DISCLOSURES

• OHSU and others have financial interest in some of the innovations you will see

• I have not made a penny on any innovation I have been involved with

  • Our fellows are given a Hunter grasper

  • Endogastic Solutions supports a research fellow
23 Years of Personal Experience Trying to Improve the Conduct and Outcome of Surgery
WHERE TO START?
Innovation distinguishes between a leader and a follower – Steve Jobs (2001)

People think focus means saying yes to the thing you've got to focus on. But that's not what it means at all. It means saying no to the hundred other good ideas that there are. You have to pick carefully. I'm actually as proud of the things we haven't done as the things I have done. Innovation is saying no to 1,000 things
THE DIALECTIC OF INNOVATION

Imagination AND Focus
One of the hardest things about innovation is getting people to accept that the way they work just might not be the best—Thomas Fogarty
“Disruptive innovation that results in a life supporting implanted medical device carries with it the obligation to study results and fine tune it as rapidly as possible. It also provides the opportunity to fill the industrial space thus created. In partnership with physician scientists, Edwards did both and now, more than 50 years later, dominates the field of valve replacement and repair. – Albert Starr
The ultimate freedom for creative groups is the freedom to experiment with new ideas. Some skeptics insist that innovation is expensive. In the long run, innovation is cheap. Mediocrity is expensive and autonomy can be the antidote.

Tom Kelley, General Manager, IDEO
WHAT DRIVES US TO INNOVATE

It is not financial rewards that drives creative processes

It is the desire to make things work better

Iterative Innovation

It is the desire to bring new developments to fix an old problem

Disruptive Innovation
TWO TYPES OF INNOVATION

Iterative Innovation
And
Disruptive Innovation
ITERATIVE INNOVATION - LINEAR

Starts by identifying the problem
THE PROCESS OF ITERATIVE INNOVATION

The Problem → A Simple Solution

Preliminary Testing (POC) → The Engineer

Sausage Making → Product
Most great ideas have been thought before but the creation of the team that can execute and (ultimately) own the space is the critical element.
THE TEAM - IMAGINATION AND FOCUS

- Jobs and Wozniak
- Gates and Ballmer
- Edwards and Starr
- Berci and Storz
- Lennon and McCartney
- Fogarty and many engineers
THE TEAM – IMAGINATION AND FOCUS

- “Idea” person
- iterative innovation - user or manufacturer
- disruptive innovation - someone from another field
THE TEAM

• Idea Person/People
• Engineer or engineering team
• Critics
• Patent or Intellectual Property investigators
• Market analysts
• Financiers and Entrepreneurs
• Sales and Marketing
• Trainers
Corporate partners are essential to an innovation program

Doug Malnati, Jeff Lersh, Charlie Wilhelm from STORZ with John Hunter at CLSB Building, South Waterfront Campus
THE BUSINESS PLAN (SAUSAGE MAKING)

• Is there a market?
  • Business analyst
• Is there original intellectual property?
  • Patent search
• Is there anyone willing to invest?
  • Venture capital
  • Corporate R and D
  • Institutional Grants
  • Individuals (Angel)
THE BUSINESS PLAN (SAUSAGE MAKING)

• Is there a profit opportunity?
  • If not, is there an ongoing revenue source?
• Can we make it?
  • Team
  • Environment
  • Cultural and regulatory
Figure 1.2 Elements of a business model

- **Profit formula:** Assets and fixed cost structure, and the margins and velocity required to cover them.
- **Processes:** Ways of working together to address recurrent tasks in a consistent way: training, development, manufacturing, budgeting, planning, etc.
- **The value proposition:** A product or service that helps customers do more effectively, conveniently, and affordably a job they've been trying to do.
- **Resources:** People, technology, products, facilities, equipment, brands, and cash that are required to deliver this value proposition to the targeted customers.

Clayton Christensen, *The Innovator’s Prescription*
WHAT IS DISRUPTIVE INNOVATION?

A Game Changer
DISRUPTIVE INNOVATION – NON LINEAR

Starts by identifying the opportunity afforded by a new technology or new development
Iterative (sustaining) innovation

Sustaining innovations, whether incremental or radical, make good products better.

Pace of performance improvement that companies provide

Performance improvement that customers can utilize

Clayton Christenson, The Innovator’s Prescription
Disruptive innovation

Clayton Christensen, *The Innovator’s Prescription*
FIGURE I.1  Elements of disruptive innovation

1. Sophisticated technology that simplifies
2. Low-cost, innovative business models
3. Economically coherent value network

Clayton Christenson,  The Innovator’s Prescription
DOES ‘LEAN’ FIT INTO A MODEL OF INNOVATION?

- Lean focuses on the creation of value streams
  - High quality
  - Low waste
- Standard work maintains reproducible processes
- Standard work constantly evolves from ongoing creative innovation by the operating team
- Imagination and Focus
A TALE OF FOUR PRODUCTS FROM OHSU DEPARTMENT OF SURGERY
OPTICAL FIBER SPECTROSCOPY

Implantable fiberoptic technology to assess tissue oxygenation and blood volume

Norepinephrine injections while monitoring serosum

![Graph showing oxygen saturation over time with different doses of norepinephrine](image)
OPTICAL FIBER SPECTROSCOPY

Patented -
First commercially built probes just arrived

Erin Gilbert, Jim Dolan, Dan Garreau, Steve Jacques
OCTRI and grant funded
ELECTROMAGNETIC COILS TO PREVENT RSI

- RSI’s occur at an incidence rate of 1 in ~ 5,500 to 7,000 operations
- Currently no commercially available device available to identify surgical instruments and/or sponges
- By embedding electromagnetic coils in sponges (and ultimately in all non ferrous materials) we can detect all RSI’s “hidden” in human cadavers
- IP (patent) filed
- Next step: Develop prototype surgical “wand”

Erin Gilbert, Erica Mitchell, Peter Galen, Josh Hoyt. OCTRI funded
HAND FUNCTION DEVICE

• AV fistulas may lead to finger gangrene in ESRD.
• Early detection of hand function impairment might identify digits at risk before gangrene

Greg Landry and PSU engineers
THE LATEST INNOVATION

W3 (who, what and where) Safety Tracker

Paul White
Compview Medical
W3 SAFETY TRACKER

John Hunter
Nicholas Kunio
### CIRCULATOR

a. Attention Team! **[FULL PHYSICAL STOP]**

b. Name. Role. **[Circulator RN]**.

c. I have confirmed this is **[pt name]** with ____ as D.O.B.

### SURGEON

a. Name. Role. Continue with rest of Surgical Team

b. Plan: [announce procedure, circulator will compare to consent and confirm] [review site, site mark, and side]

c. Concerns and contingencies

d. Availability of correct:
   - Blood
   - Equipment
   - Implants
   - Images
   - Medications

   a. The fire risk elements of this case are ________. (alcohol based skin prep, surgical site above xiphoid process, open O2, use of heat source) Is irrigation available?

f. No staff relief or counting at ____ (procedure steps)

g. Estimated time to complete case

### ANESTHESIA PROVIDER

a. Name. Role. [Atending Anesthesiologist]

b. Continue with rest of Anesthesia Team

c. Methodical wound exam, intentionally retained items are identified (yellow sticker), lines, drains, ...

d. Announces count status: instruments, sponges, needles, and miscellaneous items

### IRRIS PERSON

a. Name. Role.

b. [Circulator Name] and I have completed baseline counts. Documented on the white board

c. Hands-free/neutral zone location

d. All meds on sterile field are labeled

e. Concerns

### TEAM

a. Ready to begin?

### PRIOR TO CLOSE HUDDLE

A. PRE-PROCEDURE. Before invasive procedure or incision

B. Prior to Close Huddle

C. CHECK-OUT. Before senior surgeon leaves the room

D. SURGEON starts the discussion

   a. Number and dispersal of all specimens. (reminder to sign the Path form)
   b. Are there blood products that need to be returned?
   c. Procedures that should be documented (all attempted and completed)
   d. Wound Class for procedure(s)
PATIENT INFORMED CONSENT
FOR RENDERING OF MEDICAL SERVICES/
SURGICAL SERVICES/SEDATION

Dr(s). Hunter & Associates will perform the following procedure(s):
Minimally invasive three field esophagectomy with feeding jejunostomy tube placement.

Procedure Site (mark one box, or for multiple procedures, indicate sites above): □ Not applicable □ Right-side □ Left-side □ Bilateral □ Level ________ □ Anterior approach □ Multiple sites, see above □ Posterior approach

Physicians other than the operating practitioner, including but not limited to residents, will be performing important tasks related to the surgery, in accordance with hospital policy and, in the case of the residents, based on their skill set and under the supervision of the responsible practitioner.

Qualified medical practitioners who are not physicians who will perform important parts of the surgery or administration of anesthesia will be performing only tasks that are within their scope of practice, as determined under State law and regulation, and for which they have been granted privileges by the hospital.

The physician or practitioner has explained to me, in a way that I understand, the planned
W3 Safety Tracker
W3 SAFETY TRACKER
SURGICAL INNOVATION PROGRAM (SIP)

• Mission: To facilitate, drive, and manage the innovation process for busy surgeons
• To connect with TTBD, OCTRI, and outside entities to identify support for innovation
• To get our innovators through the “sausage making”
• To sponsor an annual innovation summit to increase learning and facilitate building new product programs

• Manager: Sharon Kryger
  • Vascular Surgery, Master of Science in Clinical Research Management
WHAT DRIVES US TO DO ALL THIS?

Daniel Pink, Drive  Youtube Video
INNOVATION IN SURGERY - SUMMARY

- Innovation is what defines leadership
- Innovation requires imagination and focus
- Innovation requires team building
  - Physicians, engineers, and entrepreneurs
- Innovators need help at ‘sausage making’
- We are driven to innovate not by money, but by our desire to make a difference