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## Reimagining Clinical Practice

# Teleorthodontic Technology and Its Impact on Workflow, Workforce, and Access to Care

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### Abstract

The dental profession has experienced significant technologic innovation in the first two decades of the 21st century. Clinicians on the advancing edge no longer speak about going digital but instead speak about breaking free of the physical tethers in conventional practice and truly going wireless. This does not just refer to using wireless digital scanners or tablets chairside, but deploying wireless technology to physically relocate the office to each individual consumer. Teledentistry is in its infancy but has already lowered costs and provided greater access to care for many consumers. This paper discusses how teleorthodontics is not only leveraging technology to deliver care but it is making the dental profession rethink elective orthodontic treatment itself.

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Critical evaluation of the transition from analog to digital in healthcare delivery that occurred over the past two decades has taught us many lessons. First and foremost, technologic innovation adds value only if it improves clinical efficiency and patient outcomes. In the case of the electronic health record (EHR), the jury is still out on whether or not the large cost and effort spent on developing and deploying this technology has translated to any significant improvement in quality of care and treatment outcome. It could be argued that the EHR is merely a more cumbersome carbon copy of the paper chart. The EHR's potential was not in its ability to alter the process of capturing and recording clinical data but in how that data could be accessed and analyzed.

Dr. Robert Wachter, chair for the department of medicine at the University of California, San Francisco School of Medicine, in his keynote address at the 25th annual conference of the American Telemedicine Association, discussed why health care is just beginning a meaningful transformation post-digitization.

In his book, *The Digital Doctor: Hope, Hype, and Harm at the Dawn of Medicine's Computer Age* (Wachter, 2015), he describes the four stages of health IT: digitizing the record; connecting the parts, such as third-party applications to enterprise systems; deriving meaningful insights from the data; and translating those insights into a plan to improve value.

We have been successful at completing the first two stages but are only beginning to crunch the data and change processes. Healthcare IT has been mired in a productivity paradox (Brynjolfsson, 1993). That is to say that the anticipated benefits of technology use are not being seen. The explanation for this is that many tech tools were built for the purpose of delivering care in the same manner as before rather than rethinking the work itself. Wachter (2015) argues that the two keys for unlocking the productivity paradox are improvements in technology and reimagining the task at hand.

### Reimagining Orthodontics

Variation in teeth and jaws negatively affect appearance: It is not a disease or a pathologic process (Ackerman & Burris, 2017). Society has perceived some naturally occurring biological and physiological processes, such as skin wrinkling, as ailments or disease. Wrinkles will invariably affect every man and woman in the world at some point in their adult lives. A normal process has essentially become medicalized.

Medicalization is the process of making a condition a disease or disorder: people suffer it (patienthood), the causes are physical, it requires and demands treatment aimed at cure or relief of symptoms by persons licensed in the healing arts, and this model of the condition will be

accepted by society out of interest in the health of its people (Ackerman, 2007). The idea that any deviation in occlusion from the theoretical ideal is abnormal represents the medicalization of orthodontics. Malocclusion becomes a condition in need of therapy.

Enhancement in contemporary society is to change the naturally occurring states of the individual's body or mind in the hope of increasing their inherent capacities beyond normal. Enhancement is qualitative and cannot be measured by model gauges or cephalometric superimpositions. It is very subjective and is measured by the individual. In orthodontic practice, therapy and enhancement are overlapping classifications. All therapies with successful outcomes are enhancing, even though not all enhancements with successful outcomes are therapeutic. The problem with trying to separate enhancement from therapy is that they both need to be included in the definition of orthodontic health.

Orthodontic health should be defined as the attainment of those desired dentofacial traits that the consumer perceives to be consistent with a state of complete physical, mental, and social wellbeing (Ackerman & Burris, 2017). Ninety-eight percent of orthodontic patients are undergoing treatment that is elective and just two percent of patients are receiving "medically necessary" orthodontic treatment. It is our job as professionals to make the consumer aware of which group they

fall into when discussing need.

Elective care should not be viewed as necessary if it's not medical in nature but rather important from a sociocultural perspective. We must not be paternalistic when it comes to a consumer's desire to become better.

### **Orthodontics and Its Love of Analog**

As an orthodontic resident 20 years ago, I was required to take ten sets of alginate impressions, pour them up in plaster, trim the bases to exacting standards (American Board of Orthodontics Trim), and then polish and soap them. This process lasted for several months and, much like most of dental education, the mechanical took precedence over the intellectual. Somewhere in a cardboard box in the archive of my residency program those ten models sets are in some stage of decay. While we tinkered in the plaster lab, the digital model revolution had begun prior to graduation. It was now possible to send your alginate impressions to be scanned and then via electronic transfer you could receive a digital analogue of study models. Before I left residency, plaster trimming had already become outdated. The interesting thing about digital models is that they are created with American Board of Orthodontics bases attached and mounted in occlusion on the

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computer screen. Rather than orienting the casts as they would sit naturally oriented within the craniofacial complex, the electronic models are “trimmed” with the bases parallel to the occlusal plane, mimicking their analog predecessors.

Orthodontists are halfway free from the productivity paradox. High resolution intraoral digital scanners are replacing alginate impressions and the images of the arches can be oriented in the position in which they occupy in the craniofacial complex. However, most orthodontists have not reimagined the workflow and how digital models fit into clinical practice. Digital models today add value by simultaneously giving the clinician diagnostic data while at the same time serving as a working model for appliance fabrication.

### The Birth of Teleorthodontics

More than 60% (1,972) of the counties in the United States do not have an orthodontist’s office (U.S. Dept. HHS, 2017). A significant disparity exists between the economically advantaged and disadvantaged population’s access to orthodontic care in the United States. From 2006 to 2015, Medicaid expenditures and reimbursements have decreased (Minick et al., 2014). This has led to many orthodontists not accepting patients from this social program. Orthodontic care continues to be rationed in state Medicaid programs through the use of arbitrary scoring indexes which favor treatment of more complex conditions. Orthodontic treatment that is deemed not “medically necessary” is not approved. Many of the indices used to determine orthodontic need do not consider the esthetic component of poorly aligned teeth. This is despite the 2017 World Health Organization’s definition of oral health which includes being free of diseases or disorders that impact an individual’s ability to smile and their psychosocial wellbeing.<sup>1</sup>

The access to care crisis in orthodontics for patients who desire limited tooth straightening continues when they age out of the Medicaid program. A national orthodontic practice study found that the average cost of adult orthodontics was \$5963 in 2015, an increase of nearly \$1000 from a decade before (Keim et al., 2015). The American Association of Orthodontists released a white paper on access to orthodontic care in 2006 acknowledging that the cost of orthodontic care is a major barrier.<sup>2</sup> The proposed stop-gap solution was to encourage more of their members to donate free orthodontic services to the less advantaged. Twelve years later

there has not been a more robust and sustainable solution offered by AAO.

Technologic advancements in the delivery of clinical orthodontic care have lowered practice overhead, shortened treatment time, and placed less of a burden on the orthodontist. Most orthodontic practices can see far more patients per day than ever before. However, in a recent survey of orthodontists no participant was “too busy” to treat all persons requesting appointments (Keim et al., 2015). Two leading factors that have created excess capacity in the contemporary orthodontic delivery model are cost of treatment and the burden of time away from work or other activities for the patient.

There is ample evidence in the scientific literature that confirms the efficacy of teledentistry and how it increases access to care for the patient (Irving, M. et al., 2018). The new orthodontic delivery model of doctor-directed at-home clear aligner treatment facilitated by teleorthodontics has the potential to bridge the gap in the access to care divide. Patients who for many different reasons had been previously denied access to orthodontic care now have a viable option for addressing front-tooth alignment issues and improvement in their social smiles. The American Teledentistry Association, in a recent position paper on teleorthodontics, concluded that it is a low-risk, effective method of orthodontic delivery that increases access to care and reduces costs for the patient.

There are a few technology advancements which make teleorthodontics possible:

Software like uLab allows doctors to easily, efficiently, and effectively

start using it with minimal training; the majority of the interface is touch-based and is very intuitive.

The cloud and internet, especially 5G technology, enables instant sharing and cases can be treated from afar.

The most portable devices, like portable x-rays and oral scanners, make dental record acquisition more possible in hard to reach areas than ever before.

Fast shipping logistics powered by internet companies can deliver any device around the world in just a few days.

## Barriers to Teleorthodontics

There has been a great deal of confusion about the definition of teleorthodontics which has unfortunately negatively influenced orthodontists, state dental boards, and the lay public.<sup>3</sup> Teleorthodontics is the delivery of health information and orthodontic care across distances using information technology and telecommunications. Teleorthodontics encompasses diagnosis, treatment, monitoring and prevention, continuing education of providers and consumers, and research. Do-it-yourself orthodontics has been used synonymously with both teleorthodontics and dentist-directed at-home clear aligner treatment (Kravitz et al., 2016), when in fact, do-it-yourself orthodontics refers to a consumers' self-directed efforts to move teeth without the supervision of a dentist.

## Conclusion

Value in health care is only increased when technologic innovation forces the rethinking of workflows, induces a necessary reduction of the workforce, and lowers costs to increase access to care. The nascent practice of teleorthodontics is already lowering costs and providing greater access to care for many consumers. Unfortunately, this mode of practice allows individual clinicians exponential capacity in their practices which in turn has the potential to cause a busyness problem in the current saturated orthodontic market. Organized dentistry has yet to understand this reimagining of limited, elective orthodontic treatment, and their knee-jerk reaction has been to legislate against it. As clear aligner tooth-moving technology continues to improve at a rapid pace and more stakeholders in delivery and receipt of orthodontic care continue to seek this type of elective care, orthodontics will free itself from the productivity paradox. ■

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