THE 2026 ORTHODONTIST'S GUIDE

In-Office Aligner Production

The complete setup guide — equipment, software, the seven-step production workflow, lab layout, staffing and the full cost analysis for fabricating clear aligners under your own roof.

CONTENTS

What's **inside** this guide

A practical, end-to-end playbook for bringing clear-aligner fabrication in-house — from the first software decision to the cost per aligner, and where a design-only service fits in.

01 INTRODUCTION

Why In-Office Aligner Production Is Accelerating in 2026

Clear aligners are now among the most requested orthodontic treatments worldwide. Yet for most practices, outsourcing every case to a third-party lab still means thin margins, long turnaround times and limited control over treatment design. That equation is shifting quickly.

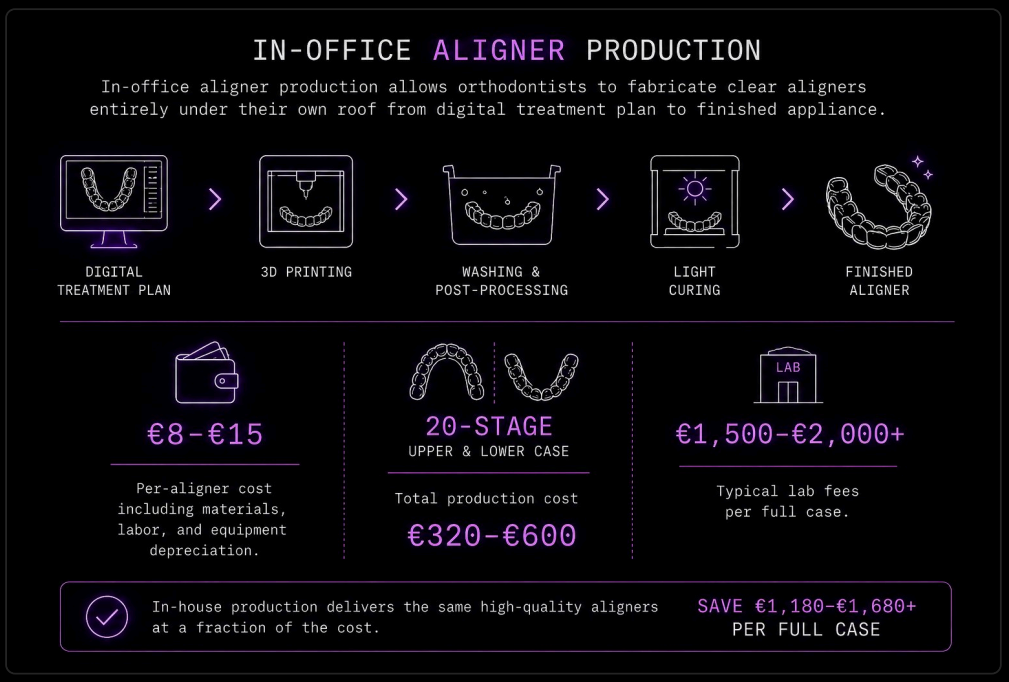

FIG. 01 — IN-OFFICE ALIGNER PRODUCTION AT A GLANCE: WORKFLOW AND ECONOMICS

In-office aligner production lets orthodontists fabricate clear aligners entirely under their own roof, from digital treatment plan to finished appliance. Instead of paying **€1,500–€2,000+** in lab fees per full case, practices that produce aligners in-house report per-aligner costs as low as **€8–€15** once materials, labor and equipment depreciation are accounted for. For a 20-stage upper-and-lower case, that translates to roughly €320–€600 in total production cost, versus several thousand euros outsourced.

But cost is only part of the story. In-house production gives the clinician same-day or next-day aligner turnaround, the ability to reprint a lost or broken aligner in minutes rather than waiting two weeks, and full clinical control over staging, overcorrection and attachment design. For practices already running 3D printers for models, retainers or surgical guides, adding aligner production is a natural extension of an existing digital workflow.

This guide walks through the entire process — equipment, software, production steps, quality control, staffing and the real cost math — so you can decide whether in-

house aligners make sense for your practice and, if so, how to set the operation up properly from day one.

02 STEP 1

Treatment Planning Software — Where It All Begins

Before anything is printed, you need a digital treatment plan. This is the clinical brain of the operation: the software where you stage tooth movements, design attachments, program overcorrections and export the series of STL models that will become your aligners.

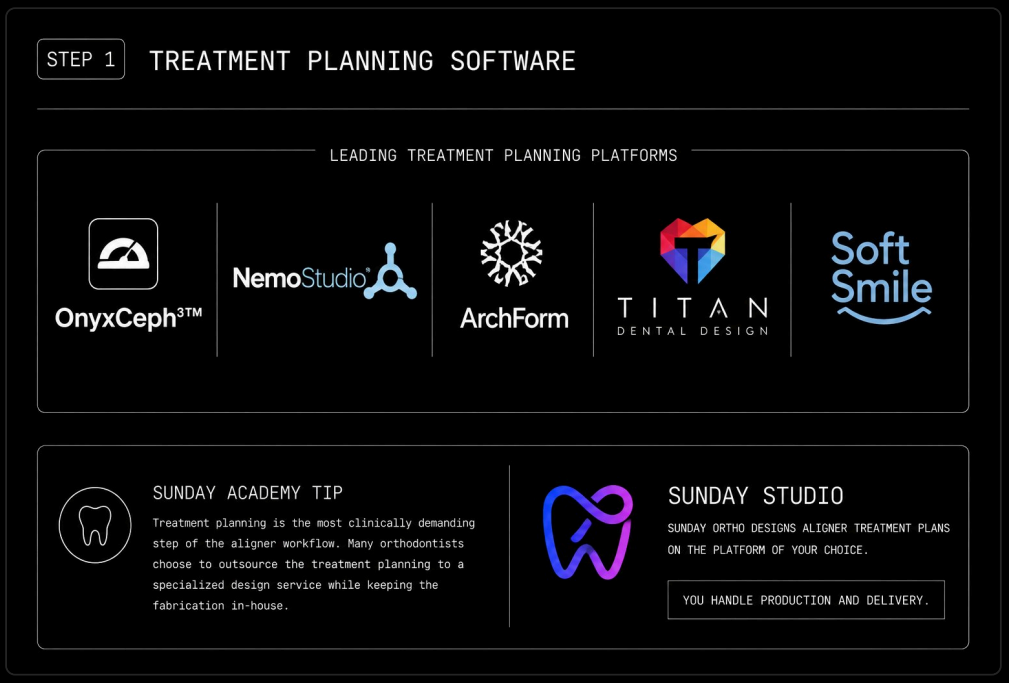

FIG. 02 — LEADING TREATMENT PLANNING PLATFORMS

Several platforms compete in this space, each with its own strengths — OnyxCeph, NemoStudio, ArchForm, Vision, Titan Dental Design and others. The choice usually comes down to which scanner you already own, your budget, and whether you need the software to handle aligners only or also other appliance types. Whichever platform you choose, the output is the same: a series of numbered STL files representing each stage of tooth movement, ready for 3D printing.

SUNDAY ACADEMY TIP

Treatment planning is the most clinically demanding step of the aligner workflow. It requires a solid command of biomechanics, staging sequences, attachment strategy and overcorrection protocols. Many orthodontists who produce aligners in-office choose to outsource the digital setup to a specialized design service while keeping fabrication in-house. This preserves production control and cost savings without spending 2–4 hours per case at the screen. Sunday Studio designs aligner treatment plans on the platform of your choice — you handle production and delivery.

03 STEP 2

Choosing Your 3D Printer

The 3D printer is the workhorse of your aligner lab. For thermoformed aligner production specifically, you are printing dental models — not the aligners themselves, in most workflows — so accuracy and throughput matter most.

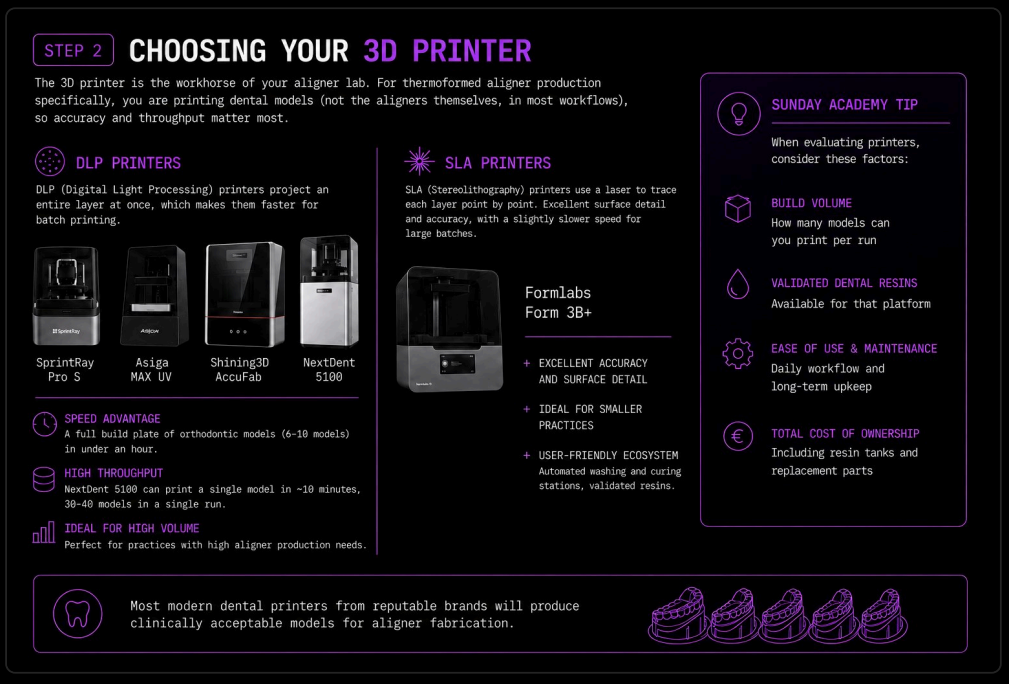

FIG. 03 — DLP VS SLA: SPEED, DETAIL AND SELECTION CRITERIA

Orthodontic offices overwhelmingly use resin-based 3D printers, either SLA (stereolithography, laser-based) or DLP (digital light processing, projection-based). Both technologies reach the sub-100-micron accuracy needed for well-fitting aligners, but they differ in speed and workflow.

DLP printers

The SprintRay Pro series, Asiga MAX UV, Shining3D AccuFab or NextDent 5100 cure an entire layer at once, which makes them faster for batch printing. A DLP printer can produce a full build plate of orthodontic models in under an hour. The NextDent

5100, for instance, prints a single orthodontic model in roughly 10 minutes, and stacking models brings throughput to 30–40 models in a single run. For practices running high aligner volume, DLP speed is a real advantage.

SLA printers

Printers such as the Formlabs Form 3B+ use a laser to trace each layer point by point. They deliver excellent surface detail and accuracy but are generally slower on large batches, since the laser has to travel across each cross-section. For a smaller practice producing a few cases per week, an SLA printer gives beautiful results, and the Formlabs ecosystem — automated washing and curing stations, validated resins — makes the workflow very user-friendly.

SUNDAY ACADEMY TIP

When evaluating printers, weigh four factors: build volume (how many models per run), availability of validated dental resins for that platform, ease of use and maintenance (daily workflow and long-term upkeep), and total cost of ownership (including resin tanks and replacement parts). Most modern dental printers from reputable brands will produce clinically acceptable models for aligner fabrication.

04 STEP 3

Selecting the Right Resin

For thermoformed aligners you are printing dental models, not the aligners themselves, so you need a model resin optimized for accuracy and smooth surfaces.

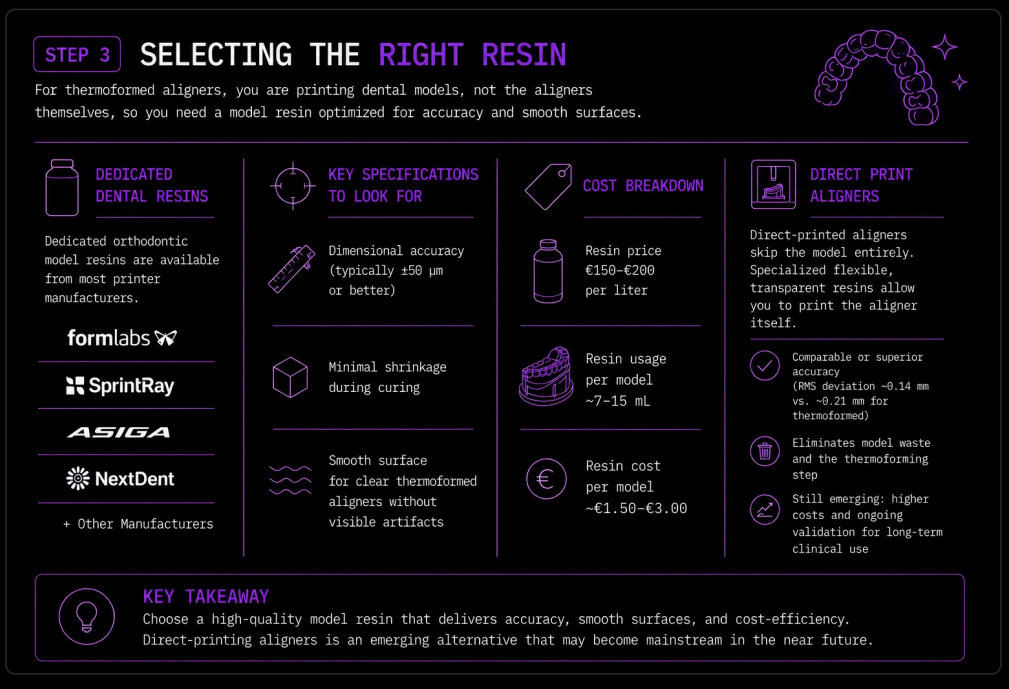

FIG. 04 — RESIN SPECIFICATIONS, COST BREAKDOWN AND THE DIRECT-PRINT ALTERNATIVE

Dedicated orthodontic model resins are available from most printer manufacturers. Formlabs offers Draft V2 Resin for fast prototyping and Model V3 for higher accuracy; SprintRay offers Model 2 and SprintRay Die & Model resins; Asiga and other manufacturers have equivalent products. The key specifications to look for are dimensional accuracy (typically ±50 µm or better), minimal shrinkage during curing, and a smooth surface that will produce a clear thermoformed aligner without visible artifacts.

Some practices use draft resins for initial models — faster print, lower cost per model — when extreme accuracy is less critical, and switch to high-accuracy model resins for cases requiring tight interproximal contacts or precise attachment seats.

Cost-wise, dental model resin typically runs €150–€200 per liter, and each orthodontic model uses roughly 7–15 mL depending on size and hollowing, which puts resin cost per model at approximately **€1.50–€3.00**.

A NOTE ON THE EMERGING ALTERNATIVE

Direct-printed aligners skip the model entirely. Specialized flexible, transparent resins — from companies such as LuxCreo and Graphy — let you print the aligner itself. We cover this workflow in detail later in the guide; for now, it is enough to know that the model-based thermoforming workflow remains the proven standard for 2026.

05 STEP 4

Post-Processing — Washing and Curing

Every resin 3D print requires post-processing before use. This involves two steps: washing off uncured resin, then UV curing to fully polymerize the part.

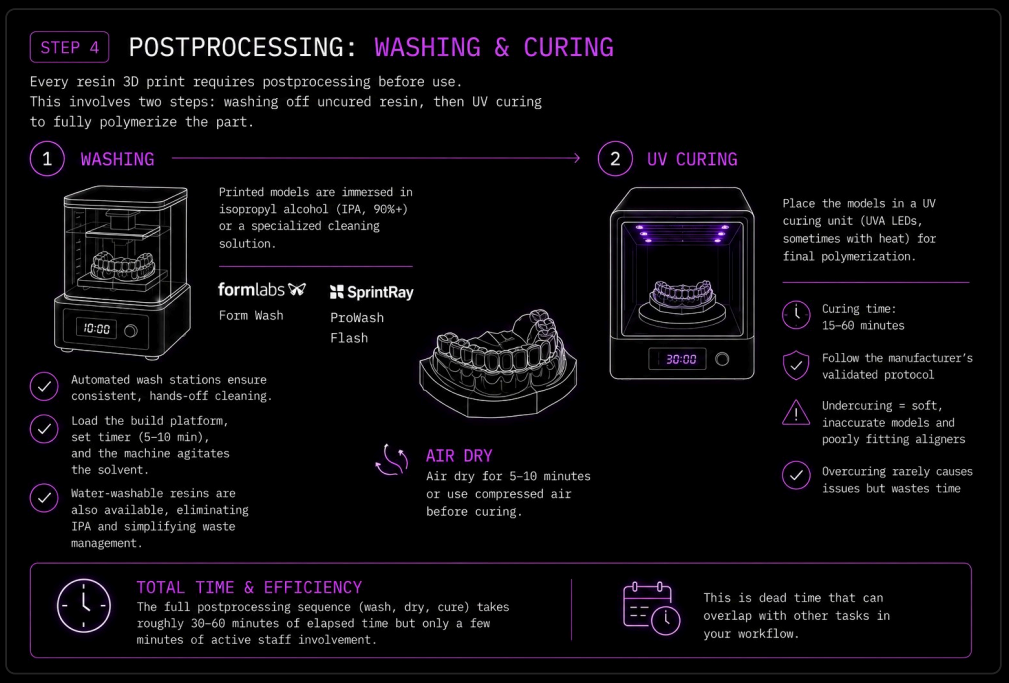

FIG. 05 — THE WASH, DRY AND CURE SEQUENCE

Washing

Washing is done by immersing the printed models in isopropyl alcohol (IPA, typically 90%+ concentration) or a dedicated cleaning solution. Automated wash stations — the Formlabs Form Wash, SprintRay ProWash or Asiga Flash — make this step consistent and hands-off: you load the build platform, set a timer (usually 5–10 minutes), and the machine agitates the solvent to clean the parts. Some newer resins are water-washable, eliminating IPA entirely and simplifying waste management.

UV curing

After washing, models are air-dried briefly (5–10 minutes, or with compressed air) and placed in a UV curing unit — a chamber with UVA LEDs, sometimes combined with heat, for final polymerization. Curing times vary by resin (typically 15–60 minutes) and should follow the manufacturer's validated protocol exactly. Under-curing produces soft, dimensionally inaccurate models that lead to poorly fitting aligners; over-curing rarely causes problems but wastes time.

The full post-processing sequence — wash, dry, cure — takes roughly 30–60 minutes of elapsed time but only a few minutes of active staff involvement. This is dead time that can overlap with other tasks.

06 STEP 5

Thermoforming the Aligners

Thermoforming is where your printed model becomes a clear aligner. A heated thermoplastic sheet is pressed or vacuum-formed over the model to create a tight-fitting shell.

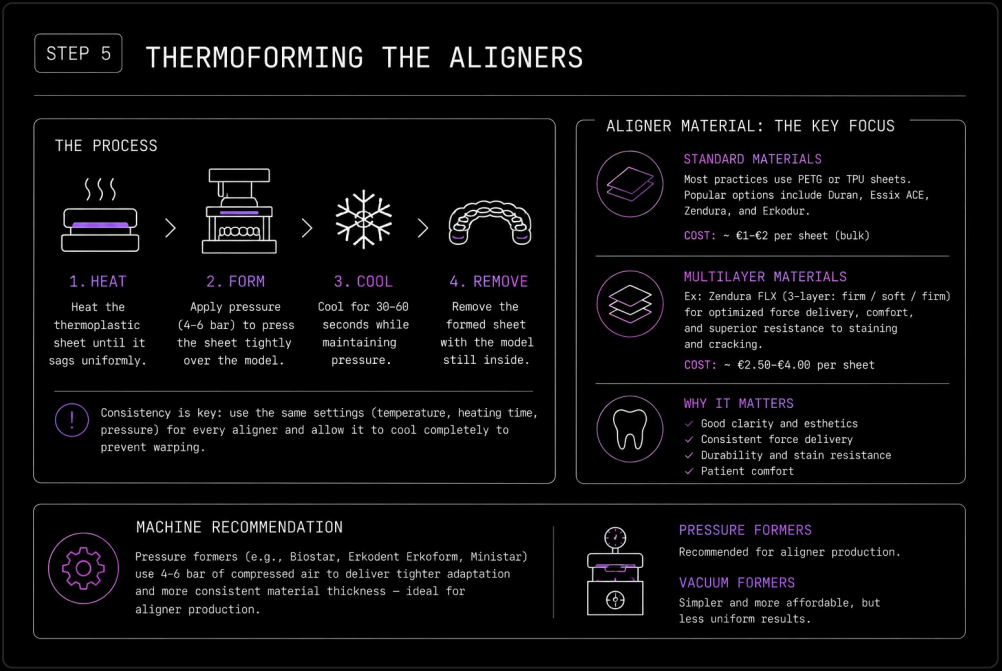

FIG. 06 — THE THERMOFORMING PROCESS AND ALIGNER MATERIAL OPTIONS

Thermoforming machines for dental use fall into two categories. **Pressure formers** (Biostar, Erkodent Erkoform, Ministar) use compressed air — typically 4–6 bar — to press the heated plastic over the model, producing tighter adaptation and more consistent material thickness. **Vacuum formers** are simpler and cheaper but may produce slightly less uniform results. For aligner production, a pressure former is generally recommended.

The process: you clamp a thermoplastic sheet (typically 0.75 mm / 0.030 in for aligners, the most common thickness for active stages), heat it until it sags uniformly, then apply pressure to form it over the model. Cooling takes 30–60 seconds, after which you remove the formed sheet with the model still inside.

Aligner material choice matters

Most practices use polyethylene terephthalate glycol (PETG) or thermoplastic polyurethane (TPU) sheets. Common commercial materials include Duran, Essix ACE, Zendura and Erkodur. PETG sheets offer good clarity, moderate stiffness and reasonable force delivery. Some clinicians prefer a softer material for the first aligner in a sequence and a stiffer one for later stages, though most practices standardize on a single material for simplicity. Sheets cost approximately €1–€2 each when purchased in bulk.

Some practices use **multilayer aligner materials** — thermoplastic sheets that combine different polymers in a laminated structure to optimize both force delivery and patient comfort. The best-known example is Zendura FLX, a three-layer material with a firm outer layer for shape memory, a soft middle layer for flexibility and a firm interior layer. Clinical studies show multilayer materials maintain force delivery comparable to standard PETG while offering superior resistance to staining and cracking. These sheets cost roughly €2.50–€4.00 each and are thermoformed on the same equipment, though heating profiles may need slight adjustment. Similar products include Erkodur ClearProtect and Duran Plus, both designed for improved clarity retention and reduced stress marks.

Consistency is crucial: use the same machine settings — temperature, heating time, pressure — for every aligner. Small variations in heating cause uneven material distribution, with palatal or lingual surfaces tending to thin while buccal surfaces stay thicker. Always let the formed aligner cool completely on the model before removing it, to prevent warping.

07 STEP 6

Trimming and Finishing

After thermoforming, the aligner is still a full sheet of plastic draped over the model. It must be trimmed to the appropriate gingival margin and polished to a smooth, comfortable edge. This is typically the most labor-intensive step in the production workflow, and there are several approaches depending on your volume and budget.

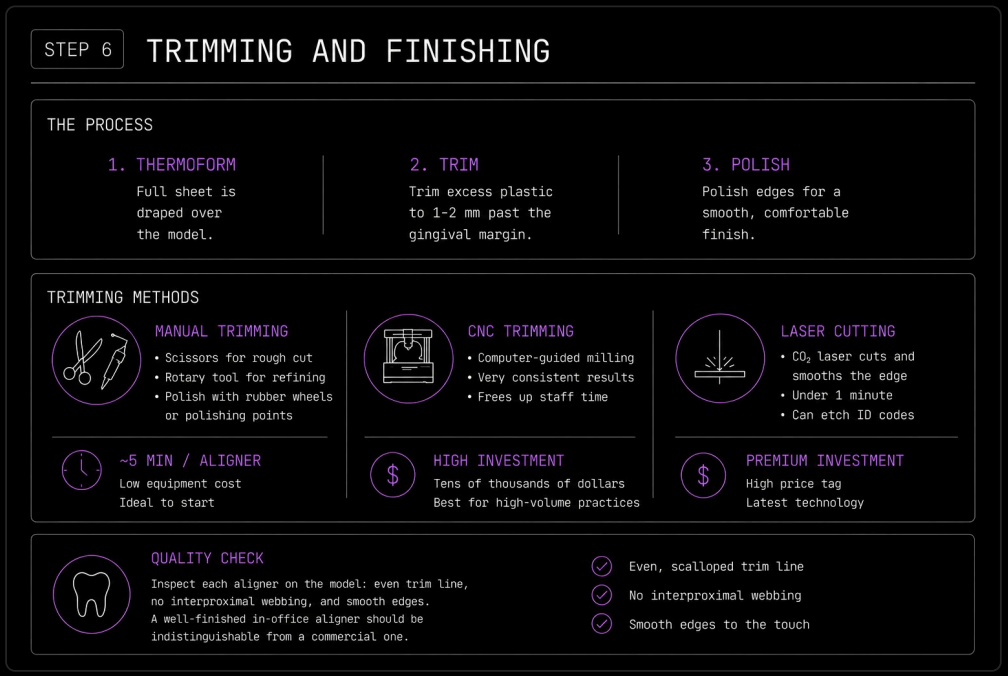

FIG. 07 — TRIMMING METHODS: MANUAL, CNC AND LASER

Manual trimming

Manual trimming is how most practices start. You rough-cut the excess plastic with curved crown-and-bridge scissors, then refine the trim line with a rotary tool (a dental handpiece with a fine carbide or diamond bur). The trim line is usually scalloped to follow the gingival contour, sitting about 1–2 mm past the gingival margin. Edges are then polished with rubber wheels, silicone polishing points or fine sandpaper discs to remove any sharpness. With practice, a skilled assistant can trim and polish a single aligner in about 5 minutes.

Automated CNC trimming

Machines such as the 5Xtrim system use computer-guided milling to follow a pre-programmed trim line. They produce very consistent results and free up staff time, but equipment cost is significant — tens of thousands of euros — making them more suitable for high-volume practices or group clinics.

Laser cutting systems

Systems such as the LAC Laser Aligner Cutter represent the latest innovation. A CO_2 laser traces the gingival margin and cuts the aligner in under a minute, simultaneously cauterizing the edge for a smooth finish that needs minimal or no polishing. Some laser systems can also etch identification codes directly onto the aligner. These units carry a high price tag, comparable to a high-end 3D printer.

For most practices starting out, manual trimming is perfectly adequate. As volume grows and you want to improve consistency or free up staff time, automated solutions become easier to justify. After trimming, inspect each aligner on the model: the trim line should be even, interproximal plastic webbing should be removed, and edges should be smooth to the touch. A well-finished in-office aligner should look indistinguishable from a commercially produced one.

08 STEP 7

Packaging, Labeling and **Professional Delivery**

This final step is often overlooked, but it matters more than many practitioners realize. Professional packaging directly shapes how patients perceive the quality of your aligners — and, by extension, the quality of your practice.

FIG. 08 — PACKAGING OPTIONS, LABELING ESSENTIALS AND BEST PRACTICES

Each aligner or pair (upper and lower for each stage) should be individually packaged in a labeled bag or pouch. At minimum, the label should carry the patient's name or ID, the stage number, and whether it is upper or lower. Many practices go further with custom-branded packaging: printed resealable bags with the practice logo, stage instructions and a professional color scheme.

For patient delivery, consider a branded starter kit with an aligner case, wear-and-care instructions, chewies for seating and the first set of aligners. Some practices hand over all aligners at once in a larger branded box; others dispense in batches of 4–6 stages at each visit to encourage compliance and regular check-ins.

The goal is simple: your in-office aligners should look and feel as professional as anything from a major lab. Patients who receive a neatly packaged, clearly labeled series in branded packaging perceive higher value — which supports your case fee and builds practice reputation.

09 LAB SETUP

Setting Up Your Aligner Lab — Space & Equipment

You do not need a large space. A dedicated corner or small room — roughly 3 × 3 meters minimum — can house an efficient aligner production setup. Organize it into functional zones.

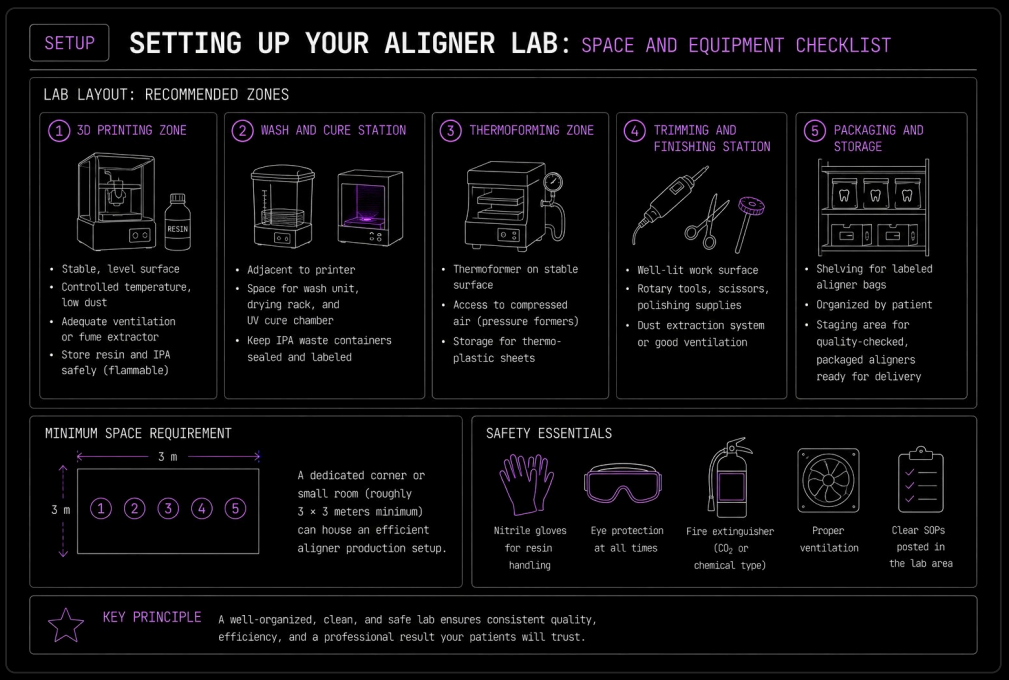

FIG. 09 — RECOMMENDED LAB ZONES, MINIMUM FOOTPRINT AND SAFETY ESSENTIALS

3D printing zone

A stable, level surface for your printer(s), with controlled temperature, low dust and adequate ventilation (or a fume extractor) to manage resin odor. Store resin and IPA safely — both are flammable.

Wash and cure station

Adjacent to the printer, with space for the wash unit, drying rack and UV cure chamber. Keep IPA waste containers sealed and labeled.

Thermoforming zone

The thermoformer on a stable surface with access to compressed air (for pressure formers), plus storage for thermoplastic sheets.

Trimming and finishing station

A well-lit work surface with rotary tools, scissors and polishing supplies, and a dust extraction system — or at least good ventilation — for plastic particles.

Packaging and storage

Shelving for labeled aligner bags organized by patient, and a staging area for quality-checked, packaged aligners ready for delivery.

SAFETY ESSENTIALS

Nitrile gloves and eye protection for resin handling, a fire extinguisher (CO_2 or chemical type), proper ventilation, and clear SOPs posted in the lab area.

10 COST ANALYSIS

Example **Cost Calculation**

The figures below model a representative French practice with moderate aligner volume. Treatment planning is outsourced to Sunday Studio at a fixed, all-inclusive per-case rate — covered as a single line in the cost table — so the model reflects a workflow where the practice keeps fabrication in-house and removes the digital-setup bottleneck.

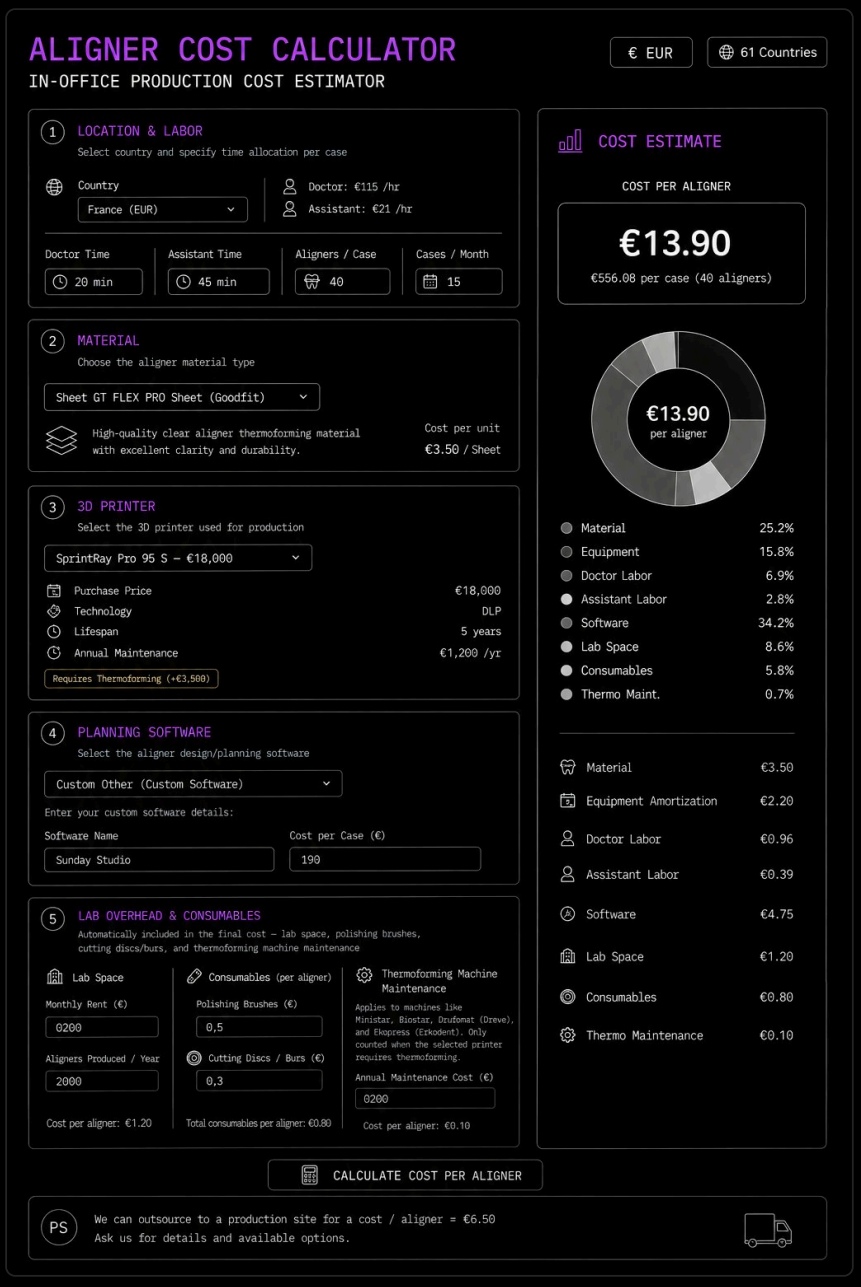

FIG. 10 — INTERACTIVE IN-OFFICE PRODUCTION COST ESTIMATOR

INPUTS

PARAMETER	VALUE

PARAMETER	VALUE
Country / labor rates	France — Doctor €115/hr, Assistant €21/hr
Time allocation (per case)	Doctor 10 min, Assistant 45 min (production oversight; treatment planning handled separately)
Volume	30 aligners/case; 15 cases/month (450 aligners/month)
Sheet material	Zendura FLX — €5.50/sheet
3D printer	SprintRay Pro 95 S — €18,000; 5-year lifespan; maintenance €1,200/yr; thermoformer +€3,500
Treatment planning	Sunday Studio — €190 HT/case, all-inclusive (setup + finishing + print-ready STL files + software)
Lab space	€200/month (€0.44/aligner at 450 aligners/month)
Consumables (per aligner)	Polishing brushes €0.50 + cutting discs/burs €0.30 = €0.80
Thermoforming maintenance	€200/yr (€0.10/aligner)

COST PER ALIGNER

COST COMPONENT	€ / ALIGNER	BASIS
Material	€5.50	Thermoforming sheet (Zendura FLX)
Equipment amortization	€2.20	Printer + thermoformer allocated per aligner
Doctor labor	€0.64	€115/hr × 10 min/case ÷ 30 aligners
Assistant labor	€0.53	€21/hr × 45 min/case ÷ 30 aligners
Treatment planning	€6.33	Sunday Studio €190 HT/case ÷ 30 aligners
Lab space	€0.44	€200/month ÷ 450 aligners/month
Consumables	€0.80	Brushes + discs/burs
Thermoforming maintenance	€0.10	Annual maintenance allocation
Total per aligner	**€16.54**	

COST PER CASE (30 ALIGNERS)

METRIC	VALUE
Total per aligner	€16.54

METRIC	VALUE
Aligners per case	30
Total per case	**€496.20**

A note on the planning line

Handling the digital setup in-house instead of outsourcing it does not remove this cost — it changes its form. You would carry a software licence or subscription plus roughly 2–4 hours of clinician time per case for staging, attachment design, IPR and overcorrections. At a doctor rate of €115/hr, even two hours represents €230 of clinical time — more than the €190 outsourced setup — and that is time not spent chairside. Outsourcing the setup is therefore often cost-neutral or favorable, while removing the most time-consuming step from the practice's plate.

> **KEY TAKEAWAY**
>
> For practices with moderate to high aligner volume, in-house production consistently delivers 70%+ savings versus full-case outsourcing, while increasing clinical and business flexibility.

11 OPERATIONS

Workflow Management and Staffing

Having the right equipment is half the equation. The other half is building a system that runs smoothly without requiring the orthodontist's constant involvement in fabrication.

Designate a champion

Identify one team member — usually an orthodontic assistant or a dedicated lab technician — to take ownership of the aligner production process. This person should be organized, detail-oriented and genuinely interested in the digital workflow. Provide thorough training on every step: software operation, printer management, resin handling, thermoforming and trimming. The orthodontist's role is treatment planning and quality oversight, not running the printer.

Build SOPs for every step

Write a standard operating procedure for each stage of production, from loading STL files into the printer software through to packaging the final aligner. Include specific parameters: resin type, layer thickness, wash duration, cure time, thermoforming temperature and pressure, trim line protocol. SOPs ensure consistency regardless of which team member is on shift, and they make training new staff dramatically easier. A good test: any step in your SOP should be learnable by a new team member in a single day. If it is not, simplify the process.

Batch production vs. just-in-time

Most practices find a hybrid approach works best. Print models in batches — running the printer overnight or over lunch with a full build plate from multiple patients — then thermoform and trim in dedicated production blocks. Some offices designate specific “lab days,” for example Tuesday and Thursday mornings, for aligner fabrication; others prefer a just-in-time model for same-day starts. Either approach works; the key is consistency and scheduling.

Quality control checkpoints

Build QC into every stage. After printing: inspect each model for completeness, correct labeling and absence of warping. After thermoforming: verify uniform adaptation with no bubbles, holes or thin spots. After trimming: check edge smoothness, correct trim line and proper interproximal clearance. Keep a brief log of any errors to spot patterns and improve the process over time.

Plan for failures

Prints sometimes fail. Models occasionally warp. Thermoforming can produce a defective aligner. Build a small buffer into your timeline so a failed print does not delay patient delivery. Keep spare resin and sheets on hand, and maintain your printer on the manufacturer's schedule to minimize unexpected downtime.

12 WHAT'S NEXT

Direct-Printed Aligners — The Future Is Arriving

While the thermoformed workflow described above is the current standard, direct 3D printing of aligners is maturing rapidly and deserves attention from any practice investing in aligner production infrastructure today.

Direct-printed aligners skip both the model and the thermoforming step. Specialized transparent, flexible resins — from companies such as LuxCreo, Graphy (Tera Harz TC-85) and several others entering the market — let you print the aligner itself directly from the treatment planning STL. The aligner comes off the printer as a finished, or near-finished, product after post-processing.

The advantages are compelling: no model waste, no thermoforming equipment, more uniform material thickness (no thinning from heating and stretching), and the potential for integrated design features such as variable-thickness zones or built-in attachment recesses. Early adopters report production times of 60–90 minutes for a set of aligners and per-unit costs already approaching thermoformed economics.

The trade-offs today: specialized resins are more expensive than model resin, material options are still limited, long-term clinical data is still accumulating, and not every printer can handle the required resin properties. But the trajectory is clear — direct printing is likely to become the dominant aligner fabrication method within the next few years.

> For practices setting up now, build your workflow around thermoforming — proven, cost-effective and well-understood — while keeping your infrastructure compatible with direct printing for when you are ready to transition.

13 PITFALLS

Common Mistakes to Avoid

Five missteps come up again and again when practices bring aligner production in-house. Each one is easy to design around if you know it is coming.

Skipping treatment planning training

The printer and thermoformer are the easy parts. Treatment planning — proper staging, attachment strategy, overcorrection and IPR planning — is where clinical outcomes are determined. Invest heavily in learning your planning software, or partner with an experienced design service for this step.

Underestimating the trimming step

Trimming is more time-consuming than most practices expect. Budget adequate staff time and consider investing in better tools early to avoid frustration and inconsistent results.

Neglecting packaging

Handing a patient a Ziploc bag with a handwritten label undermines the perceived value of your treatment. A small investment in professional packaging pays for itself in patient confidence.

Not tracking costs accurately

Many practices assume in-house production is cheaper without actually measuring per-aligner cost — including labor, failed prints, consumables and equipment maintenance. Track these numbers from day one so you can optimize based on real data.

Trying to do everything at once

Start with retainers or simple aligner cases to build confidence and refine your workflow before tackling comprehensive 30-stage treatments in-house.

14 THE DESIGN LAYER

How Sunday Studio Fits Into Your Workflow

In-office aligner production gives you control over fabrication. But the most time-consuming and clinically critical step — treatment planning and digital setup — happens before anything is printed.

Designing a full aligner treatment plan means staging tooth movements across 15–30+ stages, placing attachments with biomechanical intent, planning IPR, programming overcorrections and ensuring the final result is both clinically sound and achievable. For many practices, this step takes 2–4 hours per case — time that could be spent treating patients.

15 FAQ

Frequently Asked Questions

Q How much space do I need for an aligner lab?

A dedicated area of roughly 3 × 3 meters (about 100 sq ft) is sufficient for a printer, wash/cure station, thermoformer and trimming workstation. Many practices start in a converted storage room or a corner of an existing lab.

Q How long does it take to produce one aligner?

From printed model to finished aligner, hands-on time is approximately 10–15 minutes per aligner (printing runs unattended). A full 20-stage case can be produced in 1–2 days including print time, post-processing, thermoforming and trimming.

Q Do I need a dedicated staff member?

Not necessarily at first. Many practices start with an existing orthodontic assistant who dedicates part of their day to aligner production. As volume grows beyond 10+ cases per month, a dedicated lab technician becomes increasingly valuable.

Q What if a print fails or an aligner is defective?

This is one of the key advantages of in-house production. You simply reprint the model and re-thermoform — typically adding less than €5 in material cost and 30–60 minutes of time. No waiting two weeks for a lab replacement.

Q Can I produce aligners for both arches in one print run?

Yes. Most dental 3D printers fit 6–10 models per build plate, so you can print multiple stages for both arches — and even models from different patients — in a single run.

Q Is in-house aligner production legal and regulated?

In most jurisdictions, orthodontists producing appliances in their own office for their own patients operate within standard dental practice regulations. Check your local rules regarding biocompatible material requirements, labeling and any specific dental device manufacturing regulations that may apply in your region.

Conclusion — Four Reasons to Bring **Production In-House**

In-office aligner production is no longer a “future” workflow — it is a practical, proven way to increase profitability and clinical control in 2026. When you keep fabrication in-house, you dramatically lower per-aligner costs, shorten turnaround from weeks to days (or even same-day starts), and gain the flexibility to reprint, refine and correct mid-course without waiting on a lab.

Most importantly, bringing production under your roof puts quality back in your hands: you choose the printer, resin, thermoforming parameters, trim standards and packaging that match your clinical expectations and your brand.

The one step that does not become easier simply by buying equipment is the digital setup — and it is the step that determines your clinical result. This is where outsourcing to an orthodontist-led design service earns its place: it removes the 2–4 hour planning bottleneck while keeping the biomechanical thinking in the hands of clinicians, not technicians. Start with a simple, repeatable thermoformed workflow, build clear SOPs and QC checkpoints, and scale as volume grows — with an eye toward direct-printed aligners as the next major evolution.

Sunday Studio supports that transition: send your scans and prescription, and receive a clinically driven treatment plan — staged models, attachments, IPR and overcorrections — designed and validated by orthodontists, delivered within 48 hours so your team can focus on printing, thermoforming and a premium patient experience.

SUNDAY STUDIO — THE DESIGN LAYER

Keep fabrication. Outsource the setup.

In-office production puts fabrication in your hands. The one step that never gets easier by buying equipment is the digital treatment plan — and it is the step that decides your clinical result. Send your intraoral scans and prescription; receive a staged treatment plan designed by an orthodontist, not a CAD technician, reviewed within a team of three, delivered within 48 hours at €190 HT per case all-inclusive. You keep production, delivery and the patient relationship.

READY TO GET STARTED

Submit your first case at sundayortho.com

Email studio@sundayortho.com **Phone** +33 7 81 25 66 54