AXTRA3D

CASE STUDY

DIE-MODELS IN THE DIGITAL DENTAL WORKFLOW

TEAMZIEREIS on Precision, the Limits of Existing Technologies, and a Sustainable Quality Leap

This case study traces their transition from a mature DLS process at its technical limits to the implementation of the Axtra3D Lumia X1, resulting in a measurable and sustainable improvement in quality.

In many digitally driven dental laboratories, traditional die models are being phased out, not because they lack relevance, but because additive manufacturing systems often fail to deliver consistent, long-term results. TEAMZIEREIS chose a different path: to produce die models with consistent, reproducible quality suitable for everyday laboratory workflows.

TEAMZIEREIS' INITIAL SITUATION

TEAMZIEREIS operates a fully digital CAD workflow based on exocad and other systems. The digital datasets were never the limiting factor; the challenge lies in the physical realization of the models. The requirements defined by TEAMZIEREIS were clear:

- Consistent, tangible friction
- Stable seating without play
- Reproducible fit across multiple print jobs
- No quality drift over time
- Minimal manual post-processing

Previously TEAMZIEREIS relied on Carbon's DLS production process. Under very specific conditions, the DLS process was capable of meeting quality expectations, particularly for die models designed using the 3Shape Model Builder.

However, despite extensive process optimization, clear technological limitations became increasingly apparent:

- Results not reproducible across workflows
- Fit and friction were not stable over time
- Outcomes depended heavily on design
- parameters and boundary conditions

Further quality improvements were no longer achievable through process optimization alone; a technological innovation was required.

THE TURNING POINT: CHOOSING THE LUMIA.X1

The solution emerged with the implementation of the Axtra3D Lumia X1. This technology uniquely combines DLP and laser exposure, elevating precision additive manufacturing significantly.

To TEAMZIEREIS, the benefits quickly became clear:

- Significantly higher precision
- Noticeably improved surface quality
- Stable fit and friction over time
- Reproducible results independent of build platform position

For the first time, the manufactured die models achieved a surface quality that TEAMZIEREIS perceived as comparable to injection-molded parts, a decisive factor for seating behavior, tactile feedback, and long-term performance.

WHY HPS AND TRUELAYER MAKE THE DIFFERENCE

The foundation of this quality leap is Hybrid PhotoSynthesis (HPS) by Axtra3D. In simplified terms, HPS combines two complementary approaches:

- Area-based exposure for speed and uniformity
- Additional laser exposure for maximum detail resolution and precision

This is further enhanced by TrueLayer technology, in which each layer is formed as a true, precisely defined layer without grayscale compromises. For die model applications, this results in:

- Highly uniform, dense surfaces
- Clean, sharply defined edges
- High dimensional accuracy across the build area
- Identical behavior from identical datasets

In applications such as die models, where friction and fit operate within hundredths of a millimeter, this combination is critical and removes all tradeoffs between accuracy, surface finish, throughput, and resolution.

TEAMZIEREIS' CONCLUSIONS

11 models per build = **80%** more output

50 minute build time = **60%** faster than before

Beyond the applications described here, TEAMZIEREIS sees substantial potential in Axtra3D's HPS-Technology for additional dental indications that were previously difficult or impossible to implement additively.

The experience with the Lumia X1 shows that HPS-Technology provides a robust foundation to meet these increasing quality demands, not temporarily, but sustainably.

AXTRA3D'S DENTAL SOLUTIONS

Our dental offerings include solutions for:

Dentures
Splints
Dental Models
Crowns & Bridges
Aligners
Surgical Guides

Which we proudly offer as Axtra Solutions™ with our material partners:

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