TRAUMA, OODA LOOPS, & BREAD BAKING
False Supremacy of System II
System I
fast, automatic,
impulsive, emotional,
and unconscious

System II
slow, reflective,
deliberative, rational,
and conscious
Lazy, Short-cuting, Slacker
System I condemned as heuristics, satisficing, non-optimal or barely good enough
Expertise?
No System II Here
What about an expert-level resuscitation?
Optimal Resuscitation is a System I Game
Organic
Calm/joking
Not the regimented ABCD
Why I Hate ATLS
If you don’t treat trauma patients frequently, an ATLS course provides an easy method to remember for evaluation and treatment of a trauma victim.

--ATLS Website
But what if you do treat trauma frequently...
Cognitive Fail
Ignores Expertise
ATLS is an attempt at Task Decomposition
Protocols & Guidelines
A simulacrum of a System I Game for System II level Players
Best for controlled, simple domains
ATLS (and any procedural decomposition) eliminates any expertise benefits
Novices establishes a baseline (albeit an ok, but not great one)
Experts

Slow, Painful, & Wrong

(even when designed by that expert)
How Should We Approach Resus?
John Boyd
O.O.D.A. Loop.

Observe.

Act.

Decide.

Orient.
What the OODA Loop is and isn’t
Who We Are

Observe
- Implicit Guidance & Control
  - Unfolding Circumstances
  - Outside Information
  - Unfolding Interaction With Environment

Orient
- Observations
  - Feedback
  - Forward

Decide
- Implicit Guidance & Control
  - Decision (Hypothesis)
  - Feedback
  - Forward

Act
- Action (Test)
  - Unfolding Interaction With Environment
  - Feedback
  - Feedback
  - Feedback
Observe

Unfolding Circumstances

Outside Information

Unfolding Interaction With Environment

Observations
If we Observe the Wrong Things
Pulse Rate
Classes of Shock
See Response to Crystalloids Prior to Blood
Log Roll
Spine Exam
Observe the Right Things at the Wrong Time
RSI before Neuro Exam
Observe the Right Things at the Right Time
Orient

Who We Are

Unfolding Circumstances

Implicit Guidance & Control

Observations

Feed Forward

Outside Information

Unfolding Interaction With Environment
Most Important Part of the Loop
Processing conscious or subconscious
How do we Observe the Right Things at the Right Time?
We need to look in order to see
We need to know in order to look
Orient

Who We Are

Implicit Guidance & Control

Observations

Feed Forward

Unfolding Circumstances

Outside Information

Unfolding Interaction With Environment
ATLS is Empiric Observation without Orientation
We can not see what we do not know
Ideal Orientation leads to instant grasp of the situation
Who we Are is How we Orient
Boyd’s Mental Models for Military Orientation

Mathematical Logic
Physics
Thermodynamics
Biology
Psychology
Anthropology
Conflict (Game Theory)
Orient

Who We Are
*Knowledge
*Experience
*Mindset/Stress
*Affective Dispositions to Respond (ADRs)
Mental Preparation
Lateralization & Cross-Training
Optimal
Orientation=Speed
Orientation=Tempo
Optimal Orientation in the Resus Bay is a System I Game
Pattern Recognition
Illness Scripts
Decide
(Hypothesize)

Who We Are

- Implicit Guidance & Control
- Observations
- Feedback
- Decision (Hypothesis)

Unfolding Circumstances
Outside Information
Unfolding Interaction With Environment
Decide
(Hypothesize)

Who We Are

Unfolding Circumstances

Outside Information

Unfolding Interaction With Environment

Implicit Guidance & Control

Feedback

Decision (Hypothesis)
Orient to Act
Fingerspitzengefühl
Fingertip Feel
Illness Script linked to Action Scripts
Pattern Matching Based on Prior Experience/Knowledge
Will it work?
Act
(Test)
Execution Gap
Decision to
Completed Action
Speed of Action
Do Something:
GET OFF THE X
Perturbate the System
Small moves
to be able to
re-observe
OODA Loop
A Bat and a Ball Cost $1.10

The Bat costs $1 more than the Ball.

How much does the Ball Cost?
Act to Test
Mess Up Your Opponents Loop
You

That

Other

Guy
“...Every combatant observes the situation, orients himself...decides what to do and then does it.

If his opponent can do this faster, however, his own actions become outdated and disconnected to the true situation, and his opponent’s advantage increases geometrically.”

-John Boyd
“Death is not the enemy, but occasionally needs help with timing”

Rule #20
Peter Safar
Murphy
You
Plan for Decompensation
Plan for Failures
OODA for Error

OODA for Improvement
O.O.D.A. Loop.

Observe.

Act.

Decide.

Orient.
Can ATLS Teach Trauma?
Streetlights and Shadows
Searching for the Keys to Adaptive Decision Making

BY GARY KLEIN
Procedural Task Lists Erode Expertise
A simulacrum of a System I Game for System II level Players
Becomes the System I of Bad Players
Mental Models
Illness Scripts
Action Scripts
Patterns/Scripts

Pulseless Blunt
Pulseless Penetrating
Precordial Stab c Hemo
Pelvic Trauma/Fast Neg
Pelvic Trauma/Fast Pos
Head Inj/Abd Inj
LUQ Stab
Experts’ take on Cases
Don't Eliminate System II
<table>
<thead>
<tr>
<th>Checklist Item</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has trauma related history &amp; physical exam with initial life saving measures (primary &amp; secondary survey) been completed?</td>
<td>☐</td>
<td>☑</td>
<td>☑ (Yes, patient is intubated)</td>
</tr>
<tr>
<td>Is the patient’s GCS 8 or below?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Has a CXR been reviewed?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Is the pulse oximeter on the patient and functioning?</td>
<td>☑</td>
<td>☐</td>
<td>☑ (not indicated for penetrating trauma)</td>
</tr>
<tr>
<td>Has a pelvic X-ray been reviewed to rule out a pelvic # and a pelvic binder considered?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Have the appropriate fluids (crystalloid, blood) been initiated?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Has an arterial blood gas been performed?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Is the patient in shock (Base deficit &lt;= -6 OR persistent tachycardia OR hypotension)?</td>
<td>☑</td>
<td>☐</td>
<td>☑ (clinical exam sufficient, FAST, DPL, CT scan done or pending)</td>
</tr>
<tr>
<td>If yes, has the surgeon been notified?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Has blood been ordered and MTP considered?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Have you assessed for internal bleeding with:</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Have you checked the neurovascular status of all 4 limbs?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Have you checked for open wounds and controlled external bleeding including from the scalp, back &amp; perineum</td>
<td>☑</td>
<td>☐</td>
<td>☑ (Yes, action taken to warm patient if needed)</td>
</tr>
<tr>
<td>Has the temperature been recorded and hypothermia excluded (T&lt;35)</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Have the consultants stated their plan?</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
<tr>
<td>Have the necessary agents been prepared for transport</td>
<td>☑</td>
<td>☐</td>
<td>☑</td>
</tr>
</tbody>
</table>

Options:
- Anesthesia/RT
- General Surgery
- Orthopedic Surgery
- Neurosurgery (if notified)
- Narcotics
- Anxiolytics
- Paralytics
What the F*#& is going on?
To Review
All about System I
ATLS/ACLS ignore expertise by Decomposing a System I Process
These courses are a boon to novices and a drag on experts.
OODA Loop Can Act as a Framework for Analyzing Resuscitative Thinking
ABCD

to

OODA
Resuscitation is a game that should be played by experts.
Expert Resuscitation should be a SYSTEM I Game
Orient to Observe
Orient to Act
ALWAYS BE ORIENTING