AI-Driven Growth of DSOs

The dental practice landscape has changed substantially over the past two decades, as a consolidation of solo practices has resulted in increased numbers of multi-location group practices, with significant growth coming from the administrative support of Dental Support Organizations (DSOs). The concept of the DSO originated in the early 1990s, with a new business model that sought to handle the nonclinical operations of a dental practice to allow clinicians to focus on what they do best—dentistry. DSOs would contract with a dental practice to provide the necessary business management support that was previously borne by the practice owner. Additionally, by supporting multiple practices, DSOs could better negotiate equipment costs, manage insurance reimbursements, and roll out technology. This model caught on in a short period of time, with many dentists flocking to these partnerships.1

DSOs have been at the forefront of adopting technology that demonstrates value-add to their businesses. Hence, DSOs have been quick to identify artificial intelligence (AI) as a transformative means to support their business and clinical processes to benefit patient care. Specifically, AI can unlock clinical insights to inform practice affiliation and post-affiliation onboarding. Next, it can help support a standard of care across practices for compliance. And finally, AI technology can improve practice performance through the use of visualization tools to support dentists with patient treatment discussions and professional development of associates.

DSOs have built a powerful value proposition to support dental practices, and a key way in which DSOs expand is through practice affiliation.2 In December 2019, Heartland Dental became the first DSO in the United States to pass the 1,000 supported office mark.3 Smile Brands has more than 650 affiliated dental offices, and North American Dental Group (NADG) is currently at 245 practices and continuing to grow. The way in which a DSO assesses the risk, value, and potential of each practice affiliation is dependent on many proprietary factors; however, prior treatment norms can be critical.4

Traditionally, in the context of prospective affiliations, DSOs take a small sample of patient charts to understand the existing standard of care and other attributes of the patient population. Dental AI unlocks the ability to complete this review in detail for every patient of the practice and provide detailed data to support clinical and business decisions on an affiliation. Understanding the scope of dentistry by the legacy dental team can greatly help shape future conversations, assess risks, and identify opportunities before an affiliation is finalized. Moreover, after an affiliation, practice- and patient-level insights can inform a clinical and operational onboarding plan, which can be monitored centrally through practice reports automatically generated by AI algorithms and analytics.

To solidify this point, consider that every radiograph, both historic and recent, can be analyzed during due diligence to identify important clinical, business, and patient factors that influence...
the affiliation decision. For example, these factors could include the following:

- the percentage of edentulous spaces that exist in the current patient pool, indicating a potential for implants and hard- and soft-tissue grafting (See Figure 1 for an example.)
- the proportion of Class 2 and Class 3 carious lesions that have yet to be treated (Figure 2 and Figure 3 show examples of this AI-powered analysis.)
- the periodontal health of the practice (See Figure 4 for an example of an AI-powered analysis.)
- the proportion of existing crowns and restorations that have recurrent decay, and how old they are (Figure 2 and Figure 5 show AI analyses examples.)
- the proportion of posterior teeth that contain amalgam restorations encompassing 50% or more of the coronal area, and the age of these restorations

As dental AI proliferates and increases quantification of the clinic, practice brokerage firms may themselves release detailed, standardized data extracts powered by their artificial intelligence vendors to potential partners or acquirers. An example of this concept can be found in the automotive sales market. The Carfax® report and similar data reports have emerged as a standard document exchanged between buyers and sellers to establish a shared fact base on the accidents, service history, and potential valuation of a vehicle. In the future, the dental industry may have its own AI-powered standardized reports on the clinical, business, and patient data for a practice.

Undoubtedly, the deeper quantification of practice data will impact the strategy, valuation, and operational integration of DSO practice supported affiliations.

**Comprehensive Chart Review**

Assessing compliance, risk, and utilization becomes increasingly important as an organization grows. As the number of supported offices increases, the ability to provide supported dentists with data to review and understand their standard of care becomes crucial as the liabilities of not doing so can grow.

Improvements in AI analytics allow an organization to better understand the pulse of a dental practice. DSOs can provide supported doctors with tools to track metrics and answer questions such as whether all patients are in compliance with updated medical histories, what proportion of patients in the practice/organization have perio charting or outdated charting, and what part of the patient pool is without radiographs or hasn’t had updated radiographs within 18 months. AI practice support can not only allow these questions to be answered and tracked, but also create alerts to help the supported dentist understand missing outstanding information, which helps reinforce best practices within the supported office.

In addition to tracking clinical protocol metrics, having the ability to automatically quantify and track treatment outcomes can help support higher levels of care. For DSOs striving to provide...
the best data and information to supported dentists, AI analytics help the dentists identify areas to improve consistency and quality. For example, AI algorithms can review radiographs and assess the quality of obturation for root canal therapy teeth or marginal seal on cemented crowns. By being able to quantify the quality of treatment performed, AI can assist in identifying areas for targeted continuing education courses to help improve patient care and outcomes.

Many businesses and healthcare organizations have embraced the concept of dashboards to display key performance indicators. Frequently, large television screens are mounted around the work area to display metrics in real-time and reinforce organizational priorities. With the advent of dental AI, these dashboards in the dental clinic can move beyond traditional business metrics and now encompass oral health objectives and outcomes. For example, among the current week’s regular hygiene appointments, how many patients appear to have untreated periodontitis and how many of these patients has the practice scheduled for an appropriate follow-up treatment? Change management is difficult for any organization. For DSOs looking for ways to provide data to supported dentists so they can add value to their affiliated practices, AI software can provide new tools, rich with clinical and business insights and configurable for the specific business and clinical objectives of each practice. Tactics for operationalizing these metrics include dashboards displayed around the office, weekly email reports, provider-specific scorecards/dashboards, morning huddle dashboards, and end-of-day reports.

**Clinical Performance Enhancement**

As dentists graduate from dental school, they typically look for a practice that incorporates the latest in dental technology, high standards of patient care, and a consistent patient flow. By having the business acumen and financial means to invest in advanced technologies across the entirety of its organizations, the DSO-supported model is increasingly attracting dentists. Whether a young graduate or transitioning owner, a provider can feel supported to offer the highest quality of care to their patients. Most students who have recently graduated have had some exposure to digital technologies, whether through 3D-printed models, CAD/CAM, or guided implant surgery. Soon, dental AI is likely to be added to the technology curriculum that dental students study. Graduates rightfully expect that their exposure to and utilization of technologies does not get left behind after dental school and that these technologies will be part of the office workflow where they will be employed.
Through a more thorough and complete understanding of a patient’s oral health, artificial intelligence allows for better treatment planning, patient understanding, and clinical output. Machine learning algorithms can, for example, detect and visually identify caries, periodontal disease, and compromised restorative margins (Figure 6). In the operatory, this visualization feature can serve two purposes. First, it helps reinforce previous training for newer dentists leaving the academic setting and acclimating to the busy rhythm of active practice. Second, visualizations support effective communication by dentists who must explain their diagnoses and receive patient consent for the recommended treatment plan. DSOs can know they are equipping their affiliated dentists with the latest software to support diagnoses founded in evidence-based science and optimal communication in the operatory. Patients receive the right recommendation at the right time, and dentists can feel confident and comfortable in both their understanding and communication of treatment.

Now more than ever, DSOs are striving to make investments to support their clinicians and their respective offices not only because they understand the expectations of a new generation of clinicians, but they realize the value technology can bring to the patient. At the end of the day, it is the patient experience that is at stake, and bringing technology to the forefront of their clinical armamentarium can help practitioners acquire new patients and provide better care to existing patients.

**Specialty Referral Support**

The power of AI can also be applied by DSOs to support affiliated dentists when they consider making specialty referrals. Oral surgery, orthodontics, and periodontal treatments are likely to be early areas where AI analysis on radiographs may help DSOs and affiliated dentists track the potential for referrals. For instance, the ability for AI to detect tooth number, clinical crown, mandibular and maxillary bone allows for the assessment of the percent impaction of wisdom teeth and their associated angulations. With respect to orthodontic recommendations, spacing, crowding, tipping, impacted canines, and potential space discrepancies with erupting dentition can be measured and scored. Combining these findings can help to drive comprehensive multispecialty treatment planning if needed and patients can benefit from understanding the complexities of their oral health during their initial visit with their dentist. Figure 7 shows examples of AI-powered analysis in this area.

**Conclusion**

Dental Support Organizations have been at the forefront of adopting new technological innovations with affiliated practices. Dental artificial intelligence holds early promise to support the underlying mission of DSOs to help affiliates reach new levels of business and clinical excellence. From the decision to affiliate with a practice, to the morning huddle at the clinic, to the ultimate patient experience in the operatory, AI will be an important tool for DSOs and the dentists they support.

**REFERENCES**