

**Accuracy of complete-arch digital implant impression with newly
designed scan bodies.**

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Objective

To investigate the accuracy of complete-arch digital implant impression using newly designed scan bodies.

Inclusion Criteria:

At least 18 years old and able to understand an informed consent

Fully edentulous jaw

2-6 dental implants have been placed in the edentulous jaw

The implants have been osseointegrated

Mouth opening larger than 4.5 cm

Exclusion Criteria:

Poor oral hygiene

Presence of peri-implantitis or peri-implant mucositis

Presence of temporomandibular joint disease

Unwilling to participate in the research

Study design

(1) Test data: for each patient, the follow three impressions are made.

- ① Conventional splinted open-tray impression:** A preliminary stone cast are produced using alginate impression material. Impression copings are connected to the implant analogs and splinted with self-cured pattern resin. The splinted assemblies are cut and connected to the abutments intraorally, and then reconnected. Open-tray impressions are made using siloxane impression material. The stone casts are poured with low expansion type IV gypsum. Scan bodies without extensional structure are connected to the analogs fixed in the stone casts, which are then digitalized with a laboratory scanner. The digital models are exported as STL files.
- ② Digital impression using scan bodies without extensional structure:** scan bodies without extensional structure are connected to the abutment intraorally and scanned with an intraoral scanner. The digital models are exported as STL files.
- ③ Digital impression using scan bodies with extensional structure:** scan bodies with extensional structure are connected to the abutment intraorally and scanned with an intraoral scanner. The digital models are exported as STL files.

(2) Reference data

The scan bodies with extensional structure are connected with self-cured pattern resin intraorally. The splinted scan bodies are scanned with a laboratory scanner and exported as STL files.

(3) Data analysis

The STL files are imported to an inspection software. Each of the test data is aligned

with the reference data using “best-fit” algorithm. The deviations between test data and reference data are calculated automatically.

(4) Statistics

Differences between groups in trueness and precision are evaluated using two-way ANOVA, Post-hoc analysis is performed with Bonferroni test. The level of significance was set at $\alpha = .05$.