The Art of Dental Engineering
Our motto is: Hand in hand with our customers and partners, we lead the way in the development of innovative technologies. For us that means technological leadership and being the first to bring innovative functions to the market as well as passing on user knowledge and never leaving customers to deal with possible problems by themselves.

**Two strong partners:** hyperDENT® is a joint venture of OPEN MIND Technologies and FOLLOW-ME! Technology Systems. OPEN MIND is arguably the most innovative CAM provider in the world and the leader in 5-axis simultaneous milling for high-tech industries such as aerospace and medical engineering. FOLLOW-ME! is a spin-off company from OPEN MIND that focuses on the dental industry. The hyperDENT® milling algorithm originates from OPEN MIND; FOLLOW-ME! develops functions and interfaces. The two companies also work closely together on the marketing of hyperDENT®.

**The best of both worlds:** In terms of its composition, the development team of hyperDENT® is quite unique in the dental market. Here, experienced developers of industrial CAM solutions work alongside dental technicians with extensive user knowledge. In addition to the usual lab equipment, our fully equipped, in-house dental laboratory also contains a vast array of CAD/CAM technology from our process partners. This allows our dental technicians to check every development step for practicability in "real life" straight away.
**Internality counts:** The dental industry is a globalized sector and with many dental prostheses being supplied from abroad, the supply chain in dental technology has been internationalized for many years. Whether it be in America, Asia, or Europe, quality is a criterion that is sought and demanded everywhere. *hyperDENT®* is marketed all over the world by an international network of distributors and there is always a local service adviser on hand to provide tips and practical support.

**Quality counts:** Established dental companies such as KaVo or 3M Espe offer their customer a complete CAD/CAM process chain, consisting of a scanner, CAD, CAM, and materials. The customer has the advantage of a contact partner and service from a single source. However, a high-quality result can only be achieved using high-quality individual components, which is why *hyperDENT®* is one of the most popular CAM products in this segment.

**Flexibility counts:** In the course of digitizing dental technology, CAD/CAM system integrators have become a permanent fixture. They offer their customer the opportunity to compose their own individual process chain using various components. In terms of hardware (scanner, milling machine), they often offer a choice, but for CAM software, often only *hyperDENT®*. Besides the quality, this is attributable in particular to the flexibility of *hyperDENT®*, as machining templates can be individually produced with the aid of a template generator.

**Internality counts:** A broad network of partners in the dental industry is indispensable, as the digital process aims to meet the customer demands. *hyperDENT®* is used by renowned companies in both open and closed process chains; direct interfaces to all major CAD systems and its ability to be combined with a wide range of milling machines make these partnerships possible.
3M Espe places its trust in hyperDENT® for its Lava product series.

KaVo places its trust in hyperDENT® for its Arctica product line.

A selection of milling machine partners of hyperDENT®.
The requirements of CAM users vary. A mill center with a high part throughput will attach value to the efficiency and flexibility of its CAM software, while a smaller laboratory is likely to attach importance to ease of use and comprehensive service. hyperDENT® takes this into account with its modular product structure and has specified a product line for each customer group.

hyperDENT®: A product line for each customer group.

The newest member of the hyperDENT® product family was designed for combination with small milling machines, with any functions relating to the flexibility and optimization of production that were less essential to this application being rigorously eliminated. The hyperDENT® Compact is therefore the ideal high-end entry product for digital dental production.

hyperDENT® Classic is the flagship product of the hyperDENT® family and its design is consistent with the flexibilization and optimization of production. Functions such as auto-nesting and multiple start or the programming of freely definable indications enable an unprecedented level of effectiveness in dental production.

hyperDENT® Options: With hyperDENT® Options, an existing hyperDENT® Compact or hyperDENT® Classic license can be enhanced with additional functions that increase the added value. The hyperDENT® Template Generator, the hyperDENT® Abutment Creator, the hyperDENT® Model Creator, and the hyperDENT® Grinding Module are currently available in this product category.
**hyperDENT®**: No restrictions on restorations or materials.

High-quality CAM software must be able to cover a broad spectrum of restorations and materials so that the user can respond effectively to current and future market requirements. *hyperDENT®* does not just develop with the market, it is often a step ahead, so it is not rare for innovations to be available in *hyperDENT®* before anywhere else.

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**High-quality classic and innovative restorations** can be created with *hyperDENT®*. This means there are no limits to the standard repertoire of the dental technician (crowns, bridges, inlays/onlays, etc.). Even with innovative restorations such as individual abutments or bars for dental implants, *hyperDENT®* can demonstrate its overwhelming superiority. Complete models and occlusal splints are further examples of restorations that will soon be added to the *hyperDENT®* spectrum.

**A wide variety of high quality materials** can be machined with *hyperDENT®*. Whether working with soft materials such as zirconium oxide, PMMA or wax, or hard materials such as cobalt chromium or titanium, *hyperDENT®* always delivers first-class results. The more challenging the material properties, the more intensively the strengths of *hyperDENT®* are called upon, which is how our own patented milling technologies, for the finishing of glass ceramics for example, were developed.
**hyperDENT® Highlight: The abutment creator for the production of complex implant structures.**

Although implant-supported dentures is one of the largest areas of growth in the dental market, the production of abutments and caps is highly demanding of the technology used thanks to the extreme levels of precision that must be satisfied. The hyperDENT® Abutment Creator is a tool that is easy to operate but is also very powerful in order to meet these requirements.

The hyperDENT® Abutment Creator provides a library of millable interface geometries for the most common implant systems that can be linked with a corresponding CAD dummy geometry library. An automated geometry exchange mechanism ensures that highly precise parts can be produced even in spite of any imprecision in the upstream systems.

The hyperDENT® Abutment Template provides a range of intelligent functions for ensuring the necessary precision of produced parts. In this way, the screw fit of the screw channel machining can be milled separately and the correct drill for drilling the screw channel can be allocated by the automatic diameter detection. The interface geometry can be produced in a section-wise, tool-specific and geometry-specific manner, making this yet another aspect in which the highest level of precision is ensured.
The increasing expansion of the intraoral scanner means that the milling of complete models for dental technology will be essential as it will no longer be possible to refer back to a mold. A highly automated process is required in order for work to be as cost-effective as possible, and this is provided by the hyperDENT®.

**hyperDENT® Highlight: The model creator for the efficient production of complete models.**

In order to mill complete models as efficiently as possible, an automatic process must be used to distinguish important areas from less important areas. This must be implemented to ensure the highest level of precision, for example in the stub segments, on the gum line, and in the contact point connections. In contrast, very rough processing can be performed on a number of other areas of the model. hyperDENT® detects these different areas automatically and corresponding strategies for each individual area are already stored in the model master template. Less important areas are therefore machined using only a few roughing strategies in order to save time, whereas more important areas are subject to highly precise processing using various additional finishing strategies.
Glass ceramics and other composite materials are the future of dental technology as they offer some considerable advantages over conventional materials in terms of aesthetics and service life. However, these materials are often considerably more demanding than conventional materials with regard to machining, making this an area in which the quality of the CAM software is essential.

*hyperDENT® Highlight: The grinding module for effective polishing of glass ceramics.*

The machining of glass ceramics by means of classic milling strategies and milling tools places a great amount of strain on the milling tools. Particular machining strategies are required if the service life of the tools is to be optimized. *hyperDENT®* therefore uses patented peeling strategies for the machining of glass ceramics, making use of the entire length of the tool and therefore working in a far more tool-friendly way than classic milling strategies. This intelligent motion control additionally ensures optimum processing time and the highest quality results.
Intuitive operation, quick calculation and milling, and high-quality results are the factors that the customer expects from CAM software. No other CAM software offers such good performance as hyperDENT® for all of these factors collectively, and this is the reason for the technological leadership of hyperDENT®.

**hyperDENT®**: Quick, simple, and reliable.

**Extreme user-friendliness** or a high degree of automation of the CAM software is essential for the dental user, as he or she often has only little experience in CAM programming. hyperDENT® provides a series of functions that simplify the workflow and also contains a series of functions that work automatically in the background and relieve the user of the corresponding work steps.

**High application performance** of the CAM software is demonstrated firstly in the calculation and milling times and secondly in the stability of the process. The calculation times of hyperDENT® are also so short because the calculations are delivered to all the processor’s cores due to the multi-core support. The stability of the milling process with hyperDENT® is due in particular to various sophisticated collision controls, which prevent milling accidents from the outset.

**The final quality** is demonstrated in the fit and surface quality of the milled dental prosthesis and both factors are strongly influenced by the quality of the underlying tool paths. hyperDENT® can draw on the wealth of high-end milling strategies of the company OPEN MIND Technologies, which are arguably the best in the whole CAM field. Parts manufactured using hyperDENT® therefore also stand out due to the particularly high final quality.
A machining template is the 'script' for producing a customized part, as it is also used to specify the corresponding strategies. In other CAM systems, the manufacturer often reserves the right to write this 'script' – but this is not the case with hyperDENT®.

**hyperDENT® Highlight: Create individual machining templates with the template generator.**

It is essential to have the flexibility to react to customer requirements, but it is also very important to have the flexibility to directly deploy other material or tool partners in the course of processing. However, if the machining template you are using cannot be individually designed or adapted, then you do not have this flexibility.

Users of the hyperDENT® template generator, on the other hand, can conveniently select their machining strategies via a dialog box and set the parameters for the strategies to correspond to their requirements. This means that materials and tools are freely configurable.
Automated nesting of indications in the blank can save a great deal of time and money.

Users can save time as they can use an automated technique to place the indications within the part blank. What is potentially even more important is that the placement is performed so well that the user does not need to make any manual corrections. This is the result of a very intelligent algorithm.

Users can save money as the existing spatial conditions are optimally exploited during the placement of the indication in the blank. This requires there to be an overlap of the milling boundaries of the indications, for example. An intelligent algorithm is also necessary here – this was developed by FOLLOW-ME! and is now available in the hyperDENT® Classic.
The Art of Dental Engineering.

Dental engineers and artists typically share a similar approach to their work – leaving behind the traditional methods and paradigms in a process of creative destruction, and then using inventive ways of thinking and acting to develop new solutions. This is the similarity that we seek to express through our concept of art. The artist Gabriele Stieghorst therefore continuously designs new series of images in which she paints over technical designs from our hyperDENT software, transforming them into unique works of art.

(All designs in the series can be found at: www.gabriele-stieghorst.com/Art of Dental Engineering)