# Standard Operating Procedure (SOP)

## Digital Scanning and 3D Printing Workflows in the Dental Office

### Purpose

To standardize digital workflows using intraoral scanning and 3D printing in the dental office, ensuring consistent quality, predictable turnaround times, clear communication with laboratories or design partners, and safe, repeatable clinical outcomes.

### Scope

This SOP applies to all clinical and administrative staff involved in intraoral scanning, digital case management, design coordination, fabrication oversight, and delivery of dental appliances or restorations.

### Responsibilities

Dentist is responsible for diagnosis, prescription, scan approval, and final delivery. Clinical staff is responsible for scan capture, file management, and case documentation. Laboratory or design partners are responsible for design accuracy and fabrication quality when applicable.

---

# Workflow 1

## Clinical Scan Sent to Lab for Design, Fabrication, and Delivery

### Overview

The dental office captures the intraoral scan and transfers full responsibility for design and fabrication to the laboratory. The completed appliance or restoration is returned for delivery.

### Procedure

1. **Case Evaluation and Prescription**
   Dentist determines indication, appliance type, material, and delivery timeline. Digital prescription form is completed with clear instructions.
2. **Intraoral Scan Acquisition**
   Clinical staff performs full-arch or quadrant scan following scanner protocol. Verify scan accuracy, margin clarity, occlusal capture, and absence of voids.
3. **File Review and Approval**
   Dentist reviews scan chairside or same day. Confirm anatomy, occlusion, and scan completeness.

4. **File Transfer to Laboratory**
   Scan files and prescription are uploaded to the laboratory portal. Case notes, photos, and bite records are attached as needed.
5. **Laboratory Design and Fabrication**
   Laboratory completes design, printing or milling, post-processing, and quality control.
6. **Case Receipt and Inspection**
   Upon return, staff inspects fit, finish, and material integrity before scheduling delivery.
7. **Clinical Delivery**
   Dentist seats or delivers appliance, verifies fit and function, and provides patient instructions.

### Key Controls

Clear prescriptions, scan quality verification, and lab communication are critical.

---

# Workflow 2

## Scan in Clinic, Lab Designs, Clinic Fabricates and Delivers

### Overview

The dental office scans the patient, the laboratory designs the appliance, and the clinic completes printing and delivery in-house.

### Procedure

1. **Case Evaluation and Prescription**
   Dentist determines appliance type and confirms the case is suitable for in-office fabrication.
2. **Intraoral Scan Acquisition**
   Clinical staff captures scan and verifies margins, occlusion, and anatomy.
3. **File Transfer for Design Only**
   Scan files and prescription are sent to the lab specifically for design services.
4. **Design Review and Approval**
   Lab returns digital design. Dentist reviews design for accuracy, occlusion, and contours before approval.
5. **In-House 3D Printing**
   Approved design is imported into slicing software. Correct resin, orientation, supports, and print settings are selected.
6. **Post-Processing**
   Printed appliance is washed, cured, finished, and inspected following resin manufacturer protocols.

7. **Clinical Delivery**
   Dentist delivers appliance and verifies fit and function.

### Key Controls

Design approval and strict adherence to print and curing protocols are essential.

---

# Workflow 3

## Scan and Design in Clinic, Lab Fabricates, Clinic Delivers

### Overview

The clinic controls scanning and design, while the laboratory handles fabrication and finishing.

### Procedure

1. **Case Evaluation**
   Dentist confirms the case is appropriate for in-office design.
2. **Intraoral Scan Acquisition**
   Clinical staff captures scan and verifies quality.
3. **In-Office Design**
   Design is completed using dental CAD software. Margins, occlusion, and contours are finalized.
4. **Design Review and Export**
   Dentist reviews final design. Approved files are exported in the required format.
5. **File Transfer to Laboratory**
   Design files and fabrication instructions are sent to the lab.
6. **Laboratory Fabrication**
   Lab prints or mills the appliance, completes post-processing, and performs quality checks.
7. **Delivery in Clinic**
   Finished appliance is delivered to the patient.

### Key Controls

Design accuracy and communication of fabrication requirements are critical.

---

# Workflow 4

### Scan, Design, Print, Finish, and Deliver Fully In-House

## Overview

The dental office manages the entire digital workflow from scan to delivery.

## Procedure

1. **Case Evaluation and Planning**
   Dentist confirms clinical indication, material selection, and delivery timeline.
2. **Intraoral Scan Acquisition**
   Clinical staff captures high-quality scans and verifies all anatomical details.
3. **In-Office Design**
   Design is completed using CAD software with attention to margins, occlusion, thickness, and patient comfort.
4. **Print Preparation**
   Design is sliced with correct orientation, supports, resin selection, and print parameters.
5. **3D Printing**
   Printer is calibrated and validated. Print is completed following manufacturer specifications.
6. **Post-Processing and Finishing**
   Printed appliance is washed, cured, finished, and polished. Final inspection is performed.
7. **Clinical Delivery**
   Dentist delivers appliance and confirms fit, function, and patient satisfaction.

## Key Controls

Printer calibration, resin handling, post-curing accuracy, and quality control are mandatory.

---

# Documentation and Quality Assurance

All cases must include digital prescriptions, scan files, design approvals, fabrication notes, and delivery confirmation. Deviations or remakes should be documented and reviewed to improve workflow efficiency.

# ONE-PAGE VISUAL WORKFLOW CHART

### Digital Scanning and 3D Printing Workflows in the Dental Office

## WORKFLOW 1

### Scan ➜ Lab Design ➜ Lab Fabrication ➜ Clinic Delivery

Patient Exam
➜ Intraoral Scan in Clinic
➜ Dentist Reviews and Approves Scan
➜ Files Sent to Lab
➜ Lab Designs and Fabricates
➜ Case Returned to Clinic
➜ Clinical Delivery

Best for: Minimal in-office digital workload, traditional lab partnership
Office role: Scan and delivery only

---

## WORKFLOW 2

### Scan ➜ Lab Design ➜ In-Office Fabrication ➜ Clinic Delivery

Patient Exam
➜ Intraoral Scan in Clinic
➜ Files Sent to Lab for Design
➜ Design Returned to Clinic
➜ Dentist Approves Design
➜ In-Office Printing
➜ Post-Processing and Finishing
➜ Clinical Delivery

Best for: Faster turnaround with controlled fabrication
Office role: Scan, print, finish, and deliver

---

## WORKFLOW 3

### Scan ➜ In-Office Design ➜ Lab Fabrication ➜ Clinic Delivery

Patient Exam
➜ Intraoral Scan in Clinic
➜ In-Office CAD Design
➜ Dentist Approves Design
➜ Files Sent to Lab
➜ Lab Fabricates
➜ Case Returned
➜ Clinical Delivery

Best for: Offices with CAD expertise but no printing
Office role: Scan, design, and deliver

---

## WORKFLOW 4

### Fully Digital In-House

### Scan ➜ Design ➜ Print ➜ Finish ➜ Deliver

Patient Exam
➜ Intraoral Scan
➜ In-Office CAD Design
➜ Dentist Approves Design
➜ In-House Printing
➜ Washing, Curing, Finishing
➜ Quality Check
➜ Clinical Delivery

Best for: Maximum speed, control, and profitability
Office role: Full digital ownership

---

# STAFF-FRIENDLY CHECKLISTS

## Use These as Chairside or Lab Bench Guides

---

## WORKFLOW 1 CHECKLIST

### Scan to Lab for Design and Fabrication

☐ Confirm prescription and appliance type
☐ Perform intraoral scan
☐ Verify margins, occlusion, and completeness
☐ Dentist approves scan
☐ Upload scan and prescription to lab
☐ Track case status
☐ Inspect returned appliance
☐ Deliver to patient and document outcome

---

## WORKFLOW 2 CHECKLIST

### Scan ➜ Lab Design ➜ In-Office Print

☐ Confirm case is approved for in-office fabrication
☐ Perform intraoral scan
☐ Verify scan quality
☐ Send files to lab for design only
☐ Receive and review design
☐ Dentist approves design
☐ Import file into slicer
☐ Select correct resin and print settings
☐ Print appliance
☐ Wash, cure, and finish
☐ Inspect fit and surface quality
☐ Deliver to patient

---

# WORKFLOW 3 CHECKLIST

### Scan ➜ In-Office Design ➜ Lab Fabrication

☐ Confirm case suitability for in-office design
☐ Perform intraoral scan
☐ Verify scan accuracy
☐ Design appliance in CAD software
☐ Dentist approves design
☐ Export correct file format
☐ Send files to lab with fabrication instructions
☐ Inspect returned appliance
☐ Deliver to patient

---

# WORKFLOW 4 CHECKLIST

### Fully In-House Digital Workflow

☐ Confirm indication and material selection
☐ Perform intraoral scan
☐ Verify margins and occlusion
☐ Complete CAD design
☐ Dentist approves design
☐ Slice file with correct orientation and supports
☐ Load correct resin
☐ Print appliance
☐ Wash and post-cure per manufacturer protocol
☐ Finish and polish
☐ Perform final quality check
☐ Deliver and document