The Precision Medicine PARADIGM for Dental Sleep Medicine

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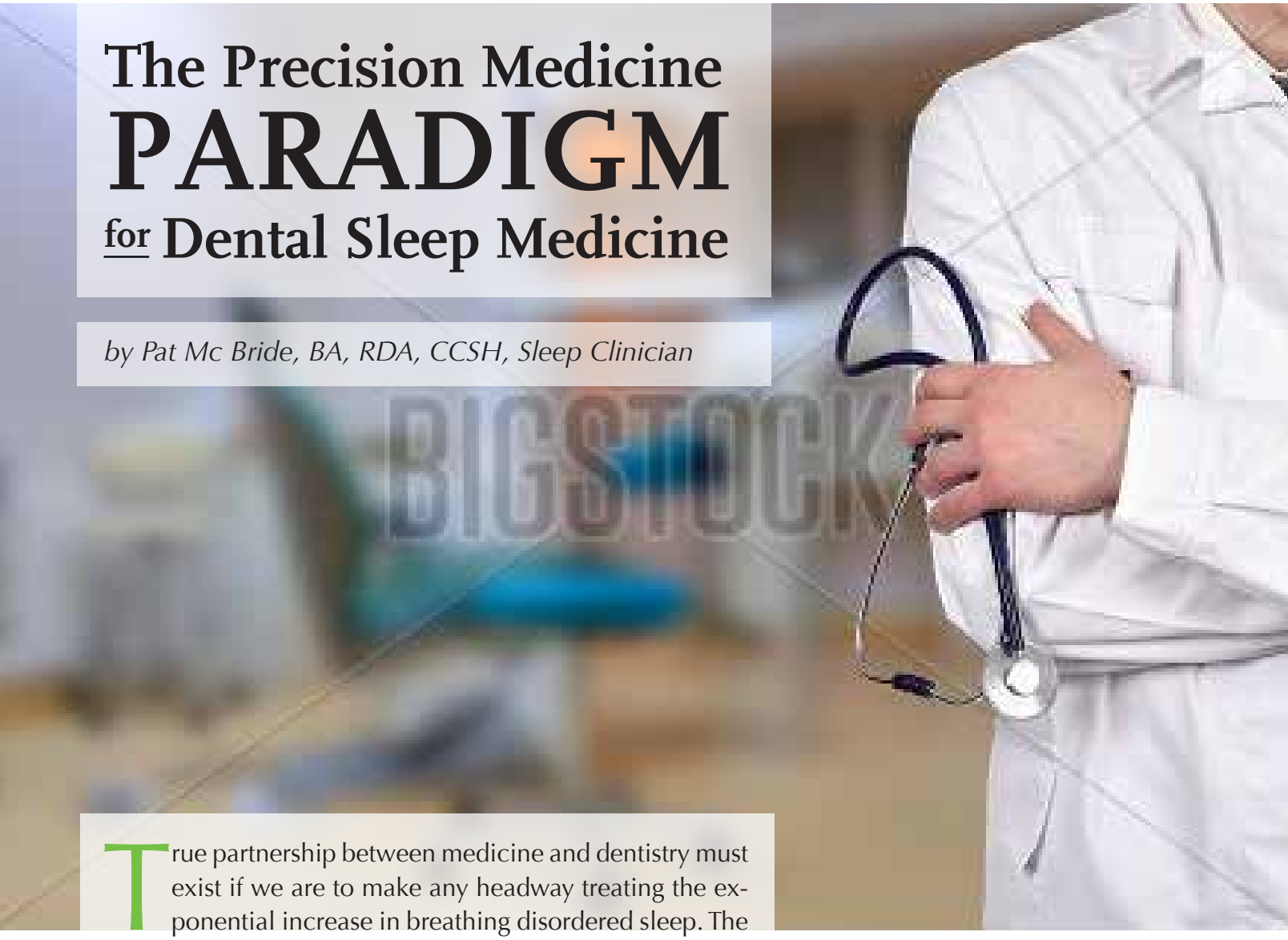

True partnership between medicine and dentistry must exist if we are to make any headway treating the exponential increase in breathing disordered sleep. The days where a one page medical history in a paper chart sufficed in most practices is long gone, replaced by behemoth systems with digital forms compiling massive amounts of patient health data; all of which must be carefully reviewed prior to definitive diagnosis and treatment planning.

Electronic health records (EHR) – already a mainstay of medical practice – will soon be mandated for the dental practitioner. Patient portals must be opened for access to records and a seamless correspondence back and forth between physician, dentist, laboratory and patient. Moving a general dental practice into one that includes a medical model can be overwhelming when one takes into consideration balancing the dental aspects of the practice with the demanding needs of medical patients. When a practice partners with and relies upon community physicians to care collectively for patients, a comprehensive and precision medical system must be carefully established. Don't question whether a small practice just starting to treat sleep can "afford" to implement a medical system any longer, it is the future of medical management and treatment for SDB is medical. You cannot afford not to.

SF Bay Area based Mike Selleck, DDS, DABDSM began his sleep medicine practice years ago the way many of our colleagues have with the tragic loss of a friend who pulled a C-PAP mask off in the night and died. Devastated, he looked for answers and his journey towards a medical model began.

When the issue of documentation and communications with physicians became one of being "detached" he embarked on the path to fully incorporate "their" hospital-based EHR. "It didn't take long to realize that without a means by which we could connect directly with the physicians, labs, and patients and they with us systematically care provision and management was going to be chaotic. Yes, it was a nightmare to get it all going, but the level of communication, quality of care and clinical outcomes has risen substantially. The patient's perceptions of the quality of care and concern they receive have also drastically improved that if we had to, we'd do it all over again in a minute. We have become a 100% physician referral source for the kind of care management we offer firstly because we serve the underserved, and secondly because we can move seamlessly back and forth through the system with effectiveness and efficiency."

Gilles Lavigne's brilliant placement of the Wikipedia definition of Precision Medicine in this issue's article states essentially that it is the tailoring of medical treatment to the individual characteristics of each patient (https://en.wikipedia.org/wiki/Precision_medicine), taking into consideration genetic predisposition, health status, lifestyle, culture, race, sex, biological and environmental risk factors. It is an advanced decision making process.

In other words, precision medicine takes into account individual differences in the genes, environments, and lifestyles of people allowing the design of targeted disease interventions from the start. What does this mean? In conventional medicine, our patients are treated individually but more often than not they are treated with the same prescribed therapies that everyone else with the same disorder gets. The downside is that with this model, individual differences get overlooked. One cannot know which therapies will work and have fewer side effects for one set of patients over another. Precision medicine uses health information technology to integrate medical history into patient centric approaches, improve health and treat disease all while focusing on targeted longitudinal care outcomes. Oddly enough this individualized methodology actually requires a population-based perspective. Primary is learning what works and does not work for a person while at the same time knowing that causality cannot be inferred on one person at a time. The information gathered from an individual must be compared against that of large numbers of other people in order to recognize individual characteristics that are important and identify relevant population subgroups that are likely to respond differently to treatment. Allowing for large data sets that includes all strata of patients affords for less bias and unreliable disease prediction models. Precision medicine's current focus is on treatment; the real future plan gives attention to early detection and disease prevention, which of course applies to everyone.

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Understanding the complexity of SDB and the attendant comorbidities is essential for the dentist partnering with physicians. Within the EHR are numerous areas where patient data regarding health status, medications, lifestyle and comorbidities are noted. Careful review of this information aids tremendously in definitive diagnosis and treatment planning. As an example, when the

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dentist reviews data prior to patient intake he/she may note not one, but two or three medications for hypertension on board. What that tells us before we ever see this patient with diagnosed OSA is that they also have a level of brain damage resultant of the OSA. That brain damage acts to perpetuate the OSA syndrome and the patient ends up with high set point hypertension that is medication resistant. Treatment for this patient may resolve the OSA with C-PAP or combination therapy but not always. If they are PAP resistant/fail your treatment plan of oral appliance must also include assessment and management of the hypertension as well as the OSA by monitoring the patient's BP at every visit, asking whether they have taken their medications regularly and if necessary referring them back to PCP if it remains too high. But, you also must be completely informed as to what the BP norms for this patient are by age, sex, and comorbidity factors. During treatment, certain levels of resolution of the respiratory disturbance index numbers can be achieved, but could hit a "stopping point" where the dial simply refuses to move; the brain just cannot cope with anything else. This is where the impact of the comorbidity factors in.

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All patients whether child or adult, man or woman presents differently with inspiratory flow limitation (IFL), upper airway resistance syndrome (UARS) or OSA. The factors mitigating and influencing treatment selection will be precise to each age group and their particular sets of accumulated data. Information recently discovered and published by Dr. Ron Harper et al out of UCLA notes that SDB patients are routinely deficient in Magnesium and Thiamine (B1) especially if they sweat in their sleep. Understanding, monitoring and treating nutrient deficiency is well within the treatment paradigm for sleep disordered therapy. Ergo these levels must be reviewed and adjusted throughout therapy. A strong understanding and partnership with the patient's MD can make this a much easier process. Stasha Gominak, MD's work on D3 deficiency in SDB and neurology patients is groundbreaking, and should be foundational in assessment and treatment for sleep patients. D3 plays an important role in sleep. The pacemaker cells of the brainstem appear to directly impact the timing of sleep. Most people walk around these days vitamin D3 deficient simply because we don't go into the sun like we used to years ago. Vitamin D3 isn't a vitamin at all, it's a hormone absorbed by the skin, turned into cholesterol and used by the body appropriately. For good sleep levels should be 60-80 ng/ml. Most of our OSA patients tested with levels well under 30 or significantly deficient. If a patient takes a statin drug it further blocks what little vitamin D3 the body gets from the sun. Correcting D3 levels can substantially improve sleep and the attendant daily headaches, digestive issues (GERD), as well as initiation and maintenance of sleep. Additionally, if that same patient is deficient in thiamine and magnesium takes a statin and has leg cramp/muscle issues, can you contact the prescribing MD through EHR and discuss changing the dosing time of day to help alleviate the leg cramps, and improve sleep fragmentation? Often moving a dose to a few hours earlier in the day allows the patient to "walk off" the cramp/twitch side effects. If there is communication with the MD regarding the collective comorbidities and presentation complaints, these issues are easily handled and quality of clinical outcome improves. This access and open line communication is a hallmark of precision medicine and centers on patient need based on presentation and symptomology criteria. Having scientific knowledge of and evidentiary support to share with your physicians always advances your cause and helps your patients. Constant vigilance is required with regard to obtaining education regarding new data and therapy discoveries. These are just a few examples of the global diagnosis and treatment thought process required of the dentist who embarks upon treating the SDB population. Definitive testing and MD diagnosis of the disorder is always required prior to embarking on alternative/adjunctive therapy for the SDB patient.

There is no way treating the SDB community of patients can be a turnkey or cash cow revenue producing operation. Besides, in my experience, a turnkey is only ever as good

as the person turning the key. Anything quick and easy will never factor in longitudinal health outcomes, tends not to be patient centric or participatory, does not provide public education or address the health concerns of the underserved. There must be access to care for every level of the economic strata, and specific treatment paradigms established to ensure that care is provided at the highest level with utmost efficiency.

Being patient centered should be a core value for all physicians and dentists. If we are to look at a metric design for care provision in this manner we must start with the clinician first. Does he or she have specific curiosity regarding the patient's disease process and the four dimensions of the "illness experience?" Our job when a patient either presents or is referred into our care is to first establish rapport. We must both elicit and understand the patient's feelings about their diagnosis, their actual level of understanding of what is wrong with them, the impact the disorder has on their ability to function during the day, and finally their expectations as to what should or can be done. Critical is the ability and desire to understand the patient as a whole person. Longitudinal treatment success can only be achieved if the dentist and patient can find common ground regarding the management of the disorder. Common ground incorporates patient education and participation in the entire process of walking towards wellness. This doesn't mean that the patient directs the care, but rather that the dentist operates in an realm where they can respond fully to the unique needs of the patient, and address appropriately issues as they come up during treatment. When the patient is placed at the center of the care metric and perceives a common ground with the dentist, they accept recommended treatment options more readily, will cooperate with referral out of the DDS setting into an adjunctive therapist or MD providers practice for associated care, participate in the process directly and take responsibility. Patients who have providers who actively promote precision report feeling better faster, have higher levels of care satisfaction, have fewer complications and report improved health status overall [Impact of Patient Centered outcomes].

Whether you have been treating the SDB patient for a long time, or are just starting out, expanding into a medical model that places the patient at the center of the paradigm is essential. Use the technology and a precision medical model to improve the level of care for your dental patients as well. Whatever it takes to turn your vision to the future and improving everyone's health status is time and money well spent. Educate yourselves as to what options exist for your practice and demographic of patient. Dentistry has so much to offer the medical community in terms of supportive care and concern for the patients. It needs to be diligent in its mission to join with the medical community fully engaging the sleep-disordered patient in a management model where patient needs are addressed as fully as possible. What dentistry absolutely does not want is for the medical community of peers to view us as cavalier or myopic in our understanding of the seriousness of this issue. There are millions of unscreened and as yet to be diagnosed people suffering. Make it your goal to reach out and touch as many of these people as you can, if even just to screen them and make them aware. You may never treat them with an appliance or other dental therapy, but you may educate them and perhaps save their life. DSP

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