A 2020 Vision of Orthodontics – How Technology is disrupting “Business as Usual”

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The Queen Elizabeth

Boeing 707

Dagwood’s Teeth Replacements

Making predictions is very hard, especially about the future.

Yogi Berra

With the Valuable Help of...

- Arlen Hurt
- Atlanta Orthodontic Specialists
- Bryan Delano
- Clint Berry
- Dave Ternan
- Dr. Doug DePew
- Kathleen Stenersen
- Reid Simmons
- 3M Unitek
Orthodontic Future Shock

- Invisalign
- New Kinds of Appliances:
  - Metals → Ceramics
  - 3D Printing – Models → Appliances
  - IoT – Embedded Sensors
- Growth of Dental Group Management Practices
- Growth of Dental / Orthodontic Tourism
- The Browning of America
- Patient Centered Healthcare
**The rise of the expert non-expert**
- Generalist dental practitioner upsetting traditional role of the specialist orthodontist
- Almost pervasive lack of recognition by patients of the professional capabilities of the specialist orthodontist
- Generalist is equipped to address the needs of a patient as a “whole.”
- Comprehensive dental treatment adding to the convenience of care under “one roof.”

**Dental Tourism**

**The Browning of America**
- The Great Shift, the Browning of America.
- Orthodontic practices must understand the various cultures within their patient base, and
- Make some accommodations for the changing demographics of their communities (such as having some bilingual staff members).
- Cultural Issues – What does a nice smile look like?

**The Mobile Explosion**
- There are 7 billion people in the world.
- 4 billion use mobile phones.
- Just 3.5 billion own toothbrushes.
Integrating Mobility into Practice Management

Accelerating Intraoral Scanning

What is Augmented Reality?

Augmented Reality in Orthodontics

Dead Phone Lines

"The Americans have need of the telephone, but we do not. We have plenty of messenger boys."

– Sir William Preece, chief engineer, British Post Office, 1876

World’s Smallest Lithium Ion Battery
**400 lb. Bioplastic Cornerstone** for Canal House in Amsterdam

**Bionic Ear**

**3D Printing in Orthodontics**
- 3rd Party Specialty Manufacturers
- Printing of Models in Orthodontic Offices
- Printing of Appliances on Orthodontic Offices.

**Continuous Liquid Interface Production**

**Orthodontics – New Appliances**
No Need For Home Computers

"There is no reason for any individual to have a computer in his home."
– Ken Olsen, founder of Digital Equipment Corp.

Printing Electronic Devices

- 3D printed working electronic devices printed with a new type of plastic, called "Carbomorph", that conducts electricity.
- Printed a simple computer, a glove containing flexible sensors and a mug that knows how full it is.

Research group leader Dr. Simon Leigh
University of Warwick, UK

Wearable Health Sensors

Smart Toothbrush

Smart Devices
Smart Tooth

No Future In Television

"Television won’t be able to hold onto any market it captures after the first six months. People will soon get tired of staring at a plywood box every night."
– Daryl Zanuck, film producer, co-founder of 20th Century Fox

Intelligent Agents Can Replicate Expert Decision-making

Intelligent Agents

- Machine Learning
- Continually Processing
- Generates Input
- Must be processed
- Business Infrastructure
- Big Data
- Natural Language Processing
- Provides Input

Think, Decide, Act to solve a Business Problem

Associative Memory

Cobotics

- The World’s Most Powerful Chess Entity
  - Human Grandmasters
  - Computerized Chess Programs
  - Advanced / Freestyle Chess Teams
- Collaborative Robotics
  - a robot working in tandem with a human
  - Safer
  - More Flexible
  - Trained, not Programmed.

Your New Nurse Assistant?
Cognitive Computing

Hearing

Language Translation

Sight
Touch

Taste

Smell
Communications Satellite Folly

“There is practically no chance communications space satellites will be used to provide better telephone, telegraph, television, or radio service inside the United States.”

– T. Craven, FCC Commissioner (said in 1961)

Smart Contracts

Blockchains: The Promise

What is a Blockchain?

A distributed public database that leverages cryptography and peer-to-peer technology to group data into blocks and store them in an immutable chain of transactions.

The First Use Case for Blockchain

Bitcoin is a cryptocurrency, that uses the underlying characteristics of blockchain to issue a digital currency

\[ \text{Blockchain} \rightarrow \text{Bitcoin} \]

Bitcoin is an implementation of the technology

Blockchain is the core technology

BUT, Why Just Money?
Why Not Electronic Medical Records?

- A smart-contract is a computer program, which runs on a replicated, shared ledger (Blockchain), which can take custody over assets on that ledger, and which can track what has happened to date and respond to incoming information or events.

Digital Transformation

- Digital Transformation is NOT about force fitting new technologies into your business.
- It’s about rethinking the entire model/ecosystem
- Then using any and all technologies needed to implement the new vision.

1st Horizon Planning

- Today’s core practice management.
- Includes enhancements to and extensions of that core business.
- Includes operational efficiencies, near-term process improvements, etc.

Smart Contracts on the Blockchain

- Replicated, Shared Ledger

Digital Transformation & 3rd Horizon Planning

- Parallels 1st Horizon Planning, BUT without today’s constraints.
- Look into the future two to three years or more.

3rd Horizon Planning

- Includes operational efficiencies, near-term process improvements, etc.
3rd Horizon Planning
- Allows a “time cushion” for systems, processes, assets and infrastructure to be changed as needed.
- Rethink business models and practice management
- What could be enabled by emerging technologies?
- Identify multiple possible future scenarios

2nd Horizon Planning
- Identify most promising 3rd Horizon opportunities.
- Invest in intermediate-term 2nd Horizon initiatives for new technologies and business practices.
- Consistent with a 3rd Horizon long-term strategy.

Digital Transformation Summary
- Digital Transformation: Planned and executed in three parts.
- 3rd Horizon Planning: The long-term vision of the Digital Enterprise.
- 1st Horizon Planning: Evolution of Core operations expected to be retained within the long-term vision.
- 2nd Horizon Planning: Components of the Digital Enterprise that don’t fit within current Core operations.

Technology Enabled Orthodontic Practice of the 2020’s
- Patients automatically book appointments as required.
- Sign in with their health statistics and medications already updated.
- For whom your exam chair automatically adjusts as they sit in it.
- A robot undertakes a basic examination, leaving you to do the skilled work ably assisted by a robot nurse.
- During treatment, patient’s stress level is monitored remotely, and the lighting and background music are automatically adjusted to make them feel as comfortable as possible.
- They leave having paid automatically, and with the next appointment booked and communicated to their smartphone.

Follow Up
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