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Modern Technologies and Orthodontics in 21st Century

Orthodontics is the first specialized branch in Dentistry. For the last 100 years it has seen significant technological advancement.

However, the principal philosophy governing the practice of orthodontics did not advance as much in orthodontic field as other branches of medicine. For example, the contemporary medicine has made significant advancements when compared with the medical practices of a century earlier. The same cannot be said for orthodontics. Arguments still exist regarding the decision of extraction versus non-extraction in orthodontic treatment just as Drs. Angle and West did 100 years ago. The treatment results of modern digital orthodontics are not better than similar cases finished by Dr. Angle, Tweed, and their contemporaries many decades ago. An orthodontist from 50 years ago, if they travel through time to 2022, could practice modern orthodontics with relatively few modifications. The modern orthodontic technologies may be dazzling on the surface but very little is changed in the core principles governing the diagnosis, treatment planning, and treatment of malocclusion.

Why is there an absence of advancement in orthodontics when compared with other medical fields? It is unthinkable for a medical doctor to practice his specialty using the knowledge and technology of a decade or 2 ago. However, that is exactly what many orthodontists are doing at present. The reasons may include many factors.

First, on a fundamental level, we simply do not have the correct understanding of the biological mechanisms of how teeth are moved in orthodontic treatment. It is now known that Reitain's pressure-tension hypothesis of tooth movement not only failed to explain how teeth are moved but it may be a reason prohibiting any new technology that will promote quick, less painful, and more efficient orthodontic tooth movement. New developments in orthodontics requires a proper understanding of the mechanisms of tooth movement.

Second, considering malocclusion as a disease could possibly be another reason for the absence of advancements in orthodontics.

A disease has an etiology, which in turn directs research to understanding the etiology of the disease (malocclusion) and methods of removing the etiology as the principle of treating the malocclusion. Orthodontists are fully aware that malocclusion may be traceable to certain causes, but removal of the "etiology" of malocclusion will not result in elimination of malocclusion. This obsession of treating malocclusion as a disease by orthodontists and directing our clinical and research efforts to find the etiology is misguided and led us to a dead-end.

A third potential problem in orthodontics is the misuse of 'Big data analysis.' The idea of Big Data analysis has led to many misguided research proposals and research efforts. Decades later, the aforementioned research has only resulted in inconclusive results and a waste of research efforts and resources.

In sum, orthodontic education must be fixed. The present orthodontic educational model has generated orthodontists who know how to treat malocclusion but do not possess the potential to improve and advance the orthodontic field as do our colleagues in the medical fields. We should abandon old orthodontic concepts and think 'out of the box.' We need new thinkers, new concepts, and new discourse. New technologies are only as good as the orthodontist who must choose how and when to apply them.

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