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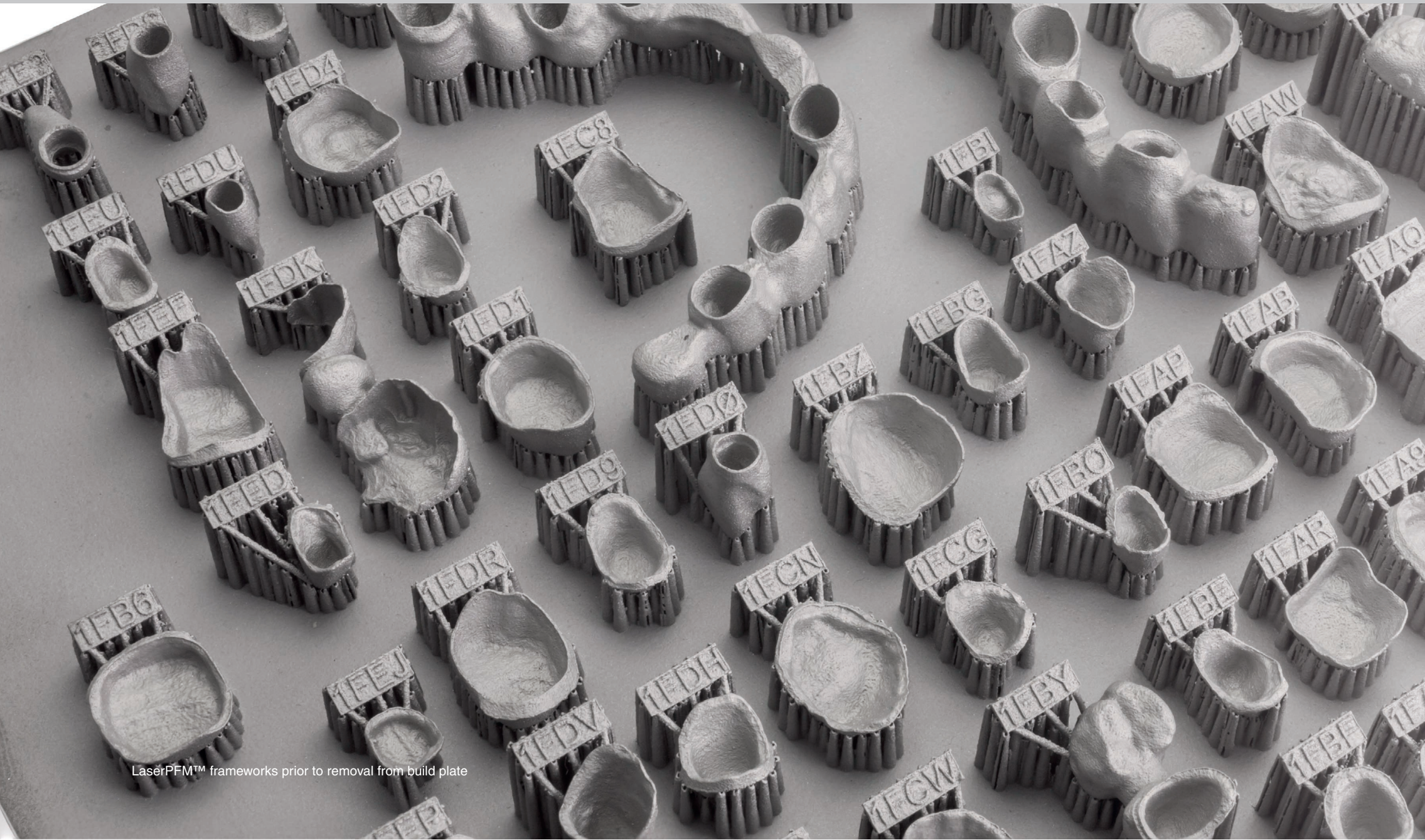
Open CAD/CAM systems for digital dentistry



LaserPFM™ frameworks prior to removal from build plate

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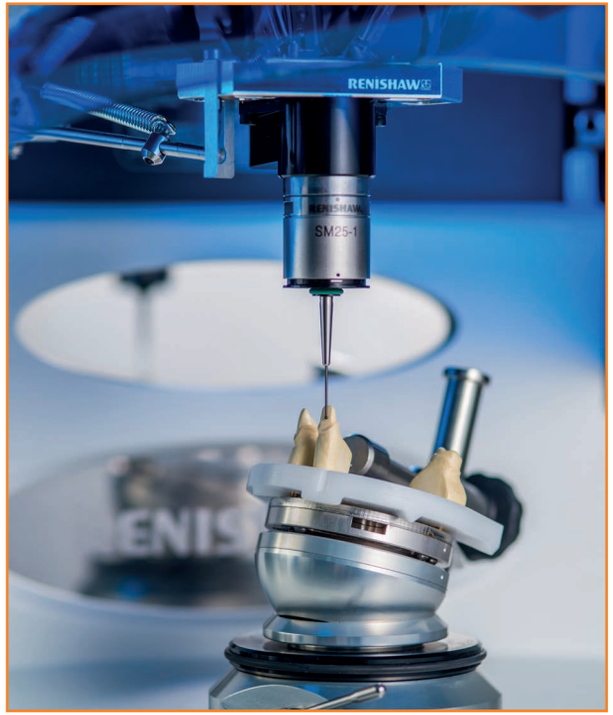
Front cover porcelain work produced by Mark Bladen Dental Laboratory, Worcester, UK

Dentistry in the digital world

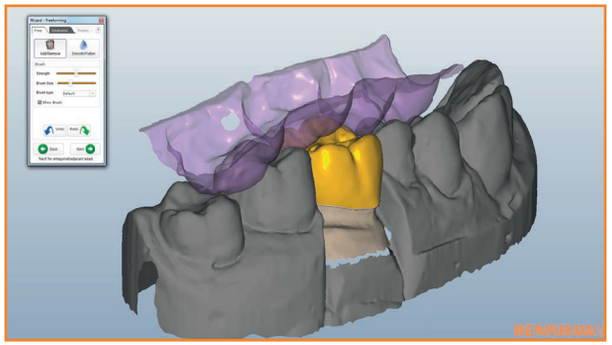


The digitisation of dentistry and dental technology has helped to realise real life economic and technical gains. A laboratory can improve throughput by using fast and powerful CAD software such as Renishaw Dental Studio (RDS) and employing Renishaw's ISO13485 quality controlled manufacturing services. This allows the laboratory to operate a flexible working environment, potentially up-skilling trusted employees to work on higher value items and in turn realising a higher income for the business. Add to this the reassurance of Renishaw's 10 year framework guarantee and a dental laboratory can grow a flexible and profitable business.

System highlights

DS10

Contact scanner – for high accuracy applications



Renishaw dental studio

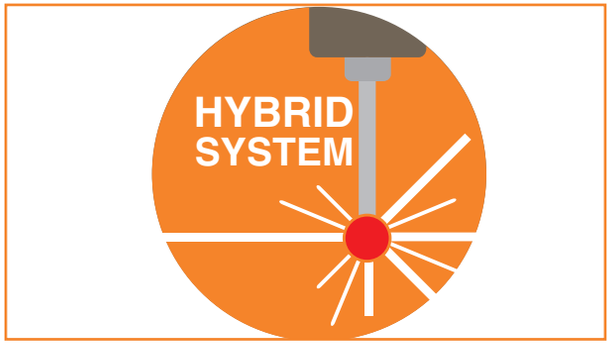
CAD software for dental scanning and advanced anatomical design

ISO13485

Quality assured manufacturing centre

DS30

Optical scanner – for use where speed is paramount to give higher throughput



Hybrid scanning

Combining optical and contact scanning for flexible and accurate data acquisition

Frameworks

A range of CoCr, zirconia, wax and PMMA

High accuracy scanning - DS10

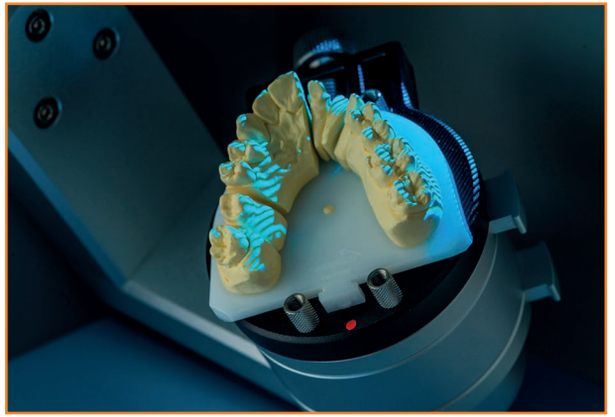
The DS10 scanner uses a patented non-cartesian mechanism. Unlike conventional designs, this provides a lightweight and cost-effective structure that enables high-accuracy processing in a compact device. This means that even the smallest lab can accommodate a scanner.

DS10 is based on an innovative but well proven mechanism, providing exceptional accuracy in a compact, lightweight package. With accuracy tested to ISO 10360-4, the DS10 achieves superior accuracy through the use of Renishaw's contact scanning technology which has been used in thousands of measurement applications worldwide, including critical applications such as aerospace engine parts.

Features at a glance:

- Full bridge scanning
- Abutment scanning pins
- Implant bridge position measurement
- Bite impression scanning
- Wax scanning

High speed scanning - DS30



The use of advanced ‘blue light’ technology allows quicker and more accurate scanning into narrow and deep areas than conventional dental scanners. Using only the smaller blue light wavelength, the scanner does not require a door, making it spacious, easy and quick to access.

The blue light technology allows the scanner to produce images accurate to 10 microns. Intelligent multi-view allows the selection of the best possible angles to acquire the required data. Impression scanning is fast and accurate, allowing the digital manufacturing process to proceed without the need of a conventional model.

Features at a glance:

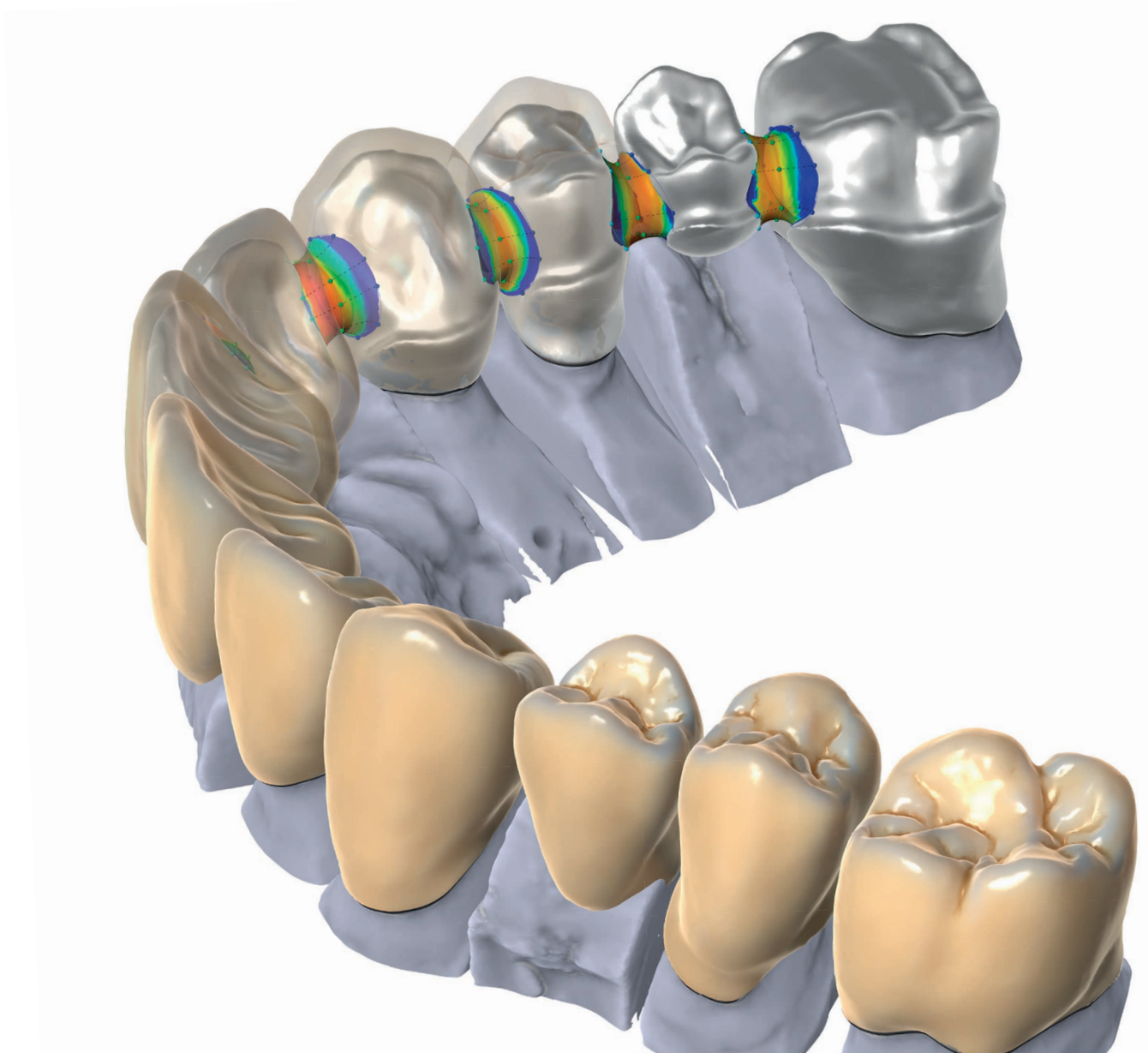
- Blue light scanning
- Full bridge scanning
- Abutment scanning pins
- Antagonist scanning
- Impression scanning
- Wax scanning

Renishaw Dental Studio

Advanced dental CAD

Renishaw Dental Studio (RDS), powered by exocad®, is a feature-rich dental CAD package offering an intuitive design environment. Centered around a simple wizard style workflow, RDS allows for rapid progression up a shallow learning curve, allowing for a fast return on investment.

RDS offers a large array of design and analytical tools as standard to enable efficient scanning and design of dental frameworks and accurate morphing of anatomical features. By offering further optional modules, RDS can extend its features making it a flexible offering that grows with your dental lab.



Data acquisition and import tools

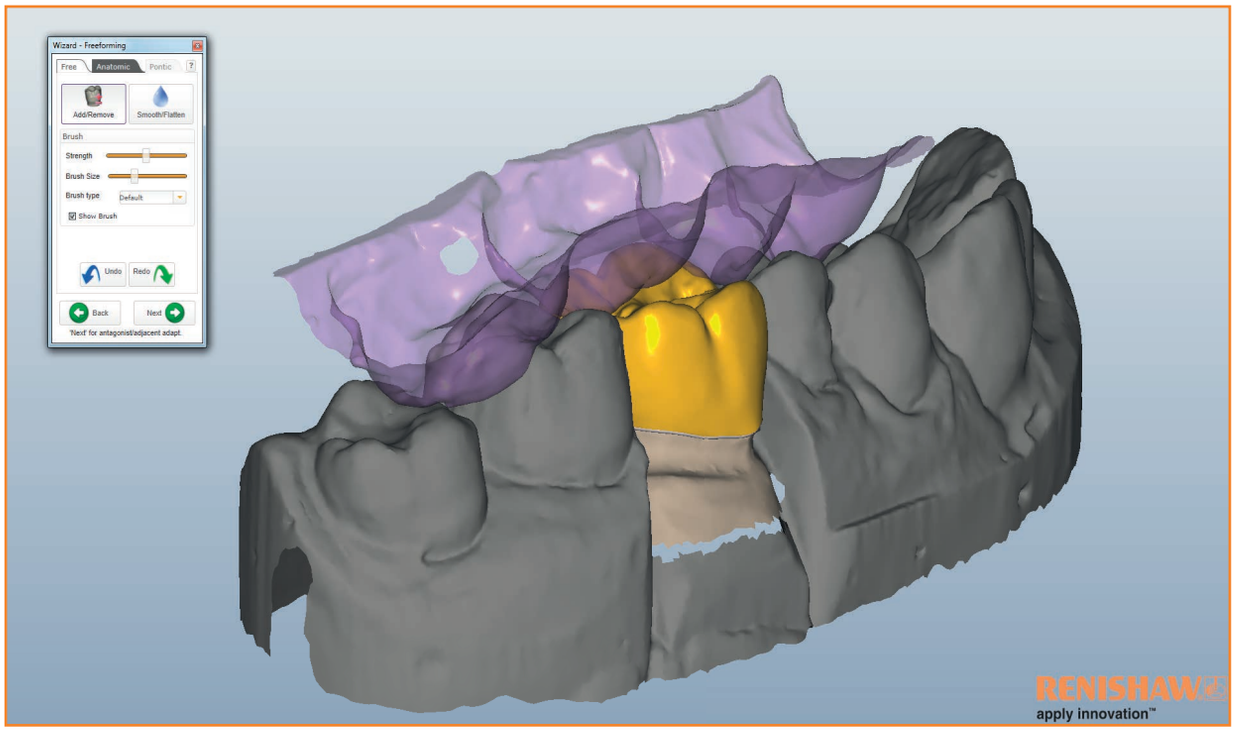
Fully integrated scanning	✓
Multi-die scanning	✓
Hybrid scanning capability	✓
Separate gingiva scan option	✓
Impression scanning	✓
Wax-up scanning and design	✓
Open STL data import and export	✓
Intra oral STL data import	✓
Itero™ data import	✓
3D PDF export	✓

Design tools

Full contour crown design	✓
Anatomical morphing	✓
Virtual wax knife	✓
Virtual bite registration	✓
Full framework reduction	✓
Selectable framework reduction	✓
Buccal facings	✓
Automatic occlusal adjustment	✓
Automatic interstitial adjustment	✓
Automatic connector design	✓
Multiple pre-determined connectors	✓
Design from pre-op data	✓
Mirroring from pre-op data	✓
Telescopic crowns	✓
Photorealistic rendering	✓
Inlay design	✓
Veneer design	✓

Add on modules

Virtual articulator	✓
Provisional crown	✓
Dicom viewer	✓
Model creator	✓
Implant module	✓
Bar module	✓



Hybrid scanning

Renishaw's unique hybrid scanning system brings together two distinct scanning technologies into an efficient and accurate working partnership.

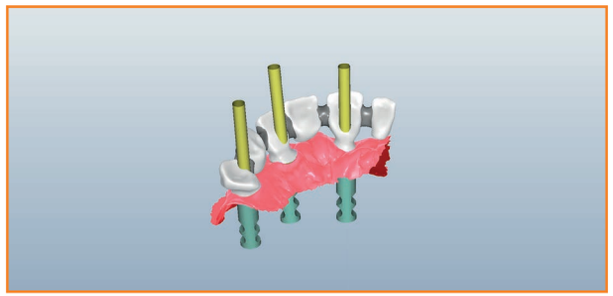
The DS10 uses highly accurate scanning methods to ensure great fit, particularly on implant frameworks. Renishaw's latest scanner, the DS30, uses blue light scanning to rapidly capture data and allow time savings in the lab. By combining the data from both scanners through RDS, it is possible to scan almost any restoration quickly and accurately.

Benefits of hybrid scanning:

- Fast bulk data capture of soft tissue, dentition and wax or pre-op geometry.
- Accurate capture of implant and features critical to final fit of restoration.
- Flexibility to choose the best tool for any particular case.
- Contact scanning tested to ISO 10360 part 4.
- Ability to mix and match scanner types for data capture of surfaces whose reflectivity are not suitable for laser or light scanning.

Implant module

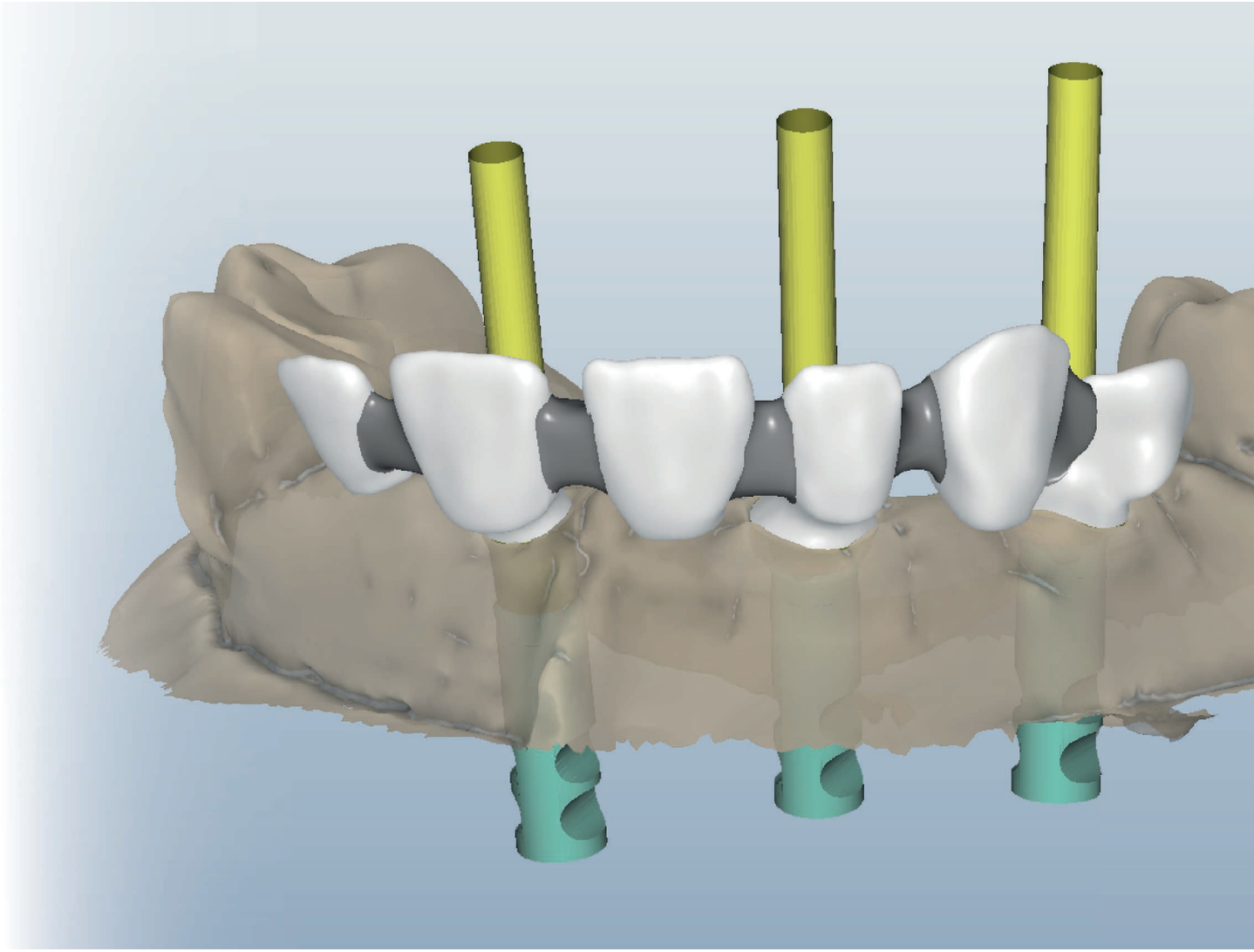
Abutment and screw-retained bridge design



Adding the implant module to Renishaw Dental Studio opens up further design possibilities enabling a range of implant supported structures to be quickly and efficiently crafted.

Design all aspects of implant restorations from custom abutments, screw retained crowns and implant bridges for numerous implant platforms. Combined with Renishaw's unique hybrid scanning technology you can be assured of a reliable and consistent fit.

Hybrid scanning capability	✓
Angled screw holes	✓
Custom abutments	✓
Screw retained crowns	✓
Concurrent crown/bridge and abutment design	✓
Copy mill/copy CAD	✓
Titanium base/link abutment	✓
Large implant libraries can be further extended	✓
Emergence profile design	✓



Bar add-on module

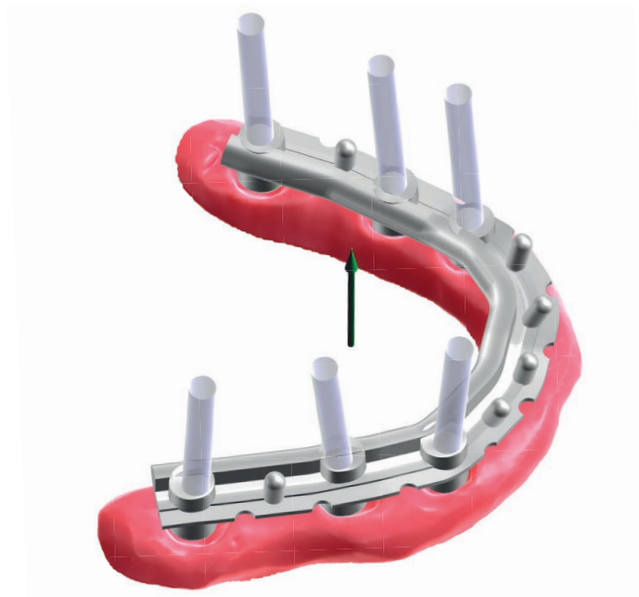
Design dental bars

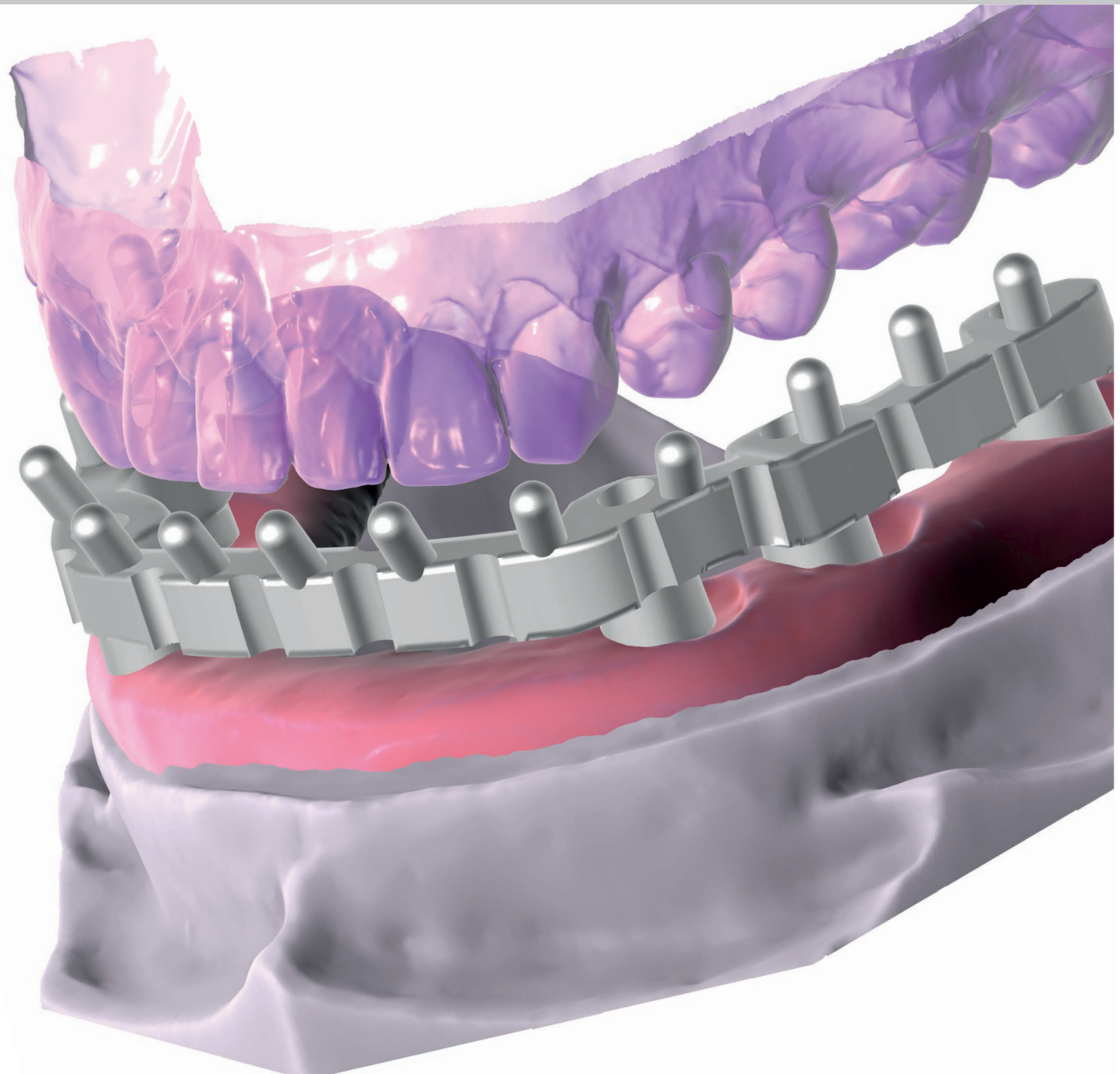
The bar module allows both fast and easy realisation of standard dental bars, as well as advanced custom bar design.

Attachments or retentions can be added to the bar, cylindrical holes and arbitrary geometries can be cut out in order to bond and retain pre-fabricated attachments onto the bar.

Complex clinical situations can be designed with ease to allow for maximum patient comfort.

Producing bars with optimal fitting requires an ultra-precise scanner, such as DS10, as part of Renishaw's hybrid system, to ensure high process reliability.

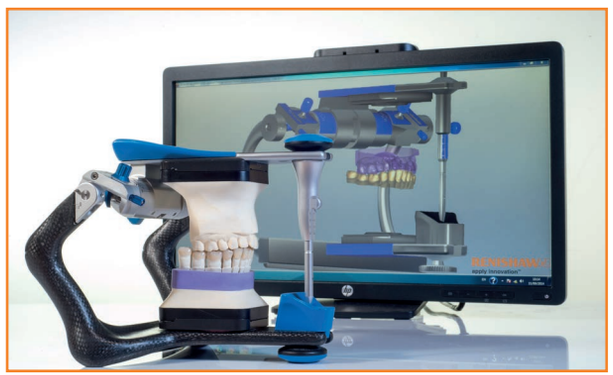


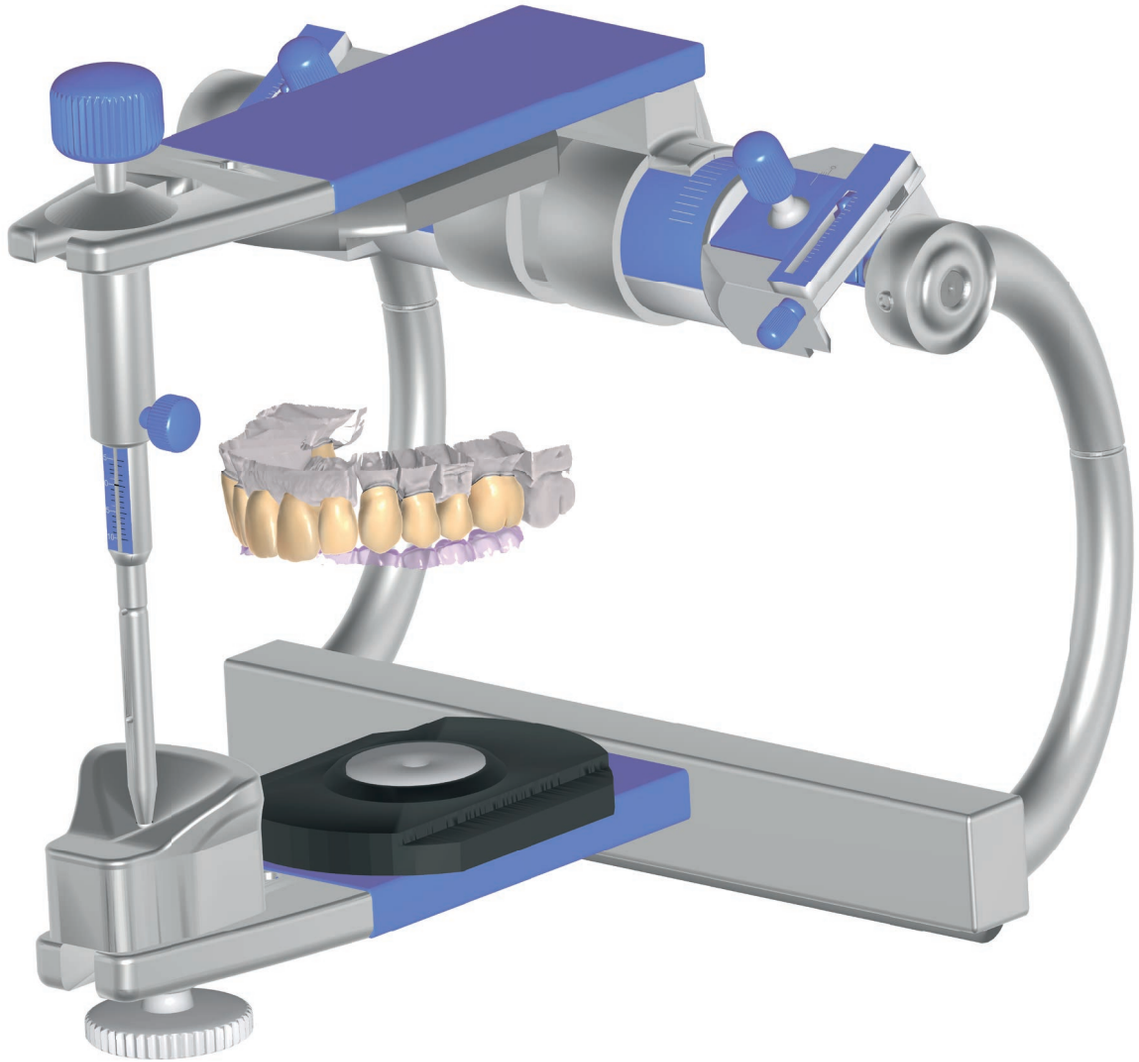


Virtual articulator add-on module

The virtual articulator allows you to bring familiar design procedures into the digital world. By allowing you to modify a number of parameters, the virtual articulator gives extra control to design full contour morphology for complex cases.
Control parameters such as:

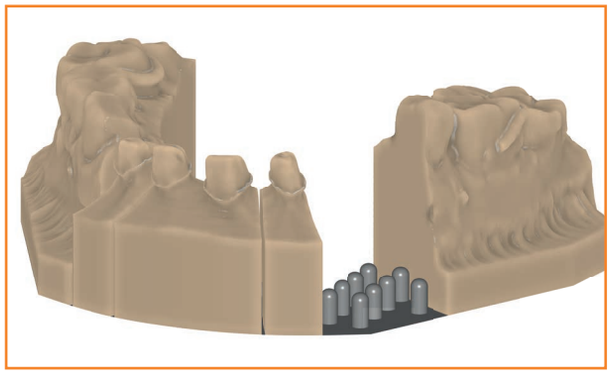
- Bennett angle
- Condylar angle
- Immediate side shift
- Incisal needle length





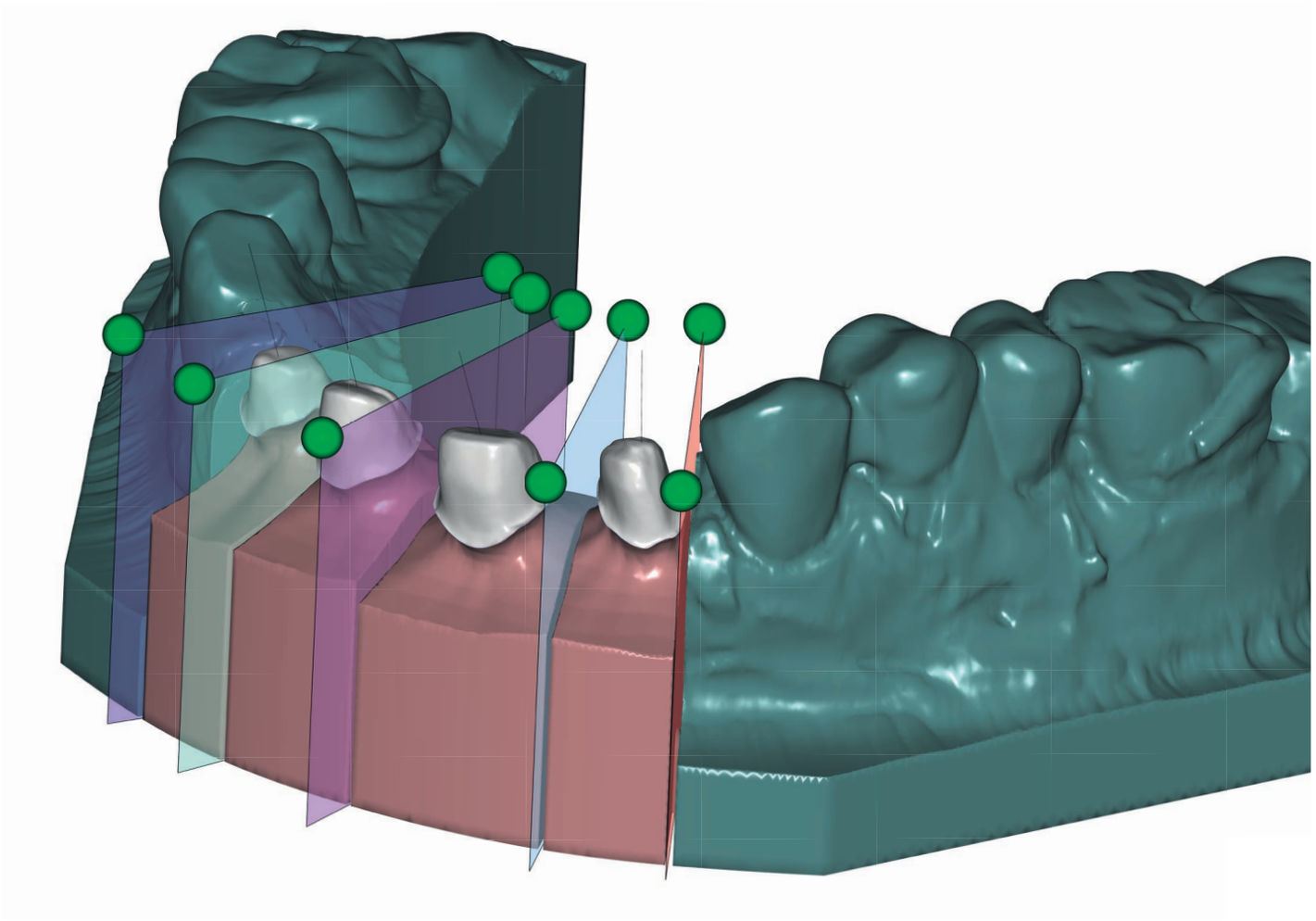
Model creator module

Create physical models



Model creator gives you the ability to create physical models from intra-oral scan data or from impression scans.

The model creator module allows you to design models with detachable segments using pre-manufactured bases and monolithic models where no additional parts are required.

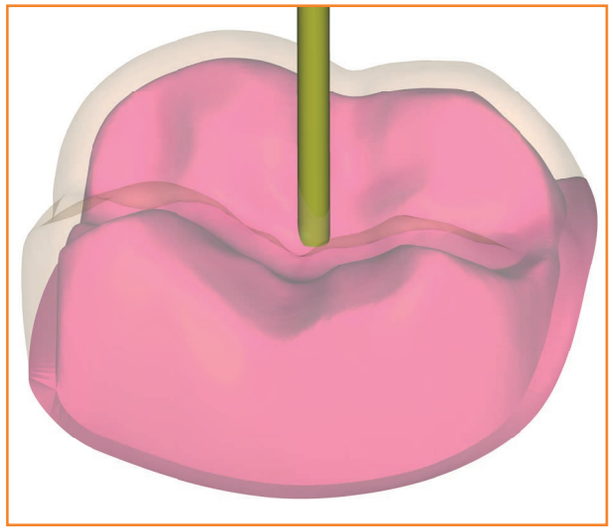


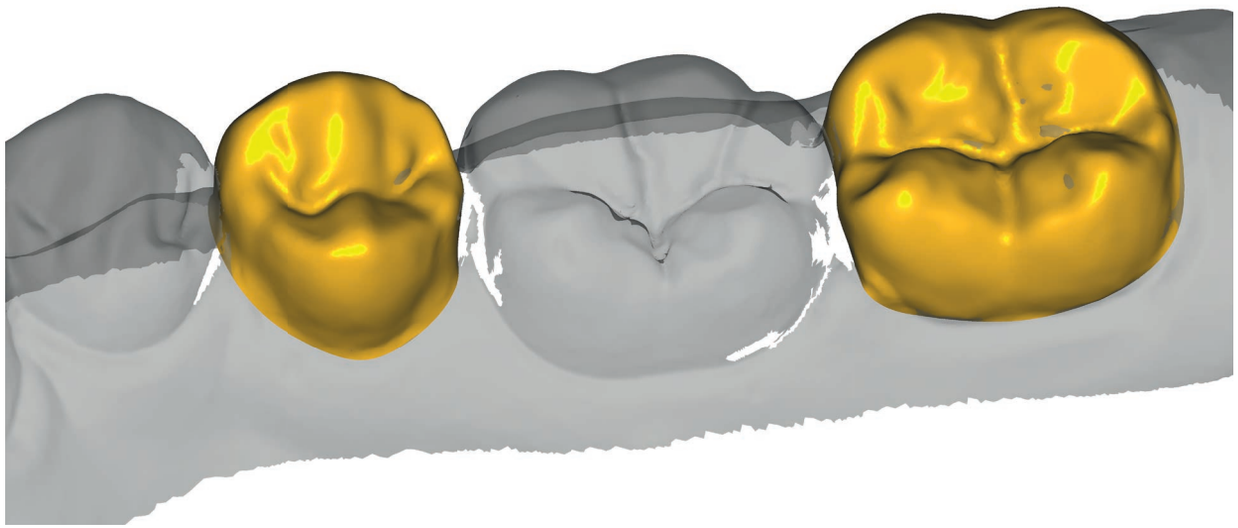
Provisional module

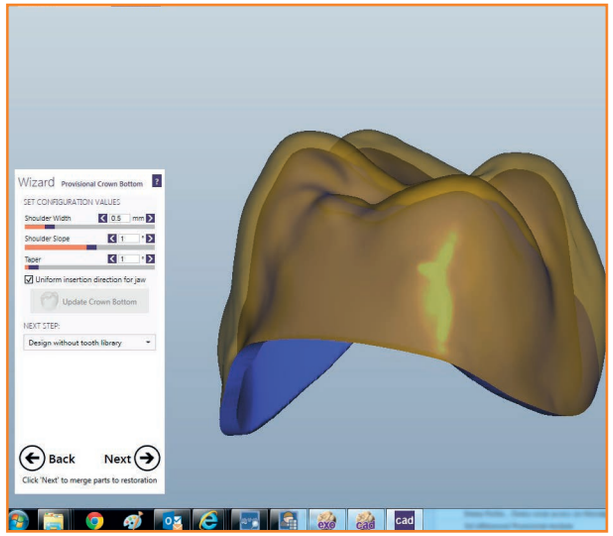
Design temporary crowns and bridges

Design temporary crowns and bridges quickly and easily using the provisional module. Using the original pre-operative data from a patient, temporary restorations can be created with no need for tooth preparation. Alternatively, use the in-built tooth library to create new morphology.

- Design temporary restorations quickly and easily
- Use either existing tooth anatomy, library teeth or mirror the jaw
- Use familiar design tools to fine tune anatomy
- An ideal companion for intra-oral cases
- Design data can be sent to Renishaw to take advantage of our PM100 temporary PMMA material







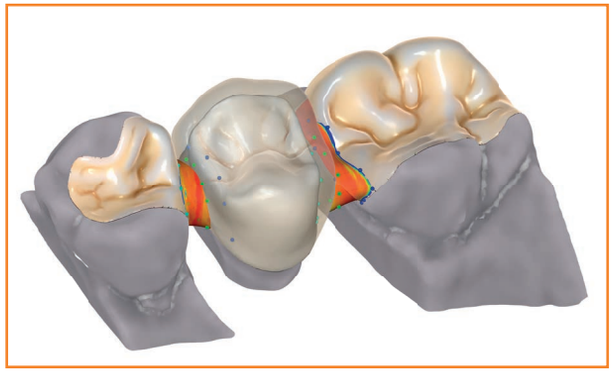
TruSmile™ technology

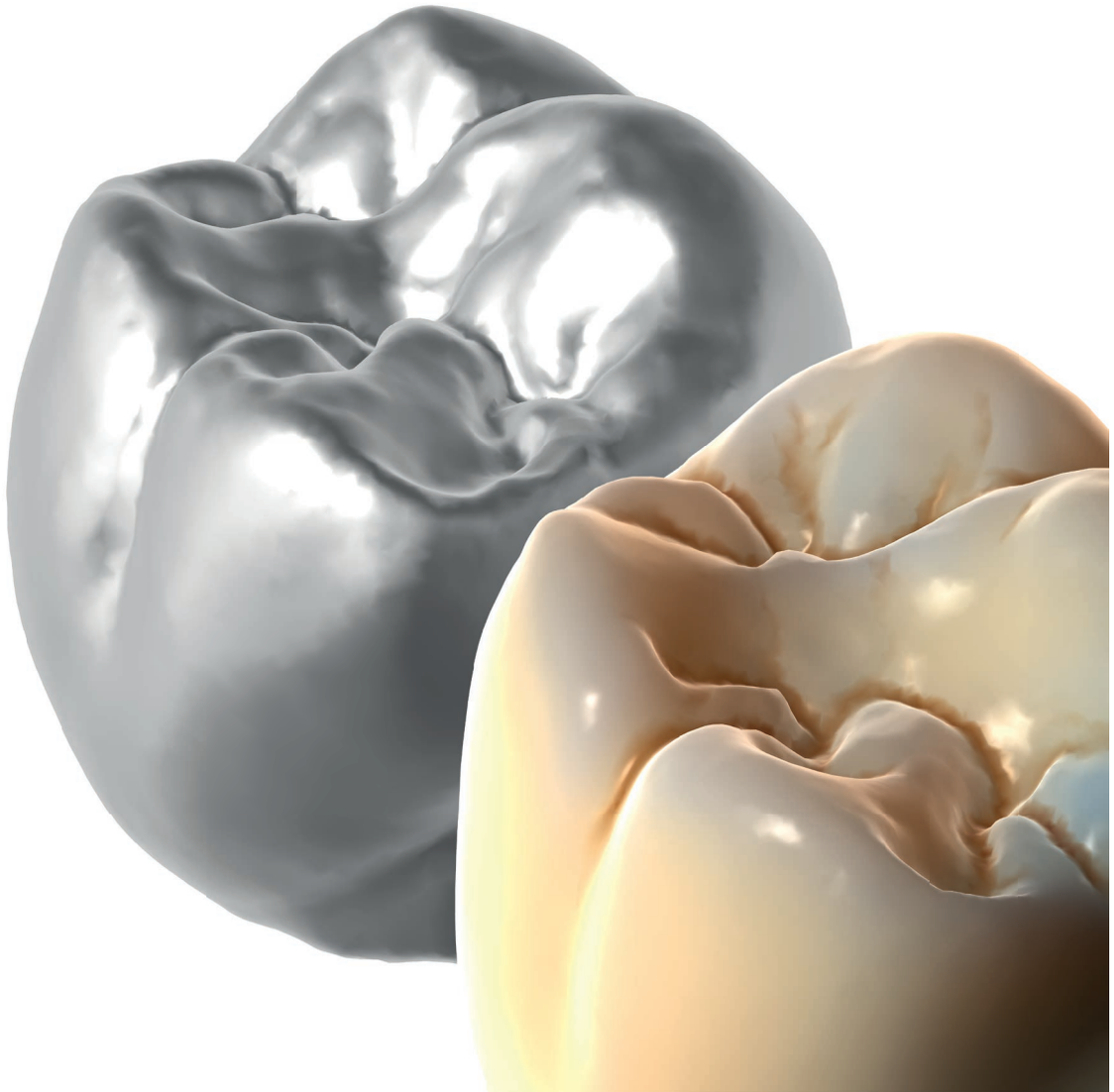
Render restoration designs

TruSmile™ technology provides near photo-realistic rendering of dental restorations allowing visualisation of the final restoration before committing to manufacturing.

Coupled with the point-of-knife wax tool (a standard feature in RDS), bespoke and complex designs can be achieved such as auxilliary and dissectional grooves whilst allowing the fine tuning of critical aesthetic decisions.

TruSmile comes as standard with Renishaw Dental Studio, giving everything required for high-aesthetic full contour design.





Implant supported restorations

LinkAbutments™

LinkAbutments are available in all Renishaw materials.

Manufactured to your custom designs for bonding in-lab to your chosen titanium base.

This offers a cost effective two-piece design for screw-retained or cement-retained restorations.

For screw-retained crowns:

- Easily retrieved for maintenance
- Fully CAD designed
- Porcelain applied directly to the LinkAbutment body
- No excess cement during fitting
- Lower cost than cement retained crowns

For cement-retained crowns:

- Use any Renishaw material
- Fits a wide range of implant types
- Fully CAD designed
- Suitable for anterior region
- Aesthetics not compromised by composite in-fill

LinkAbutment™

LaserAbutments™

LaserAbutments offer you new and potentially profitable advantages over traditionally made custom abutments. Made from CE marked cobalt chrome (CoCr), which is routinely used for crowns, partial dentures and implant bridges, the material has several benefits when used for abutments.

- Supplied with a pre-polished emergence profile
- Suitable for both screw retained crowns or custom abutments
- Compatible with major implant types
- Free from nickel, cadmium and beryllium*
- Titanium screw included with each LaserAbutment
- Manufactured by Renishaw entirely in the UK using CE marked materials
- Produced using the computer controlled ‘laser melting’ process – giving more consistent results
- Manufactured with a quality management system certified to ISO13485

LaserAbutment™

* in accordance with the manufacturers reported nickel content and permitted deviation BS EN ISO 22674:2006

Open manufacturing

Whether using a Renishaw-supplied CAD system or one from a 3rd party, Renishaw can offer you a fully quality controlled manufacturing option via an electronic submission and tracking service from your existing PC. Take full advantage of this service for the following materials:

Realistic™

High translucency zirconia allows full contour designs to be created without the extra cost of porcelain application. A quick stain and glaze gives a high quality finish while saving time and money by reducing processing in the laboratory.

LaserPFM™

An ideal alternative to cast or machined semi-precious or non-precious crown and bridge frameworks; fixed price per unit and made from traceable CE marked material. LaserPFM frameworks are made by 3D printing.

PM100

A temporary PMMA material available in four shades giving a choice to match each case. Allowing for great aesthetics even for temporary cases, PM100 is the perfect partner for the RDS provisional module.

WX100

An investment wax material specifically designed to burn out cleanly and save time spent waxing up by hand. Used either for cast or pressed ceramic frameworks, WX100 gives you the ability to introduce the digital workflow to more traditional processes.

ZR100

The highest quality isostatically pressed zirconia is ideal for crown and bridge frameworks up to 8 units, available in a choice of three shades plus bleach. High strength and excellent porcelain adhesion combine to give great aesthetics.

Service and support

Renishaw believes the quality of support you receive is just as important as the quality of the products you receive.

If you are investing in your first CAD/CAM system, or if you are upgrading to the latest technology, Renishaw can support you. We've developed all elements of our our own manufacturing processes, enabling us to provide excellent technical service and support due to an intimate knowledge of our products and processes.

Renishaw sales engineers are renowned for their pre and post sales support. Buying new equipment can be a major investment and keeping it running is often key to the profitability of a business. That is why Renishaw gives fast responsive support and a "repair by exchange" (RBE) service on hardware.

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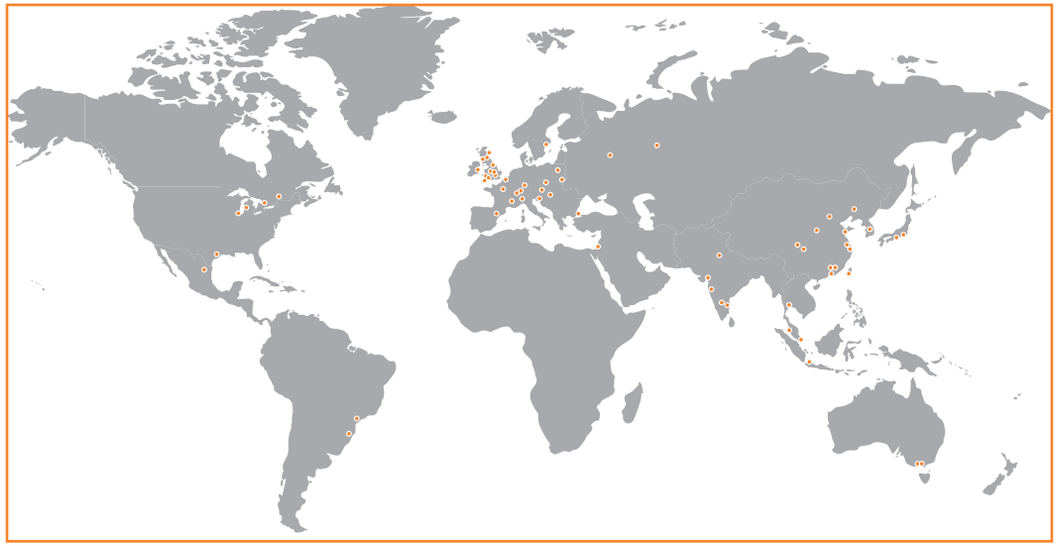
About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing and vacuum casting technologies for design, prototyping, and production applications
- Dental CAD/CAM scanning systems and supply of dental structures
- Encoder systems for high accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications



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