</code> can be used to have a patient specific text. They must be configured in the model library in the TextAttachment section.
B. Optimization
A detailed ToolTip dialog is now available with all possible Shortcuts in the Mask tab of Plateless Model Design.
Added option to sparingly cut the die cavities into gingiva masks in order to preserve contacts as well as possible, to be activated by application setting <code>ModelCreatorGingivaMaskCutDieCavitySparingly</code> (default=false)
Added user-setting for enabling/disabling "Toggle dies" in the Wizard (setting <code>ModelCreatorShowToggleDieTypesInWizard</code> , default=true)
Attachments can now be deleted all at once with a single button click
Automatic alignment will now place the upper jaw right next to the alignment plane in case there is no lower jaw
Automatically mark teeth adjacent to implants as "healthy tooth" if they have not been defined in the project like it is already done for adjacent of stump preparations in earlier versions
Digital Waxups added merged waxups (3d print optimized only) to the list of available parts for adding
In Printer presets if the software had to modify a parameter due to limits of the pre-defined tooth construction parameters, the user is now warned with a notification
Major improvement of UI/UX for the Digital Waxup Part Selection dialog
Model Alignment Minor UI/UX Improvements
Plateless Model Design minor UI/UX Improvements
Printer Preset UI/UX improvements
Printer preset values are now transferred from one jaw to the next in the same case
Printer presets can now automatically be saved The auto-save is enabled by default, which can be changed with setting <code>PrinterPresetAutoSavePresetsIsEnabledByDefault = true</code> . The printer preset can also remember the last used selection (setting <code>PrinterPresetRememberLastUsedSelectedPrinterPreset</code> , default=true)
Printer presets message box improved when window is closed with unsaved presets

Quick Model going back in Wizard will now skip the model design step for consistency with "Next"
Reconstructions to be included in the digital wax-up model can now be selected individually per tooth
The check if lab analogues are invalidly placed, is now happening in the "Model Implant" step
The text attachment user interface has been improved. A new setting ModelAttachmentTextDefaultImprintMethodEmboss has been added to define if emboss or deboss shall be used as default (default=true which means emboss)
Load Bridge Models: If more than one bridge segment has to be loaded in a case, the software now suggests the same tooth library of the previous bridge segment for the next bridge segment
Attachment restrictions feature minor UI/UX improvements
Digital Waxups improved with some part-type dependent behavior e.g. to allow connecting bottoms of bridges to the model or work with bite splints. There is also an advanced setting now for controlling how parts of various types are added to the model, in particular whether their bottoms need to be replaced to bridge a gap between the part and the model base ("DigitalWaxupModelCloseHoleOperation", "DigitalWaxupModelRemoveBottomOperation" but should not be changed unless exocad advises to)
C. Change in Behavior
Attachments parameters are now hidden from the user when min=max=value is configured in the library settings
Freeform model will now hide the option for Cut on Gingiva because it does not make sense for models
Model alignment will now show a greyed out model type dropdown when only one model type and subtype are available
Model analogs group card moved from setting to analog tab
Provisional Crowns are now only and always selected when pressing Shift-Key during Plateless Model Design
Warn user when trying to create a model where the base of the model is already closed, because that may cause issues in the model calculation (the model creator cannot know where the relevant scan data is). The user will then be guided to the Mesh Editor to trim away the artificial parts on the bottom before continuing
wax-up parts are now connected to the model base by a different mechanism, extending them at the bottom as needed
When a scene file is saved with wizard in the model design step and later re-loaded, it now does not force the wizard into the same step any more. This avoids repeating the same model step unnecessarily.
D. Bugfix
Fix issue regarding text attachment placement when Italic fonts are used
Fix preparation margin labels on dies for provisional crown stumps and/or dies which have been trimmed to their neighbor
In Model Alignment avoid that jaw scan would flicker when switching model types
In Quick-Model Design Fix issue with Wizard to the Model Attachment step
Minor fix regarding Undo/Redo behaviour when using "Reset" and "Set from View"
Plateless model design gingiva mask selection may sometimes show "Empty" as entry due to an UI initialization issue
Preset auto save is now performed if the auto save checkbox is checked, the user has modified a value controlled by the selected preset and the Plateless Model Design step is quitted by clicking on Next

The Model creation will now use the current rotation of model analogs and not the rotation from the start of the plateless model design step
When placing attachments properly treat ditch as cavity for "AdditiveOmittingCavities"
With text attachments fixed a bug where text attachments sometimes did not curve around the finished model when another attachment was too close to it, and removed a black box that could sometimes appear in the middle of the scene when a text attachment is present
ToothWorkPrintModel: Work type name, material, color and implant type information can now be displayed properly.
fix a memory leak during computation of blob-style gingiva masks
Attachment functionality is now less sensitive to errors or overlaps (setting ModelCreatorAttachmentCSGResilientMode, default=true. Also changed previous setting ModelCreatorAttachmentProfileProjectionEpsilon to 0.0001)
E. Test prototypes / Beta Features
It is now possible to have a preview of the attachment to be selected, when hovering with the mouse over the list. The feature is per default deactivate with the setting ModelCreatorEnableModelAttachmentPreviewToolTip (since only a few attachments preview images are prepared).
Allow transfer of colors from scan data into models and output them using appropriate mesh file formats supporting vertex-color information (.obj, .ply). This feature is still a test-prototype and requires enabling the setting ModelCreatorTransferScanColors=true
11. Bar Design
B. Optimization
Improve performance in bar design when the Advanced Transparency Feature is used
E. Test prototypes / Beta Features
Allow user to define a common insertion direction between telescopes and bar segments. Requires new setting BarExtendedInsertionDirectionOptions to be changed to true
12. DicomViewer
B. Optimization
Improve runtime-performance of DICOM Surface Generation feature
Speed up of volume to surface mesh generation
D. Bugfix
Fix rare performance/deadlock issue when user enters or pastes a folder path to a network drive, especially when it is also mapped as local logical drive
13. ExoViewer
A. New Feature
In exoviewer is now possible to use the Cut view option, from the context menu, when clicking a part on the main view or the group selector.
The "Add remove mesh" feature is now available in ExoViewer3D (setting AddRemoveMeshProcessorControl, default=true)
B. Optimization
Improve handling of .constructionInfo files in Exoviewer, by removing dummy objects the group selector list.
Improved drag & drop when dropping 3d mesh files or scene files onto the ExoViewer

Show/Hide menu colors optimized when the Add/Remove tool has been used
The display of the overlay and 3D main view axis, can be now controlled from the application settings dialog using switsches. To show the UI controls the setting ViewerShowAxesCheckboxesActive should be true (default). The old settings ViewerShowAxes and ViewerShowAxesInOverlay can still be used to control the state of the two switsches, in the settings-viewer3d.xml file.
The settings UI was modernized
14. Library Manager / Auto Download
B. Optimization
The tool that automatically downloads tooth libraries during module activation was updated and does now support the case where the LibDir setting of the library was remapped to a different folder in DentalCAD
C. Change in Behavior
Updated to Microsoft .NET6 with WebView2 as browser component
15. exoScan / DentalScanner
C. Change in Behavior
The support for exoScan/DentalScanner is not available any more in this release due to migration to newer Visual Studio versions.
16. DentalCAD exocad Cloud integration* (not available yet in all regions / markets / configurations)
A. New Feature
For multi tooth segmentation purposes, an automatic tooth detection can be used from the exocad Cloud* in a multitude of workflows which share that common feature. The availability of the feature depends on a multitude of factors, see separate section about "exocad Cloud"
Added new page in the my.exocad portal to show the list of available and executed cloud operations
E. Test prototypes / Beta Features
The new exocad cloud backend integration is available for testing for end-users. To test that, users must agree to the new exocad cloud backend EULA and enable in their user settings the cloud feature (setting CloudBackendEnabled, default=false). This feature will enable upload of data to the cloud depending on the used features. The new exocad cloud backend feature can be forbidden by changing the setting CloudBackendForbidden=true. The availability of the new exocad cloud-backend may depend on the market, region, software branding, internet access restrictions, my.exocad login restrictions etc.
17. DentalDB
A. New Feature
Added Duplicate Denture features to WorkParams
added possibility for the lab to update doctor on case state, when the case is received via iTero - exocad connector
Added support for MySqlConnection which is sometimes better choice then MySql.Data and supports both MariaDB and MySQL
For more details see online mysqlconnector.net

<p>Use as driver class in SQLSettings XML tag</p> <p>NHibernate.Driver.MySqlConnection.MySqlConnectionDriver, NHibernate.Driver.MySqlConnection</p> <p>and put mysqlconnector.dll to the bin folder of DentalDB</p> <p>Full example for MariaDB connection using MySqlConnection ADO.NET</p> <pre><SQLSettings> <ConnectionString>Server=localhost;Database=dentaldb;User ID=test;Password=test</ConnectionString> <SQLDialect>NHibernate.Dialect.MySQLDialect</SQLDialect> <DriverClass>NHibernate.Driver.MySqlConnection.MySqlConnectionDriver, NHibernate.Driver.MySqlConnection</DriverClass> </SQLSettings></pre>
<p>added support for Procedure RX V50 iTero RX File format</p>
<p>Full Denture can now be designed on stock abutment libraries, which is displayed as "On ball attachments" by the new WorkParams</p>
<p>Keyboard shortcuts are now available for creating a new project (Ctrl+N), loading (Ctrl+L), saving (Ctrl+S) and duplicating (Ctrl+D).</p>
<p>mylteroConnector: Introduce sharing of case status with myltero Doctors . The following statuses are supported: REVIEW, DESIGN, PRODUCTION, SHIPMENT</p>
<p>Added WorkParams parameter for "Minimum basal distance of connector"</p>
<p>Added support for alternative ADO.NET SQL Server implementation Microsoft.Data.SqlClient to allow broader SQL Server compatibility</p>
<p>mylteroConnector: The DentalDB 3.2 can now also connect to the iTero "Chairside DPMS" service instead of using the lab connection. This can be configured in the settings by XXX.</p>
<p>B. Optimization</p>
<p>If user tries to start the same software from DentalDB for the same treatment even though it is still running, the user will get a warning message (setting StartProcessConsideringSingletonOption, default=true)</p>
<p>In the Work Params Config Selection window the user can now search by text</p>
<p>The settings UI was modernized</p>
<p>The user can now select for designs on custom abutments if screw holes shall be added also through the super structure (added new parameter AbutmentCutScrewChannelAlsoThroughSuperstructureMode into WorkParams)</p>
<p>When a case is shared over dentalshare and there are 2D or NIRI images imported from the myiTerConnector, then the user will now be able to share NIRI images along with scan data</p>
<p>Work parameters for Partial Framework workflows improved (in combination with new 3.2 DentalCAD feature)</p>
<p>Workparams improvement for Partial Framework Workflows by using new mode of VirtualGingivaConnectToNextBridge</p>
<p>Videos with extension .avi and .mp4 will now be visible within MEDIA/DOCUMENTS tab in main window (changed setting TreatmentPreviewFilePattern =</p>

<p>"*.jpg;*.jpeg;*.png;*.bmp;*.workparamschanged*.txt;*.materialconfig_switch*.log;*.avi;*.mp4"). Hereby, renamed IMAGES/DOCUMENTS tab to MEDIA/DOCUMENTS as also videos will be shown.</p>
<p>Added AntagonistType ArticulatorKlosterneuburg for Articulator Gamma Dental - Reference SL</p>
<p>Bite Splint now has the virtual tooth extraction as WorkParams parameter</p>
<p>Bite Splint "Allow design on palate" can now be selected (BiteSplintAllowDesignOnPalate in WorkParams)</p>
<p>Minor UI improvements for "Options & Parameters" menu</p>
<p>Optimize loading single case performance for large database in load dialog by defining indices on database tables, see the list below. As usual, with every software upgrade, the first start of DentalDB may upgrade the database scheme and may be slow. Please be patient and wait until it is started. The first startup of new version will take awhile, because the indices need to be created first:</p> <pre> create index idx_ToothWorkParameters_toothWork_id on ToothWorkParameters(toothWork_id) create index idx_TreatmentValuedParameters_treatment_id on TreatmentValuedParameters(treatment_id) create index idx_ValuedMaterialParameters_toothwork_id on ValuedMaterialParameters(toothwork_id) create index idx_toothwork_treatment_id on ToothWork (treatment_id) </pre>
<p>The NHibernate component has been updated from version 3.3 to version 5.4.6 which may improve performance and compatibility</p>
<p>The dentalshare conversation window can now have clickable hyperlinks but by default only allows https for security reasons (setting DentalShareAllowOpeningNonHttpsLinks, default=false for security reasons but can be enabled in user-settings menu to allow also http or other link types). The links are opened locally with the standard tool for that link e.g. the web-browser when its http</p>
<p>The parameter "AbutmentMillingDiameter" is now available when "Custom Abutment" is selected as implant type</p>
<p>The user can now define in their settings menu if the Antagonist shall be added automatically (new setting AutoAddAntagonist, default=true)</p>
<p>WorkParamsConfigTool now preserves the order of the parameters in the file while existing parameter where edited and saved</p>
<p>mylTeroConnector: DentalDB now detects if multiple mylteroConnector clients are running at the same time and asks user if they want the old or new instance</p>
<p>C. Change in Behavior</p>
<p>Adjusted the behavior when credentials are cleared when "Sign me in automatically" is turned off in login mask for material credential dialog, s.t. the behavior is consistent with "dentalshare" button in actions. In both cases if user need to log in and "Sign me in automatically" is off, the user does not need to reenter die credentials as long as DentalDB is running.</p>
<p>In the bleaching color list, replaced the number '0' with the letter 'O'</p>
<p>The .NET6 version of the mylteroConnector WCF service now uses TCP instead of named pipes for local communication and exchanges the selected TCP port via a file. The port is set to 0 by default, but may also be configured in DentalDB or mylteroConnector. The config and the runtime info is stored in the directory configured in DentalShareSettings.mylteroConfigDir, which is c:\dentalshare\myltero\.config by default.</p>
<p>The Change Material configuration dialog will now not show "dentalshare" as entry any more when there is not even a dentalshare configuration available (added application setting</p>

DentalshareWorkParamsHiddenIfTreatedAsEmpty (default true), when true contacts that have not uploaded material configs will be hidden from work params selection window)
The supported NHibernate ADO.NET providers for SQLite , MySQL/MariaDB, PostgreSQL and MSSQL are now supplied together with the software. Only those are supported. Example configurations are now added into the defaultsettings-db.xml.
User can select Data Storage Path (CAD-Data folder) via settings menu (AllowUserToSelectDataStoragePath=true , that was false in previous versions). This enables end-users to define where their CAD-Data is without changing .xml files. Keep in mind that like with all user-settings, this setting is stored in the usersettings*.xml of the User-Profile in Windows i.e. every Windows account must make the change accordingly.
exoskull articulator renamed to In-Skull Articulator
The Work Params Config Tool can now preserve unknown tags in the Material section and avoids sometimes occurring duplicate of data (changing the content in the WorkParams.xsd from sequence to all)
Increased max. allowed column length for patient first/last name to 40 characters in the database scheme (previously 20 resp 30). This change apply only for newly created databases.
Show previously hidden parameter "Milling Diameter" to the user e.g. in Full Denture types
Renamed scan type "Two stone model in articulator: " to "In articulator:" and moved "Digital Impression Scan" to the top
myIteroConnector: The integration is now called "iTerO Connection" and the settings are now called "iTerO - exocad Connector Settings".
D. Bugfix
Fix issue where the current selected material configuration was not selected in the material configuration selection dialog and instead a wrong warning was shown (caused by false positive internal check of the parameter file hashes)
In Settings Menu fix issue where sometimes it asked to restart the software after pressing save, even though nothing really changed
PDF Print Report fix when working in Dark Skin Mode due to black text on black background
When selecting a project in DentalDB the mouse cursor no longer remains a wait-cursor until it is being moved.
In print report longer scan mode names will no longer get cut off
3D-preview would wrongly react on F5 hotkey to refresh the whole scene into an empty purple display
Fix issue where DentalDB may have appeared on the wrong screen on start in multi-monitor setups with different DPI values
Fix memory leak caused by WPF issue regarding treatment preview file list control
Fix potential crash when DentalDB is accidentally started twice due to a race condition
In DentalDB Load dialog when user selects multiple projects and marks them as deleted, and then resets all the project filters, the as deleted marked projects may re-appear due to a filter refresh issue
In case of Single Arch Denture cases the message box for "selected tooth only" did not always work correctly
The "MaterialRestriction" feature of WorkParams e.g. for CustomAbutment (manual) did not always work correctly due to a UI glitch since 3.0 Galway
The 3D-WebPreview may have crashed with "PLY-Parsing Exception" with a specific type of .ply files

The cached dentalshare credentials were sometimes cleared when user was closing the work-params selection dialog even though "Sign me in automatically" was enabled by the user
When a project is imported, the button "View in DentalDB" in the notification might not always have worked
When importing a project from an external sources in the background, the patient data are not always update in client list of patients based on the newly imported project
When many cases have been imported, sometimes an entry in the long list of import notifications was not selectable any more
When selecting a project in DentalDB the mouse cursor would sometimes stay as "wait cursor" (hourglass) until the user moved the mouse
When the user saved a project and then loaded another project very fast, then sometimes the tooth selection control may not have been displayed correctly
Work Params Config Tool fixed issues where some values did not update in the UI, e.g. that description of "project custom info field" did not update after saving new entry due to missing UI refresh
Work Params Config Tool issue fixed where material-specific parameters where not updated directly after clicking "Ok"
Work params config tool may have crashed when copying a material that contains DependentTextualParameter
E. Test prototypes / Beta Features
For "Post & Core" a new implant type "PostAndCore" and a new marker type has been added to the WorkParams for the design of anatomic crowns
For Full Dentures the new workflow to generate denture bridge bottoms parametrically using direct tooth-to-tooth connections by default is now in the WorkParams for user selection
F. Configuration Options
For Ivoclar Full Denture workflows a special WorkParams configuration file is available "WorkparamsDB-Ivoclar.xml"
myIteroConnector: Add an option to select if DentalDB and myIteroConnector use TCP or named pipes as transport mechanism for the local communication between DentalDB and the myIteroConnector client.
By default, named pipes are used as in all previous releases. The communication method can be changed in the "iTero connection" settings or it can be preconfigured manually by editing or creating a file named "myiteroconnector.config" in the default directory "C:\dentalshare\myItero\config\". TCP can be selected by setting the file content to {"NetTcpPort":0,"DesiredBindingType":0}. Setting NetTcpPort to a non-zero value requires that the port is not occupied by any other application. A value of 0 lets the system select a port. By deleting the file, the defaults will be used again.
18. exoPrint
A. New Feature
New column is available for exoprint UI. Layerthickness definitions can be defined for material within the print3dconfiguration file. Allowing the user to define multiple thickness values grouped in a unit like "micron". This is an extension of the current configuration and no changes were made to the existing configuration, therefore this change is considered to be downwards compatible.

<p>Printer3dConfiguration files now support <DisplayName> for Material and Shade information to enable to ability to display such with different, more human readable. names instead of technical ids.</p> <p>As it is an extension former behavior did not change, therefore this addition is downward compatible.</p>
<p>The application no longer is only startable via DentalDB or with command line arguments. When the exe is started it will ask the user for essential information via file dialogues.</p>
<p>The material color chosen in DentalDB is passed to exoprint. If there is a corresponding shade defined within the used print3dconfiguration-*.xml the color will be used for preselection.</p>
<p>The new application setting "CloseApplicationAfterExport" is available to control the closing behavior of exoprint after "proceed to printing" was performed. The default is "true", so exoprint application will close after export to CAM-Software.</p>
<p>The user can define a number of copies for each part before exporting to CAM-Software. The default is 1.</p>
<p>printrequest files now support the settings of printmode, buildstyle and printer for export. These attributes were exclusive to 3dxi files before.</p> <p>This is an extension of the printrequest xml and did not change any internal or previous behavior, therefore this change is downwards compatible.</p>
<p>A new tag <TransferFormat> is available for materials in the print3dconfiguration file, allowing the user to alter the output string for material in a printrequest.</p> <p>The format needs to define placeholder in its definition. The following placeholders are possible: "{Material.Id}" and "{Shade.Id}" the curly brackets are mandatory.</p> <p>When set the material name of the printrequest will be replaced by that format, so it might cause a conflict if the setup was passing the plain material id to CAM-Software.</p> <p>This change however is no default and will probably be used in very specific cases by the customers.</p>
<p>Prusa Prusa Slicer Medical - exoprint integration</p>
<p>Utility 3D printer software - exoprint integration</p>
<p>C. Change in Behavior</p>
<p>ASG print3Dconfiguration updated to enable shade transfer from material configurations</p>
<p>print3Dconfiguration files updated to new format</p>
<p>D. Bugfix</p>
<p>Alpha AI print3Dconfig Shade tag added as Bugfix.</p>
<p>F. Configuration Options</p>
<p>Asiga configuration updated</p>
<p>Adjusted AG theme colors to make left column in exoprint main window readable in dark theme</p>
<p>I. Translation</p>
<p>The text of the "Show hidden parts..." button was adjusted to fit both cases "Hide" and "Show".</p>
<p>19. exocam / Nesting / IN-CAD Production Blank</p>
<p>A. New Feature</p>
<p>For implant screw holes the tool path calculation integration (e.g. MDW) can now supply a maximum deviation of the geometry that could be milled inside the screw channel, and the user can be warned if a configurable threshold is violated for the deviation. That may help users to avoid milling incomplete screw holes. (setting NestingVisualizeCNCToolPathImplantScrewHoleDepthDeviationProblems,</p>

<p>NestingShowCNCProblemWarningMessageBoxesImplantScrewHoleDepthDeviationProblems, default=true, and NestingParam NestingVisualizeCNCToolPathImplantScrewHoleDepthDeviationProblemMaxLimit for the Threshold (default=0.1))</p>
<p>In the tool path calculation dialog there is now an optional configurable "Expert Mode" feature where advanced parameters can be defined, e.g. for users who want to adjust the Spindle speed or the feedrate</p>
<p>B. Optimization</p>
<p>Added a new color filter for searching blank library. Color filter is only shown when a Material Type is selected already. (setting NestingProductionProcessorAllowFilteringBlanksByColor,default=true).</p>
<p>Added an additional Checkbox for showing only blanks, which are already nested on the selected machine, and improved description of old checkbox.</p>
<p>Blank creator now correctly highlights every reason for the accept button to be deactivated</p>
<p>Fix display of slot or holder names when they are too long</p>
<p>Improve display of blank library images when a ViewRotationAngle is not a factor of 90°</p>
<p>In INCAD Production Blank Nesting when there is no valid selection with current filters, show a nice display that due to filters all blanks are hidden</p>
<p>In INCAD-Nesting Production Blank the material filter combobox now does not display materials any more that do not have a selectable blank for the current design</p>
<p>ProductionBlank INCAD-Nesting filter and minor UI improvements</p>
<p>The Nesting can now remember CNC Strategy Paramter selections by the user (setting NestingRememberSaveStrategyParameters, default=true). The new user settings file is written into the typical UserSettingsStorageDir as "nestingpreferences.xml"</p>
<p>The strategy filter now also checks the Interop folder if the specified strategy script actually exists for a given combination of restorations and materials. If a production method is enabled in the Production Blank IN-CAD Nesting then the blanks are also filtered where no valid strategy exists for the machine/blank combination. This feature is ignored when no real machine is configured and requires new setting ProductionBlankCheckMachineStrategyAvailable, default = false to be true and also for the warning message ProductionBlankCheckMachineStrategyAvailableAskUserIfNoStrategy and for the filter ProductionBlankCheckMachineStrategyAvailableHideBlanks to be changed to true. (NestingInterop1 was not changed. New Settings NestingInterop1RequiresStrategyFileEntry=false, NestingInterop2RequiresStrategyFileEntry=true,NestingInterop3RequiresStrategyFileEntry=true). [OEMCONFIG] Nesting: Allow to disable strategies with StrategyFile={"Forbidden", "None", "Disabled"} or by setting a new XML entry ForbiddenStrategyType={IgnoreThisStrategy, ForbidToContinuelfThisStrategyMatchesWithAnyPriority, ForbidToContinuelfThisStrategyMatchesWithHighestPriority}, where the last two options can also help to intentionally disable production of something by creating a Strategy filter for that and then if it matches then act like no strategy exists. Also, Check if strategy files actually exist during load of the nesting (setting NestingStrategyCheckFileExistOnLoad = true . Also optionally write to Diagnostic.Trace the status for each StrategyFile (settings NestingStrategyCheckFileExistOnLoadTraceOutputFoundStrategies, NestingStrategyCheckFileExistOnLoadTraceOutputMissingStrategies, or even show an Error dialog when a stragegy file is missing with NestingStrategyCheckFileExistOnLoadShowException).</p>
<p>C. Change in Behavior</p>

In .constructionInfo import for abutments with angulated screw channels it now does not change the abutment's secondary axis any more to the angulated screw axis. (new setting NestingDataImportFromConstructionInfoAngulatedScrewChannelShallOverwriteSecondaryAxis = false . Changing it to true gives the old behavior)
Overpress Crown CAM Meta Data changed when the Overpress has a screw hole i.e. "Drill Holes" are used when going from CAD to CAM as well as .constructionInfo import (setting NestingProcessorStoresMarginCurvesIntoPartsOverpressScrewChannelComponents, default=true) . For now, we try to preserve backward compatibility with older Nesting versions by duplication data from SurfaceType.ImplantScrewChannel to SurfaceType.ImplantGeometry which can be turned off latest after the year 2024 by changing the setting NestingConstructionInfoImportDrillHoleForOverpressOnlyScrewChannel from false to true.
Temporary folder moved in %TEMP%\exocad instead of only %TEMP% to have a better overview. You can change it back e.g. by setting NestingInterop2TemporaryFolder to {env:%TEMP%}
D. Bugfix
Fix issue in CNCFileInformation when using the setting NestingCNCInformationElementTypeInlayToVeneer such that it only affects ReconstructionType "Veneer" and also apply it for the new ReconstructionType "Overlay" which then gives "OverlayCrown"
Fix issue when nesting Implant reconstruction with ImplantType "manual" which were wrongly assumed to be always direct-to-implant
In Production Blank INCAD-Nesting, fix potential StackOverflowException in some special configurations / workflows
Nesting don't show already stamped and unmovable constructions in red which could happen since 3.1 Rijeka Service Release. Also, in Production Blank Step don't show red on support pins in areas that are invalid for the reconstruction (e.g. near the blank holder) like it was before 3.1 Service release.
F. Configuration Options
Added XML Support for new "MandrelID"
For INCAD-Nesting Production Blank added settings ProductionBlankShowBestMatchFilterWidthLength + ProductionBlankShowBestMatchFilterHeight (both default false) to disable best match filters
Many new strategy-filter capabilities added e.g. for direct-to-implant implant libraries with new "CAMKeyword" feature and "AllowImplantConstructionsWithInterface" flag. For further information, exocad-partners can contact the support.
exocam
F. Configuration Options
For the configurable INCAD-Production workflow with the "NestingProductionProcessor" allow to configure material-specific through .dentalProject / Workparams if that appears in wizard by introducing new ConstructionParams NestingProductionMode and NestingProductionModeAbutments to control by .dentalProject/WorkParams if NestingProductionProcessor shall appear. Allowed values: HideNestingProductionCompletely = -2, OnlyInExpertMode = -1, Default = 0, // look at setting NestingProductionModeDefault, InWizard = 1 . To use this new mechanism to allow the standard Nesting, make sure to keep NestingProductionProcessorInWizardThenUseAsProductionInMergePartsNeverStandardNesting= false.

System Integration Changes

Libraries

- [CHANGE] Model Creator: OdPlatelessDrainHolesOnModel preset enhanced with drain holes
- [CHANGE] Model Creator: Attachment "0-3D_Print_Honeycomb" fixed for single jaw cases
- [CHANGE] Model Creator: Inhio BBR BasePin PBSM02 performance improvement
- [NEW] Bar Profile type added by Modern Dental Labs
- [NEW] Scanner Integration CADstar CS Core
- [NEW] ZFX ASC solution. Button integration
- [CHANGE] VertXsplit plate removed
- [NEW] iTero Model Creator plate preset added for 3D printing without supports
- [CHANGE] Model Creator Attachments Transversal Connector optimized for adaption with parameters
- [NEW] Bego Attachment library added
- [NEW] Dentag rotoclick. Attachment added
- [NEW] Kois Center workflow integrated in Model Creator (Model type plates and attachments)

Articulator/Jaw Motion

- [NEW] GAMMA Cardiax jaw tracking device import enabled
- [NEW] Gamma Dental Reference SL articulator
- [NEW] OXO Technology jaw motion device
- [NEW] ARCUSdigma jaw motion device
- [NEW] KaVo Protar 5B articulator
- [NEW] exoskull articulator added

exoprint

- [NEW] Uniz 3D printer integration
- [NEW] Prusa Prusa Slicer Medical - exoprint integration
- [NEW] Formware 3D printer software - exoprint integration
- [NEW] Ackuretta Alpha AI - exoprint integration
- [UPDATE] Detax materials for Asiga updated - exoprint configuration
- [NEW] Utility 3D printer software - exoprint integration
- [NEW] Nexa3D - Nexa X printer software - exoprint integration
- [NEW] Autodesk Netfabb - exoprint transfer button integration
- [UPDATE] ETEC Envision One RP - exoprint transfer button integration

Final Remarks / Appendix / End

Parts of this document have been generated from a development ticket system and has not been checked by technical writers.