Learning Curve: How to Learn a Robotic System

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Disclosures

- Stereotaxis Inc.
- Biosense Webster Inc.
- St. Jude Medical Inc.

Technology Evolution

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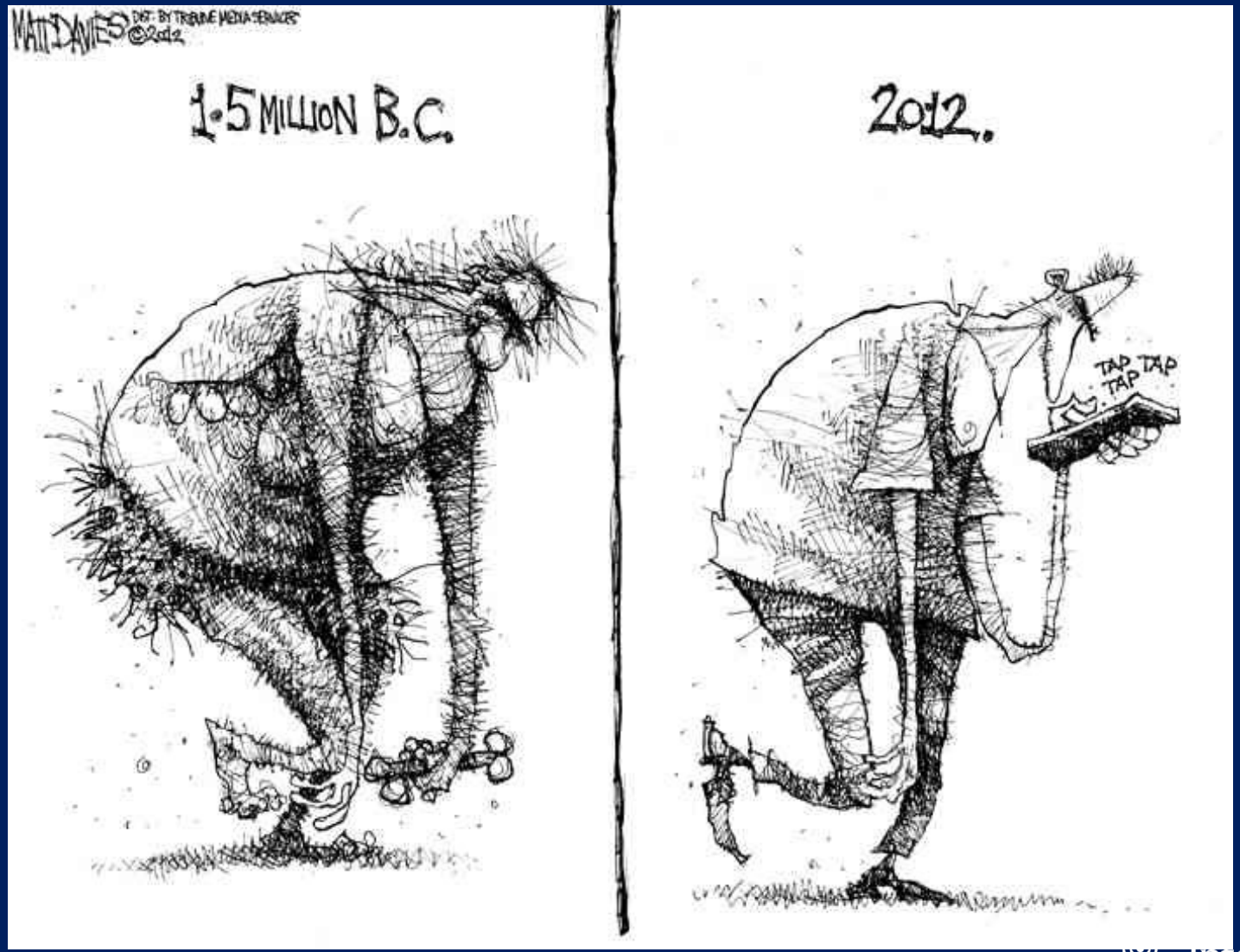
Technology Adoption: Our Evolution



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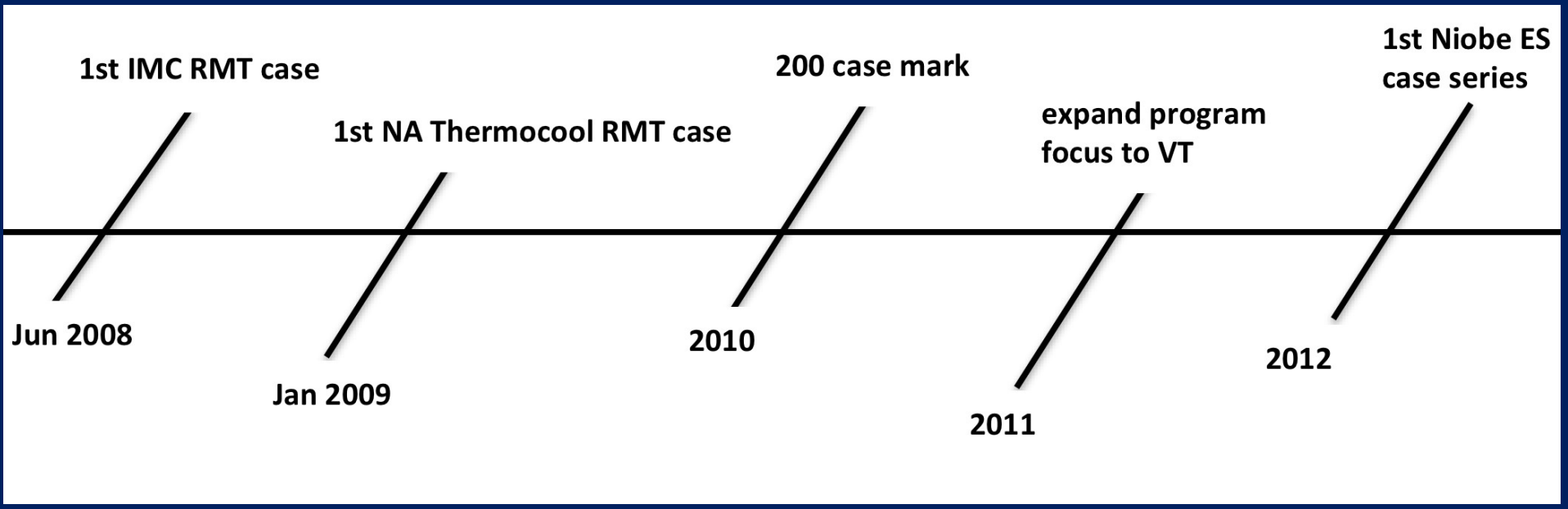
Intermountain Timeline



2017
Overall Experience: 740+ Cases
Go to for PVC/VT Cases: 250+ cases over past 5 years
“Everyday” Use for Afib and complex SVT

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Make The Decision To Try

- **Basic Questions:**
  - **Is the new technology good for my patients?**
    - **Safety, Efficacy**
  - **Is the new technology good for me?**
    - **Efficiency of practice**
    - **Ability to expand practice**
      - **Competitive advantage**
      - **Adopt new challenges**
    - **Safety and Ergonomics for operator**
    - **How high is the barrier to adoption?**
      - **Real vs. Perceived**

The Psychology of Adoption

OPEN ACCESS Freely available online

PLoS one

Facilitators and Barriers to Adopting Robotic-Assisted Surgery: Contextualizing the Unified Theory of Acceptance and Use of Technology

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Abstract

Robotic-assisted surgical techniques are not yet well established among surgeon practice groups beyond a few surgical subspecialties. To help identify the facilitators and barriers to their adoption, this belief-elicitation study contextualized and supplemented constructs of the unified theory of acceptance and use of technology (UTAUT) in robotic-assisted surgery. Semi-structured individual interviews were conducted with 21 surgeons comprising two groups: users and nonusers. The main facilitators to adoption were Perceived Usefulness and Facilitating Conditions among both users and nonusers, followed by Attitude Toward Using Technology among users and Extrinsic Motivation among nonusers. The three main barriers to adoption for both users and nonusers were Perceived Ease of Use and Complexity, Perceived Usefulness, and Perceived Behavioral Control. This study's findings can assist surgeons, hospital and medical school administrators, and other policy makers on the proper adoption of robotic-assisted surgery and can guide future research on the development of theories and framing of hypotheses.

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Modified Unified Theory of Acceptance and Use of Technology (UTAUT) model

Conceptualized for robotic surgery

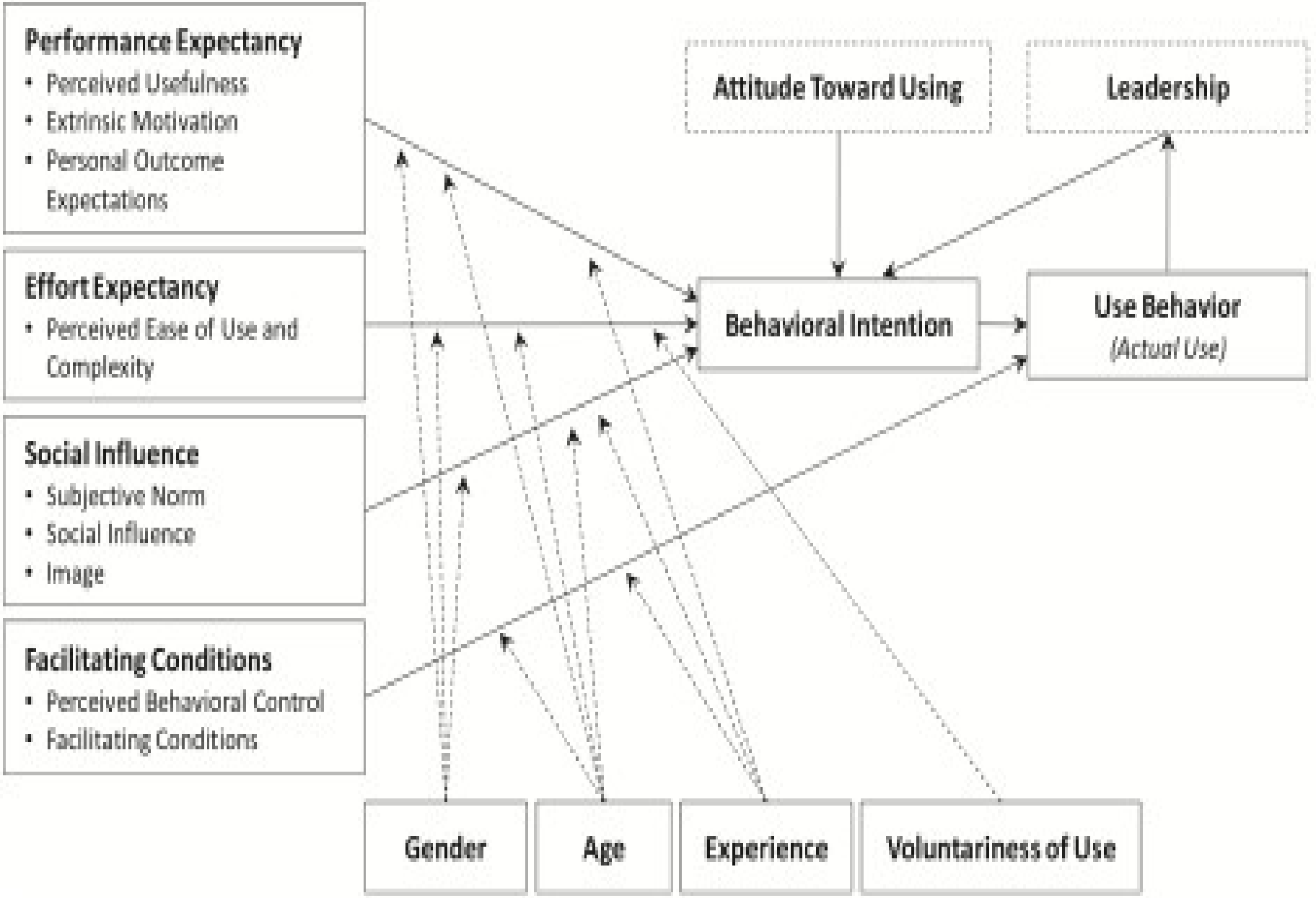

Figure 1. Modified Unified Theory of Acceptance and Use of Technology (UTAUT) model contextualized for robotic surgery.
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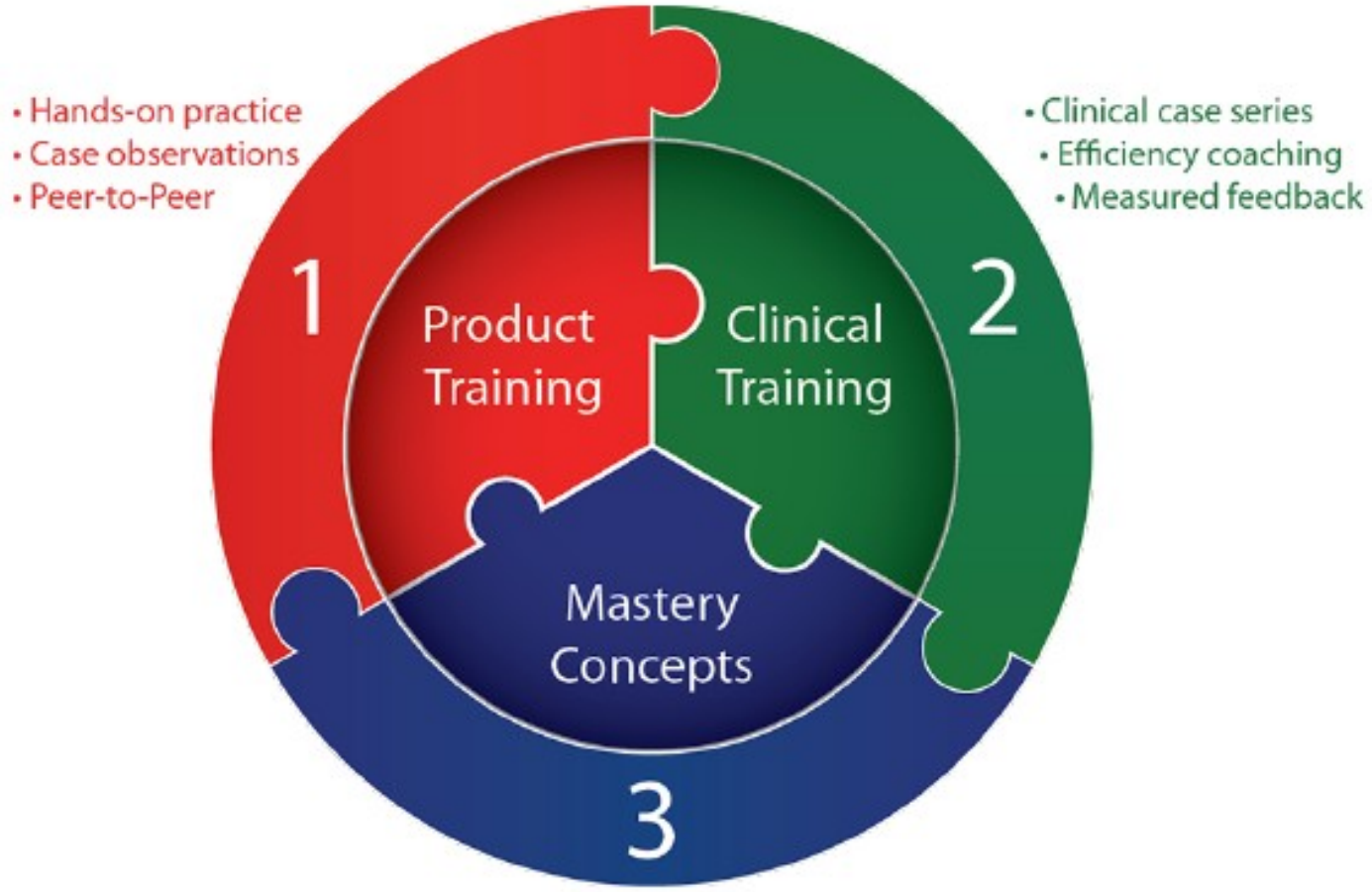
Conclusions

- **Main facilitators to adoption:**
  - Perceived usefulness (users and non-users)
  - Facilitating conditions (users and non-users)
  - Attitude towards using technology (users)
  - Extrinsic motivation (non-users)
- **Main barriers to adoption** (for both users and non-users)
  - Perceived ease of use and complexity
  - Perceived usefulness
  - Perceived Behavioral Control

Be Honest: Who are You?

- Personality Traits:
  - Curiosity
  - Adaptability
  - Patience
  - Innate skills
    - Eye-hand coordination
    - 3-D spatial comprehension
- Technology Adoption Traits:
  - Early Adopter
  - Late Adopter
  - User at risk of becoming Nonuser
  - Nonuser interested in becoming User

Program Design Example: Stereotaxis



Product Training: Get to Know the Technology

- Build a strong foundation of technology knowledge and skills: In preparation for clinical cases
  - Developing efficient procedural setup
  - Observing live and recorded procedures to visualize Best Practices
  - Formation of Best Practice skills through hands-on exercises
  - Pairing of learning physician with experienced peer physician(s)

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Clinical Training: Initial Case Series

- Build a strong foundation of clinical skills leading to success
  - Choose education path to assure success and limit frustration
  - Begin in LA
  - Make liberal use of feedback mechanisms

Choose Education Path

- “All In”
  - Do as many cases as possible as quickly as possible
  - Best for “true believer” willing to take time and not get frustrated
  - Best for someone early in career without strongly set ways

Rarely the way to go: good setup for frustration

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Choose Education Path

- “Slow Integration”
  - Designate one day a week/one case a week to start with
  - Within case split of new technology with standard
    - Try mapping only first
    - Try one side of PVI first

  -Increase schedule and within-procedure utilization as skill and confidence grows

Begin in LA

- Frequently on your schedule
- Anatomy well known
- Complex anatomy promotes learning broad skillset for navigation
- Not too challenging
  - Empty space as opposed to complex internal ventricular anatomy
  - Patients are typically stable and under anesthesia so holding still
- Quickly focuses operator on safety
  - Particularly with magnetic navigation, do not need to worry about perforation

Feedback Mechanisms

- Human Feedback
  - Real time clinical support from industry
    - Suggestions for best practices from experienced users
  - Peer interactions
    - Phone calls
    - Email
- Key for both practical insights as well as personal support

Example of Corporate Best Practices Program

Key components and tools of this program:

- A **Physician support network** is established so that the Stereotaxis user seeking to learn or improve has access to valuable insight from his/her peers.
- **Instructional videos** from satisfied physicians are viewed so that the Stereotaxis user seeking to learn or improve understands what is required to achieve desired results in the Niobe® system or Epoch™ solution lab.
- **Procedural Cards** explicitly describe the ideal remote magnetic workflow.
- **Continuous feedback** throughout the Best Practices learning process:
  - Discussion of expectations before each procedure
  - 2-way feedback and review immediately after each procedure
  - Quantitative analysis (including graphs) of progress for important metrics.

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Feedback Mechanisms

- Data Driven

Mastery

- Once basic comfort level reached
  - Confidence in successful procedures
    - Safety and efficacy
  - Confidence in process efficiency
    - Physician AND Staff
- Program tailored to clinical and practice goals
  - Integration into daily practice
  - Growth potential
    - Drawing of new referrals
    - Expanding practice to new clinical areas

Mastery

- Continued learning and evolution
  - Adoption and integration of new technologies as they are developed
  - Adaptation and tailoring of Best Practices to one's own style
  - Participation in community of users to continually improve practice for yourself and others
    - Continued relationship with peers invlolved with earlier training
    - Broad community: SCRN

The Future

- The Evolution of Technology from the “racetrack” to the “street”

Thank You!

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