CREATIVITY and INNOVATION in MEDICINE: “A PERSONAL JOURNEY”

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CREATIVITY and INNOVATION: An OVERVIEW

- Seminal why
- Innovation: 6 steps
- Tipping point: 3 phases
- A career example: Laparoscopic renal surgery
- Creativity: personal observations
FIRST STEP: “SEMINAL WHY”

“Seminal why”: A disruptive question, birthed by clinical consternation/empathy, that spurs the imagination.

The question that generates the greatest negative response in the most senior faculty member in a given specialty is invariably a “seminal why”!

ANSWERING THE “SEMINAL WHY”? WHO? WHERE?
THE NEXT STEP

Who:
Nurture: Others
• RESPONSE: encourage / anger
• SUPPORT: mental / physical / fiscal
Nature: You – know yourself

Where: Academic Health Centers

HOW?

• **Imagination** is the ability to cognitively form images and sensations without reference to the actual senses.

• **Creativity** is the universal human ability to harness imagination and the senses to generate new ideas.

• **Innovation** is where creative thought and practical know-how (i.e. domain knowledge) meet to realize value by doing new or old things in new ways.

(John Kao – AAMC Meeting - 2012 - entrepreneur, musician, MD)
INNOVATION: “6 ESSENTIALS”

• Vision of the **desired future** that defines the purpose of your innovation
• What’s the **purpose** of the journey (i.e. is it compelling, invigorating, and emotionally engaging)?
• Does it create a sense of **urgency**?
• Do you have the **time/energy** to seek the new? (Discovery)
• Do you have a practical way for disruptive innovation to **coevolve** with the day to day? (Development)
• Do you have an effective model for innovation **stewardship**? (Dissemination)

**Bottom Line:** An Academic Health Center – where creativity is encouraged and innovation is rewarded.

(John Kao – AAMC Meeting - 2012 - entrepreneur, musician, MD)

BEYOND INNOVATION: THE “TIPPING POINT”

GETTING TO THE NEXT LEVEL: THE TIPPING POINT

An act or event after which nothing is ever the same…

Washington University : Laparoscopic Renal Surgery
ST. LOUIS SOJOURN: WASHINGTON UNIVERSITY - 1984-2001

People:
William Catalona – creating an environment for creativity
Birth of a fellowship – (from Howard Winfield and on…)
Industry support: Fred Roemer, Connie Padden
Great residents: Lou Kavoussi, Sherb Figenshau, and on…
Place: Washington University

THE PROBLEM WITH SURGERY: INCISION
SURGERY:
IMPACT OF THE INCISION

1500’s - A Shakespearean view:

“Diseases desperate grown by desperate appliance are relieved or not at all.”

“Hamlet”

WHERE WE WERE:
THE FIRST NEPHRECTOMY

Gustav Simon, M.D.
Univ. of Heidelberg
August 2, 1869

“Gentleman, today I intend to perform an operation which, until now, has never been performed on a human being, namely the extirpation of a perfectly functioning kidney.”
WHERE WE WERE: 1869 - 1990

“The Knife”:
In treating renal cancer, open surgical prowess progressed from simple removal of the kidney, to removal of the kidney and adrenal. In addition the ability to remove very large tumors and even those involving the major vein of the body (the inferior vena cava) was developed.

This was the century of anesthesia, analgesia, and antibiotics. The surgeon’s tools were largely little changed: knife, suture, clamps, and hands.

LAPAROSCOPY: A SMALLER INCISION

1901: Pneumoperitoneum (Kelling)
1910: Diagnostic laparoscopy (Jacobeus)
1977: Harvest of oocyte for first “test-tube” baby (Steptoe – England)
1980: Appendectomy (Semm – Germany)
1985: Cholecystectomy (Mühe – Germany)
SEMINAL “WHY”

Why can’t we remove a kidney laparoscopically?

SEMINAL WHY to INNOVATION: “6 ESSENTIALS”

Laparoscopy 101 and Washington University:

• Vision of the desired future that defines the purpose of your innovation. (Surgery with less pain/debility.)
• What’s the purpose of the journey? (e.g. Surgery without pain)
• Does it create a sense of urgency? (e.g. Every day people are being “cut” in order to affect a surgical cure.)
• Do you have the time/energy to seek the new? (Protected time – lab day)
• Do you have a practical way for disruptive innovation to coevolve with the day to day? (Endo-urology laboratory)
• Do you have an effective model/partner for innovation stewardship? (Cook Urology /Karl Storz Inc./courses)
LAPAROSCOPIC NEPHRECTOMY: THE PEOPLE and THE PLACE

1. Urology: LOU KAVOUSSI, Steve Dierks, Shimon Meretyk, Stephanie Long and skeptical residents.
2. General Surgery: Nat Soper
3. Industry: Cook Urological (Fred Roemer and his engineers, Paul Thomson and Ed Pingleton)
4. Place: Minimally invasive surgery laboratory

LAPAROSCOPIC NEPHRECTOMY: DISCOVERY

The laboratory experience:
1990: Report of 6 successful attempts in 7 animals with avg. case time of 2.8 hours!
  Introduction of sack for entrapment and the electrical tissue morcellator (Cook Urol.)

LAPAROSCOPIC NEPHRECTOMY:
June 25, 1990

Kidney embolized AM of surgery.
5 ports + ureteral stent placed.
5 sets of vessels taken.
Morcellation: 7 min.
O.R. time: 6.8 hrs.
Comp.: intraoperative oliguria, postop CHF, dilutional anemia
3 mg MS.
Discharged: POD 6.
Path.: oncocytoma
Washington University: June 25, 1990
# LAPAROSCOPIC NEPHRECTOMY: “A TIPPING POINT AT THE GATES”

**From bench to bedside: 1990 - 1994**


1991: Laparoscopic nephroureterectomy:


(*Washington Univ.; ** Univ. of Iowa, *** Johns Hopkins)

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# DISSEMINATION: WHEN?
EVIDENCE

- Prospective randomized trials vs. retrospective reports
- Parameters: 4 E's (efficiency, effectiveness, equanimity, economy)

LAPAROSCOPIC RADICAL NEPHRECTOMY

<table>
<thead>
<tr>
<th>Literature review:</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients:</td>
<td>173</td>
</tr>
<tr>
<td>O.R. time:</td>
<td>3.2 hrs.</td>
</tr>
<tr>
<td>EBL:</td>
<td>435 cc</td>
</tr>
<tr>
<td>MSeq:</td>
<td>73 mg.</td>
</tr>
<tr>
<td>Hosp. stay:</td>
<td>6.2 d.</td>
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<tr>
<td>Complications:</td>
<td>20%</td>
</tr>
<tr>
<td>Recovery:</td>
<td>8.1 wks.</td>
</tr>
<tr>
<td>NED (2-6 yrs.):</td>
<td>91%</td>
</tr>
<tr>
<td>Cost:</td>
<td>----</td>
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</tbody>
</table>

TEACHING LAPAROSCOPIC RENAL SURGERY

1992-2002: 17 COURSES TO NEARLY 1,000 UROLOGISTS!
2.5 day courses = 54% take rate!

...what else...
"Without great solitude no serious work is possible."
– Pablo Picasso

- Creation occurs in “real time” - find some self time – block it out / set up specific times each day for email or phone calls and stick to it / create “bogus meetings” / declare a lab day! / make every 6th week a lab week
- Find a place at work to hide! (…and don’t tell anyone where you are)
- Final act of creation is a singular activity or event based on all that has been consumed and communicated

“There is more to life than increasing its speed.”
– Gandhi

- LOOK! (Slow down – get in touch.)
- To invent … you need to outvent…take it easy … find a distraction…let the problem sink into your subconscious…and then float back to the surface…
- Look at it from all angles…put it upside down…assume that what you know IS true is not…what would happen if just the opposite were correct.
  (R. Feynman – “There’s plenty of room at the bottom.” 1960)
“Success consists of going from failure to failure without loss of enthusiasm.”
– Winston Churchill

- There are no negative results – just the presence of an intellect too deficient to recognize the opportunity.
- “No” is the first step on the creative path.
- Each change in the planned course of events, is an opportunity for discovery…
  
  (Drown your sorrows over a beer and discover the tubing for cardiopulmonary bypass –
  Find a putrid left over sandwich at work and discover penicillin…
  Bemoan your dateless Saturday nights and discover Facebook…)

THE SINE QUA NON …(for me)

- Marry well …
In the time of your life, live-
so that in that wondrous time
you shall not add to the misery and sorrow of the world, but
shall smile to the infinite delight and mystery of it.

William Saroyan
1939