

Int Poster J Dent Oral Med 2012, Vol 14 No 2, Poster 592

Accuracy of scannable bite registration materials by using the CEREC 3D system

Language: English

Authors:

Dr. Konstantin Gubitz, Prof. Dr. Michael Gente,
Department of Prosthodontics, Research Unit Propaedeutik, Philipps-University Marburg, Germany

Date/Event/Venue:

12.-13.11.2010
Deutscher Zahnärztag 2010
Frankfurt am Main

Introduction

The objective of the study was to determine how exactly the interocclusal record passes information to the Cerec 3D® system and the technique influence on accuracy. We examined the simulated clinical situation in mouth and the labor situation on plaster models.

Objectives

Despite consideration of an interocclusal record the Cerec 3D®-system (Sirona Dental Systems, Bensheim Germany) often creates restorations that need to be correctly grinded in at the patients occlusion.

Material and Methods

We examined nine scannable materials¹ of different manufacturers and one conventional non-scannable material² whose surface was "powdered"³. The interocclusal records were taken in stylized antagonistic jaw models [Fig. 1] of known dimensions which were mounted in an articulator to simulate the oral situation.

Steps after curing the interocclusal record:

1. Removing - Trimming - Repositioning [Fig. 2 - Scanning]
2. Trimming in situ [Fig. 2 - Scanning]
3. Removing - Trimming - Transposing on plaster model [Fig. 3 - Scanning].

Finally, the interocclusal records placed on tooth were pictured in the Cerec® system [Fig. 4]. To assess the accuracy of bite registration the Cerec®-internal height datas on the virtual model were used. These datas were inserted in a specially developed algorithm. Thereby, the reproduction accuracy could be calculated in comparison to the known dimensions of the jaw model.



Fig. 1

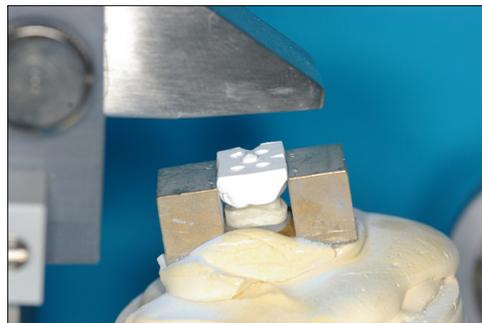


Fig. 2

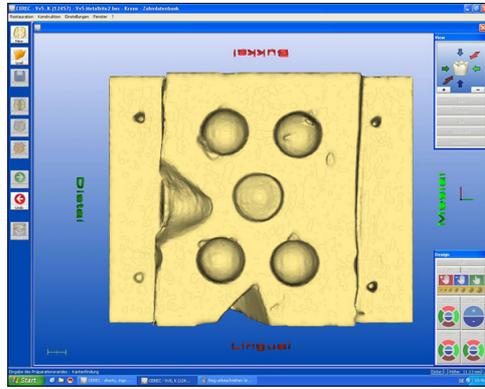
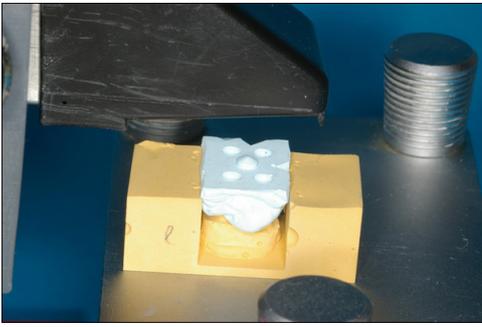


Fig. 3

Fig. 4

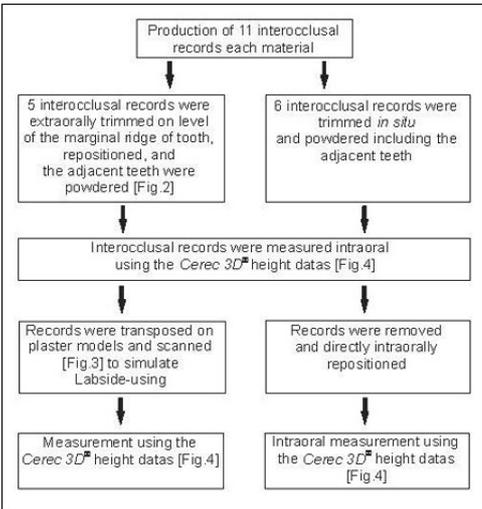


Fig. 5: Flow process chart

Results

While the extraoral trimmed and repositioned records show deviations 17-29 microns on average, the in situ trimmed records show variations about only 1-14 microns. These differences were statistically significant ($p < 0,05$, tested with Wilcoxon-Test). When transposing the records on a plaster model, deviations rise to 36-98 microns on average.

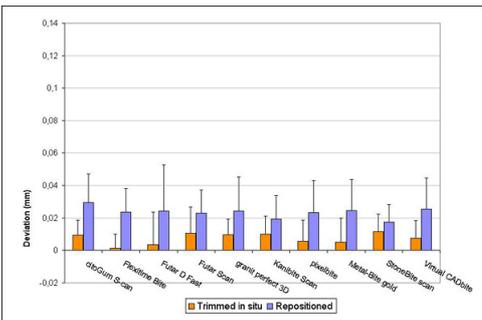


Diagram 1

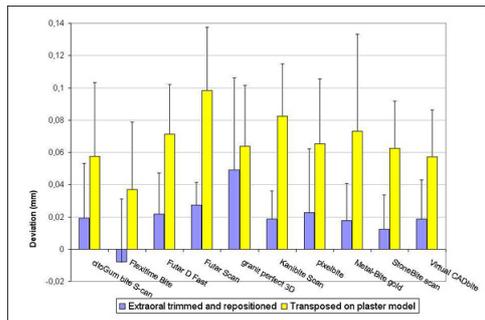


Diagram 2

Conclusions

The most accurate proceeding using a bite registration on the Cerec 3D® system is characterized by very low manipulation on registrate. Trimming the record should be done in situ without its removal. Vertical discrepancies increased when using records on plaster models.

Supplementary Notes

¹⁾ citoGum bite S-can® (mds Medical & Dental Service GmbH)
Flexitime Bite® (Heraeus Kulzer GmbH)
Futar Scan® (Kettenbach GmbH & Co. KG)
granit perfect 3D® (müller-omicron GmbH & Co. KG)
Kanibite Scan® (Kaniedenta GmbH & Co. KG)
pixelbite® (Detax GmbH & Co. KG)
R-Si-Line Metal-Bite gold® (R-dental GmbH)
StoneBite scan® (Dreve Dentamid GmbH)
Virtual CADbiteRegistration® (Ivoclar Vivadent GmbH)

²⁾ Futar D Fast® (Kettenbach GmbH & Co. KG)

³⁾ scan'spray plus® (Dentaco GmbH)

This Poster was submitted by [Dr. Konstantin Gubit](#).

Correspondence address:

[Dr. Konstantin Gubit](#)
Philipps-University Marburg
Department of Prosthodontics, Research Unit Propädeutik
Georg-Voigt-Str. 3
35039 Marburg
Germany

Accuracy of scannable bite registration materials by using the CEREC 3D system



K. Gubitz M. Gente

Department of Prosthodontics, Research Unit Propaedeutik, Philipps-University Marburg, Germany Head: Prof. Dr. U. Lotzmann

Problem

Despite consideration of an interocclusal record the Cerec 3D[®]-system (Sirona Dental Systems, Bensheim, Germany) often creates restorations that need to be correctly ground in at the patients occlusion.

Materials and methods

We examined nine scannable materials¹ of different manufacturers and one conventional non-scannable material² whose surface was "powdered"³. The interocclusal records were taken in stylized antagonistic jaw models [Fig.1] of known dimensions which were mounted in an articulator to simulate the oral situation.

Steps after curing the interocclusal record:

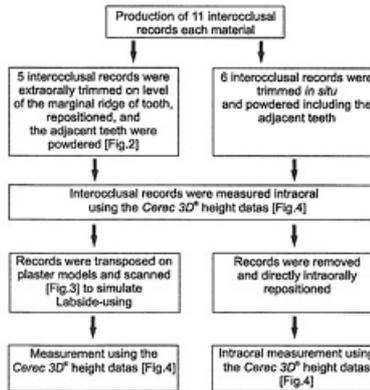
1. Removing - Trimming - Repositioning [Fig.2] - Scanning
2. Trimming *in situ* [Fig.2] - Scanning
3. Removing - Trimming - Transposing on plaster model [Fig.3] - Scanning.

Finally, the interocclusal records placed on tooth were pictured in the Cerec[®] system [Fig.4].

To assess the accuracy of bite registration the Cerec[®] internal height datas on the virtual model were used. These datas were inserted in a specially developed algorithm. Thereby, the reproduction accuracy could be calculated in comparison to the known dimensions of the jaw model.



Fig. 1 Fig. 2 Fig. 3 Fig. 4

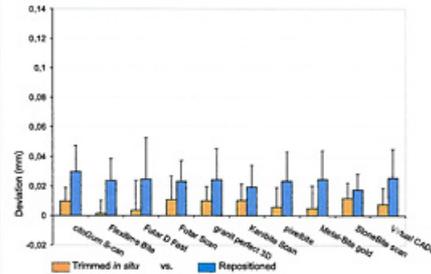


Aim of study

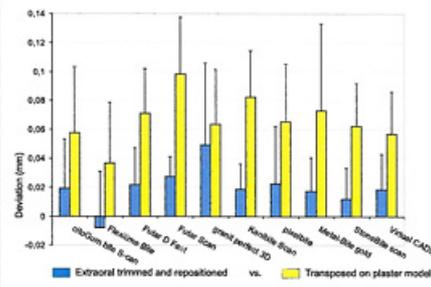
The objective of the study was to determine how exactly the interocclusal record passes information to the Cerec 3D[®] system and the technique influence on accuracy. We examined the simulated clinical situation in mouth and the labor situation on plaster models.

Results

While the extraoral trimmed and repositioned records show deviations 17-29 microns on average, the *in situ* trimmed records show variations about only 1-14 microns. These differences were statistically significant ($p < 0,05$, tested with Wilcoxon-Test).



When transposing the records on a plaster model, deviations rise to 35-98 microns on average.



Conclusion

The most accurate proceeding using a bite registration on the Cerec 3D[®] system is characterized by very low manipulation on registrate. Trimming the record should be done *in situ* without its removal. Vertical discrepancies increased when using records on plaster models.

¹⁾ citioGum bite S-scan[®] (mds Medical & Dental Service GmbH), Flexitime Bite[®] (Heraeus Kulzer GmbH), Futar Scan[®] (Kettenbach GmbH & Co. KG), granit perfect 3D[®] (müller-omicon GmbH & Co. KG), Kanibite Scan[®] (Karlidentia GmbH & Co. KG), pixibite[®] (Dietax GmbH & Co. KG), R-Si-Line Metal-Bite gold[®] (R-dental GmbH), StoneBite scan[®] (Drewe Dentamid GmbH), Virtual CADbiteRegistration[®] (Drewe Dentamid GmbH)
²⁾ Futar D Fast[®] (Kettenbach GmbH & Co. KG)
³⁾ scan'apray plus[®] (Dentaco GmbH)