

Royal Leamington Spa  
Dr. Douglas G Watt

# Onlay for upper right molar using chairside workflow with 3Shape TRIOS Design Studio



**Solutions featured:**

3Shape TRIOS intraoral scanner

3Shape TRIOS Design Studio – open chairside solution



Fig. 1 i



Fig. 1 ii

### Case information

The patient, a female age sixty-three, attended as a new patient at the practice requesting orthodontic treatment and restoration of her dentition which had multiple failing posterior restorations. This case study focuses on the upper right first molar which has a large amalgam restoration with secondary caries present, the patient requested a more aesthetic restoration to replace this and understood the need for cuspal coverage to protect the remaining tooth tissue.

### Treatment plan

For the treatment, it was decided to use a lithium disilicate onlay to provide cuspal protection whilst minimising the amount of tooth surface removed to prepare the tooth. This is carried out using a full digital workflow and direct integration between the 3Shape TRIOS Design Studio and the DGShape DWX-42W mill to allow for in house manufacture of the restoration. The upper right first molar responded positively to vitality test and there is no sign of apical pathology on radiographic examination. Fig. 1 (i, ii)

Case setup in TRIOS Design Studio as an inlay/onlay indication. Fig.2 (i, ii)



Fig.2 i

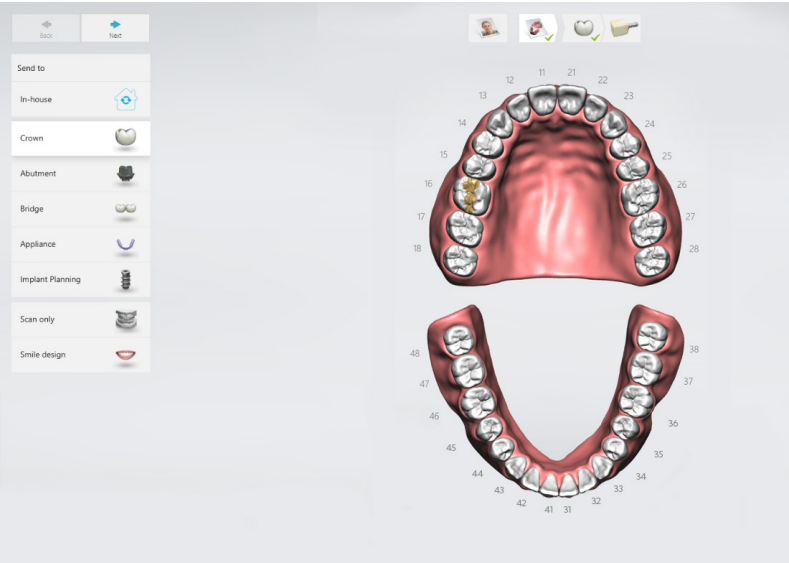


Fig.2 ii

Following the software's guided workflow, the margin line and insertion direction are defined and adjusted as necessary. Fig. 3

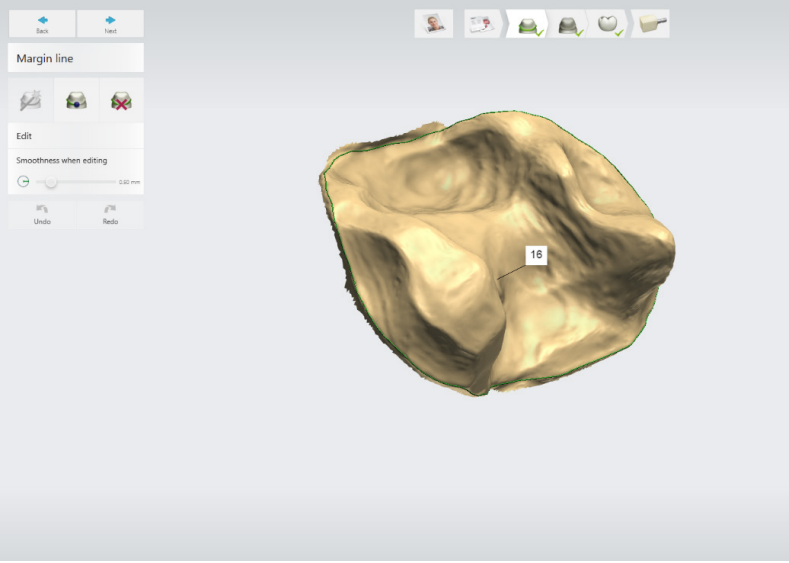


Fig. 3

Identification of the margin line is aided by the use of an HD overlay photo taken with the 3Shape TRIOS at the time of scanning. Fig. 4, 5

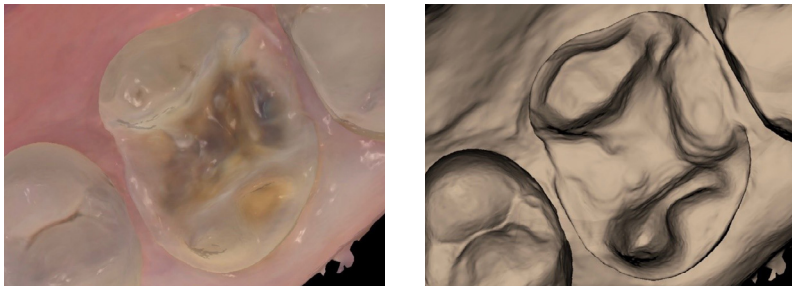
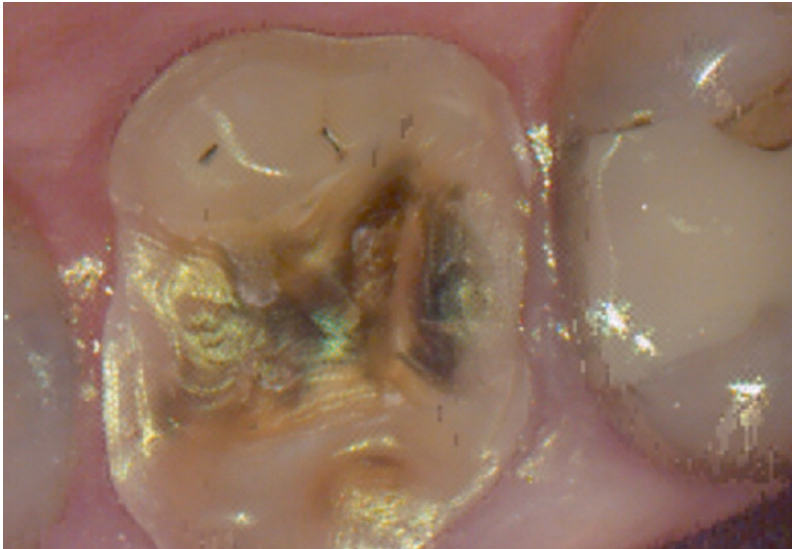


Fig. 4

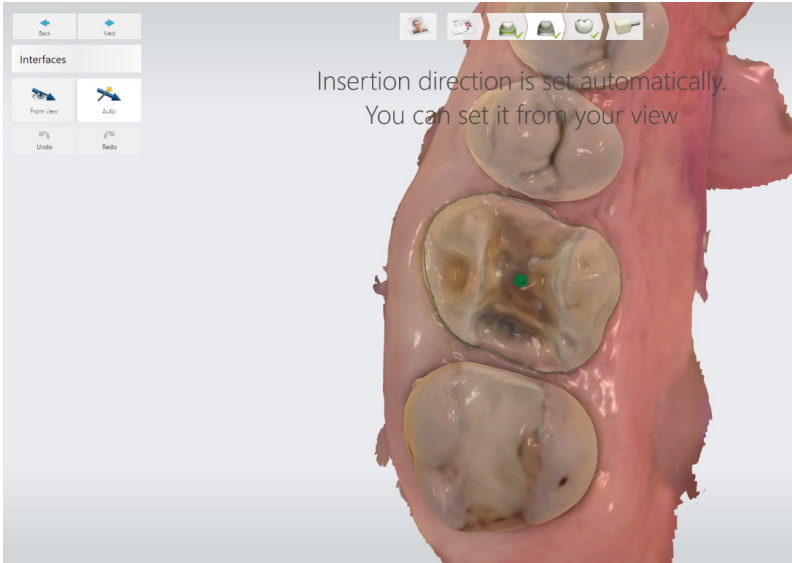
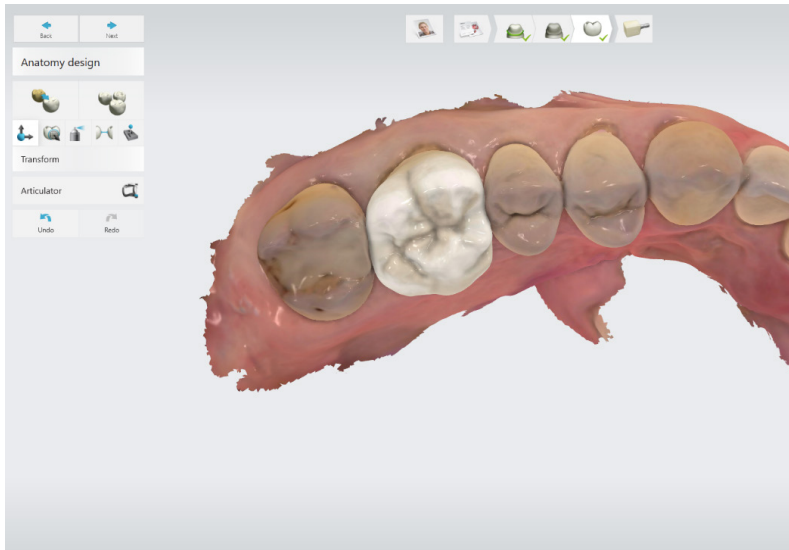


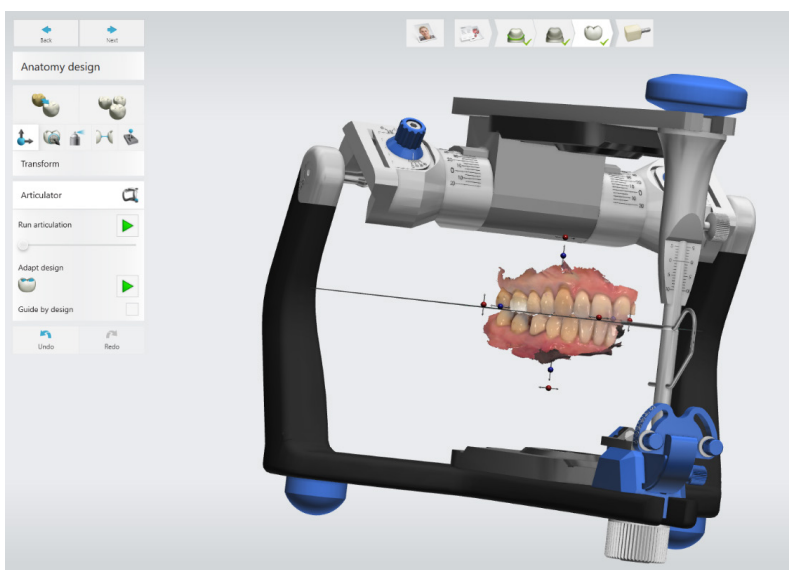
Fig. 5





Onlay design proposed by 3Shape TRIOS Design Studio software and adjusted as necessary to place occlusal contacts and interproximal contact point as required with the preferred level of contact between the teeth and abide by the set minimal thickness in line with manufacturer recommendations. Fig. 6

Fig. 6



The virtual articulator in the software is run and the design adapted to remove any working side and non-working side interferences. Fig. 7 (I, ii)

Fig. 7 i

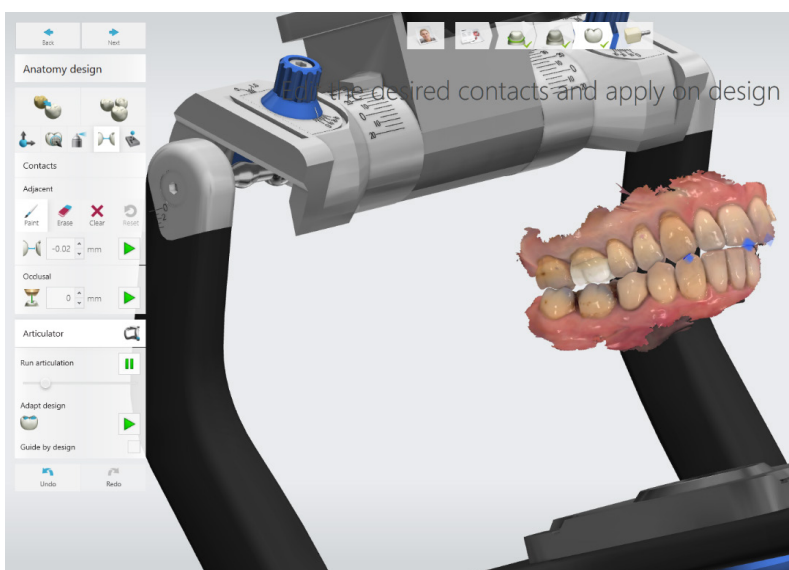


Fig. 7 ii

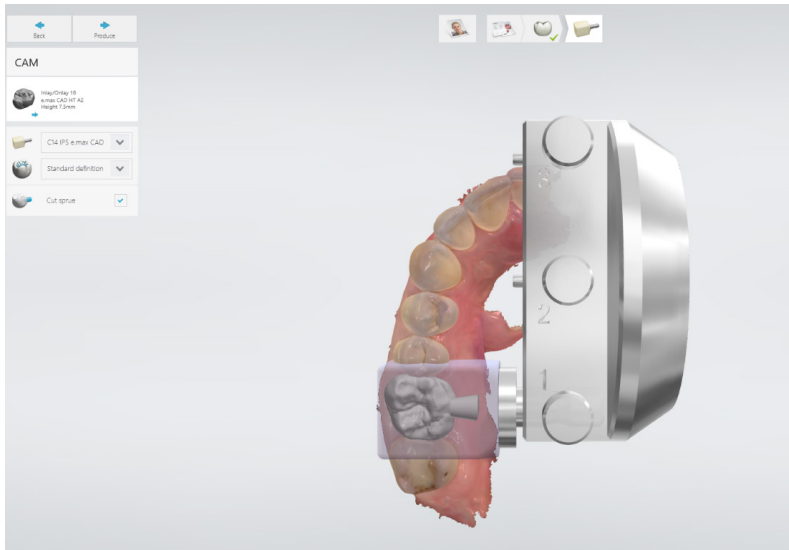


Fig. 8 i

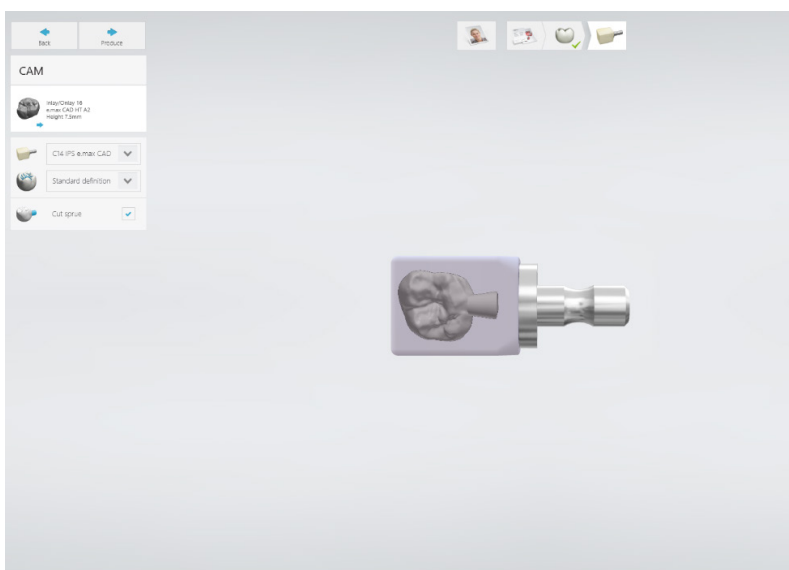


Fig. 8 ii

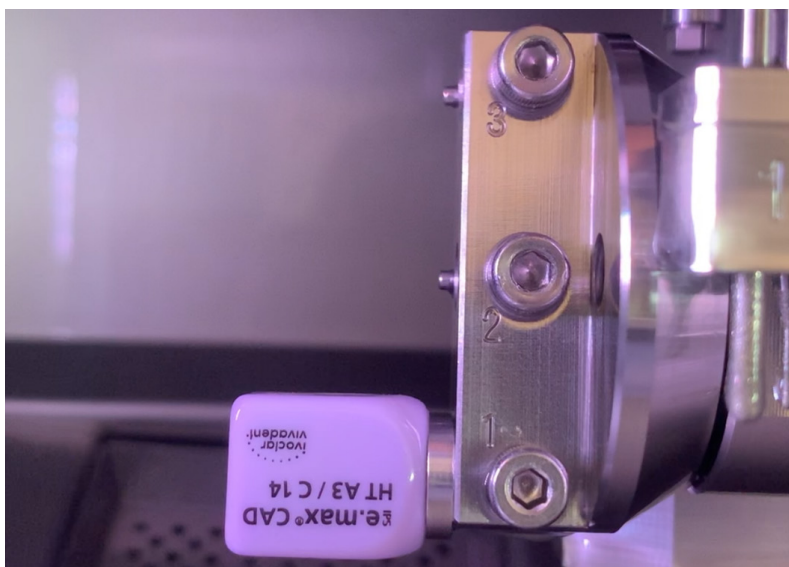


Fig. 9

Once design stages are complete and the design is correct from an occlusal interproximal and morphological standpoint and dynamic occlusion had been assessed and adjusted using the virtual articulator, the crown is nested in preparation for milling and the block loaded into the DGShape DWX-42W in the correct position. Fig. 8 (i, ii), Fig. 9

Following milling the restoration is cut off the reduce sprue and the remaining sprue smoothed. The restoration is then glazed stained and fired on a fifteen-minute firing cycle and allowed to cool.

The restoration is tried in the mouth to confirm fit.  
Fig. 10 (i, ii)



Fig.10 i



Fig.10 ii



Fig. 11 i

The fit surface of the restoration is then prepared with Ivoclar Vivadent Monobond Etch and Prime. The tooth is isolated with rubber dam and the tooth surface prepared through sandblasting using 29-micron aluminium oxide and acid etching with 37% phosphoric acid etchant gel. Fig. 11 (i, ii)



Fig. 11 ii

The prepared restoration is then bonded to the tooth using 3M Scotchbond universal applied twice and air thinned and left uncured, the fit surface of the restoration was loaded with 3M Rely-x Unicem.





Fig. 12

The restoration is seated and flash cured. Any excess removed and the contacts flossed prior to full curing. A final cure of the margins is carried out for sixty seconds on all accessible margins with a glycerine gel covering to eliminate the oxygen inhibition layer. Fig. 12



Fig. 13

The rubber dam is removed, then static and dynamic occlusion are checked. No adjustment was necessary. Fig. 13



Fig. 14

Final result. Fig. 14

## Case timeline

2.5 hours



## Conclusion

This case was completed in one day in a single appointment over the duration of two and a half hours. The initial prep and scan were completed in around 50 minutes, the design took 10-15 minutes and the milling was completed in 20-25 minutes. Glazing and firing took 20 minutes and half an hour was allowed for placement of the rubber dam and bonding of the restoration to the tooth.

The use of the 3Shape TRIOS scanner and the TRIOS Design Studio software as a continuous and seamless workflow, along with the direct integration with the DGShape makes for a very easy and predictable option for in-house manufacture and same day crown workflow.

The update to allow use of TRIOS Patient Specific Motion makes this kind of case even more predictable as the patient's actual excursive and protrusive movements can be utilised rather than a virtual articulator.

# About Dr. Douglas G Watt

Douglas Watt graduated from Birmingham University in 2003. He is a partner in a private practice in Royal Leamington Spa. His interest in dentistry are restorative dentistry, implant dentistry, endodontics and digital dentistry. He is a board member of the International Digital Dental Academy, Regional representative and Full member of the British Academy of Cosmetic Dentistry and a Member of the Faculty of General dental practitioners. He lectures on digital dentistry and mentors' dentists on the application of digital technology.

# About 3Shape

3Shape is changing dentistry together with dental professionals across the world by developing innovations that provide superior dental care for patients. Our portfolio of 3D scanners and CAD/CAM software solutions for the dental industry includes the multiple award-winning 3Shape TRIOS® intraoral scanner, the upcoming 3Shape X1® CBCT scanner, as well as market-leading scanning and design software solutions for both dental practices and labs.

Two graduate students founded 3Shape in Denmark's capital in the year 2000. Today, 3Shape has over 1,500 employees serving customers in over 100 countries from 3Shape offices around the world. 3Shape's products and innovations continue to challenge traditional methods, enabling dental professionals to treat more patients more effectively. [www.3Shape.com](http://www.3Shape.com)

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