

Pit Crew Model of CPR

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Getting Priorities Straight

- Its about compressions
 - High quality
 - Limited interruption
- Defibrillation
- Controlled ventilation
- Everything else is secondary



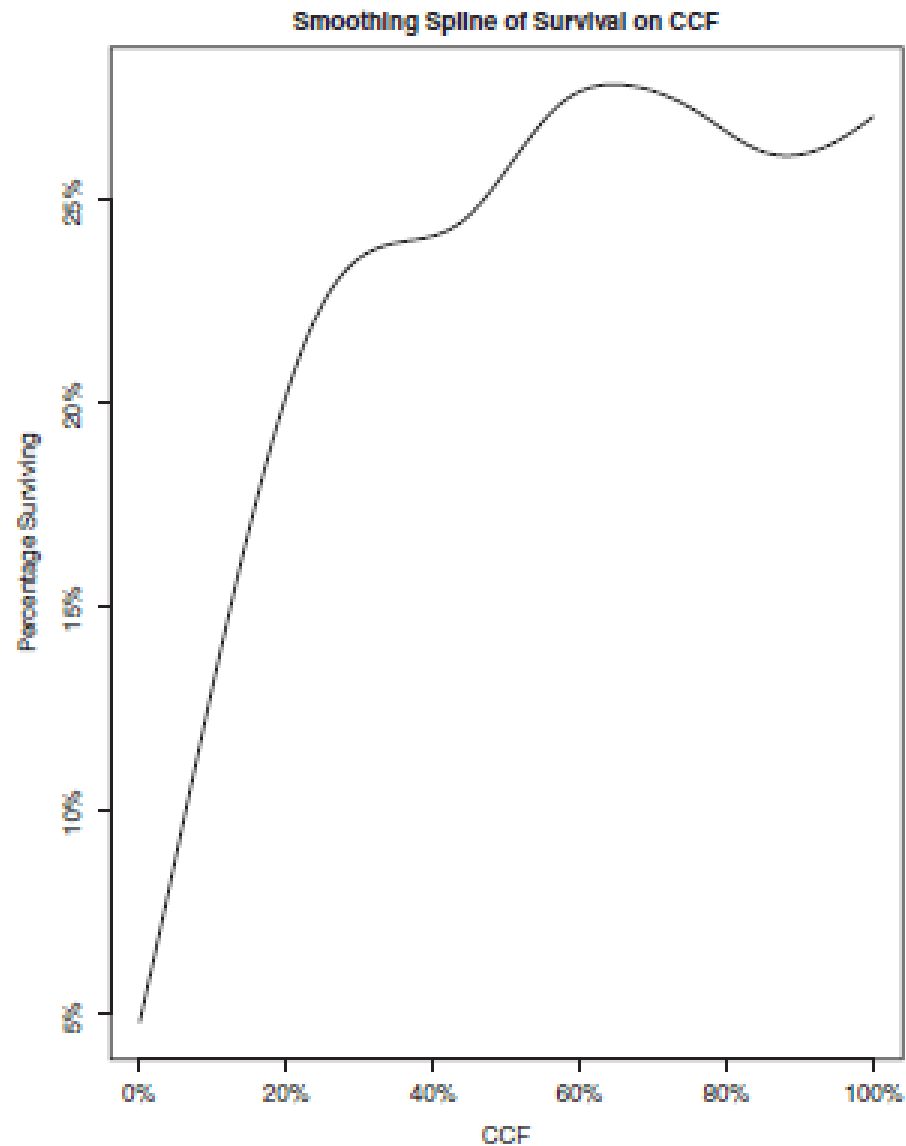


Figure 3. Smoothing spline representing the incremental probability of survival corresponding to a linear increase in chest compression fraction.

A blurred, dark image of the Austin skyline at night, with city lights reflecting on the water in the foreground. The text "This is harder to do than you think" is overlaid in white.

This is harder to do than you think

Task Interruptions

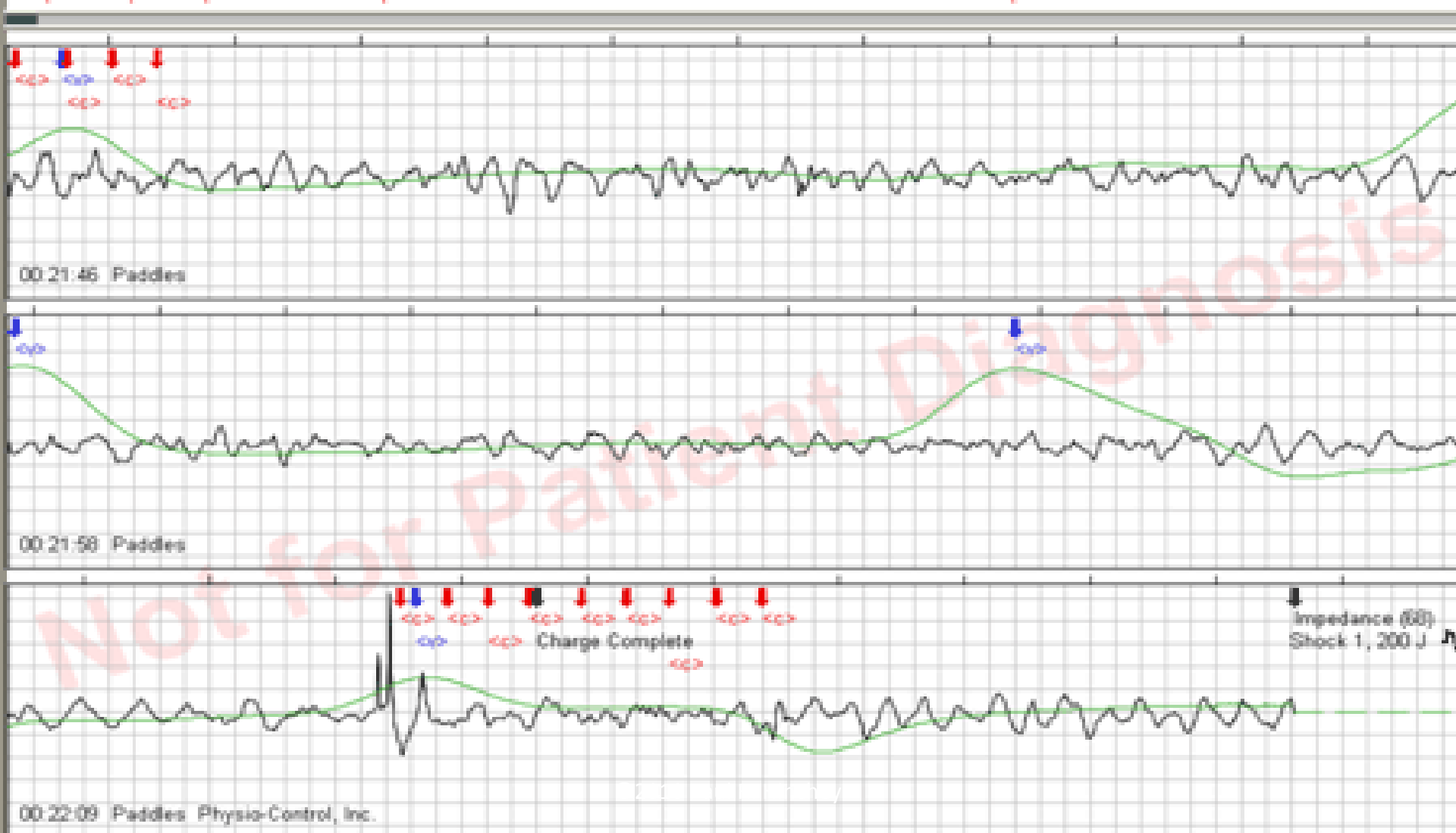
- Airway interventions and IVs
- Ventilations
- Pulse checks
- Rhythm analysis
- Defibrillation
- Changing compressors
- ~~Patient movement~~

We have limited awareness of task time in complex processes....so these interruptions should be engineered and choreographed to minimize their impact.....

>20 second pause for defibrillation. Appears that a ventilation was given before the compressions resumed. Compressions resume 10 seconds after shock delivery.



Long pause for ventilations. Then short sequence of compressions during defib charging. Compressions resumed approximately 5 seconds after shock 1 delivered.



Why engineer the process?

- Creates uniformity:
 - Accurate assessment of outcomes
 - Linking specific interventions to outcomes
 - Baseline for future modification
- In the process it:
 - Improves outcomes
 - Improves efficiency
 - Reduces errors

Professional CA resuscitation
is to CPR

....what a pit crew
is to changing tires

Pit Crew Model

- Same name...many versions
- CPR
 - Maximize compression fraction
 - Effective compression(rate/depth)
 - Provider fatigue
- Controlled ventilations
- Defib
 - Pre-charge @1:45
 - Emphasis on Shock/Don't' shock

Current Goal:

Less than 10 second break
in every
2 minute cycle of CPR

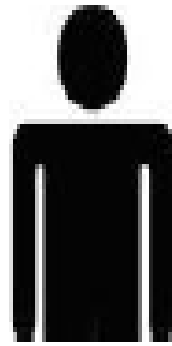
Staying Alive or Another One Bites the Dust?

- Staying alive 103 bpm
- 30:2
 - 100 compressions/min = 18s for compressions
 - 5 s break for ventilations every 30 compressions?
 - 18 of every 23s in active compression is 78%
 - NOT counting other breaks in CPR
- Pit Crew
 - Continuous compressions w/asynchronous ventilation
 - 10s break every 2 min is 92%
 - 5s of break every 2 min is 96%

So we went to the simulation lab
and now it's ALL choreographed....

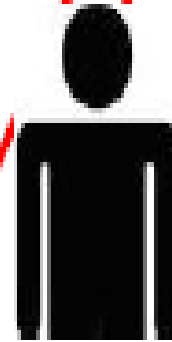
Person in Position 4 (P4)
always just outside the
"Triangle" of CPR

1. Team Leader Duties
2. May assist with BIAD preparation and securing if needed



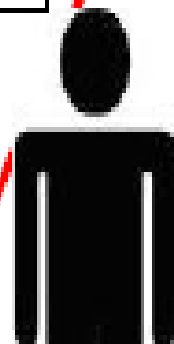
Person in Position 3 (P3) always at patients Head

1. Opens/clears Airway and insert OPA
2. Assembles/apply BVM and ITD
2. Provides 2 hand mask seal
3. Inserts/secures BIAD (King) & ITD & ETCO₂ after 400 Compressions



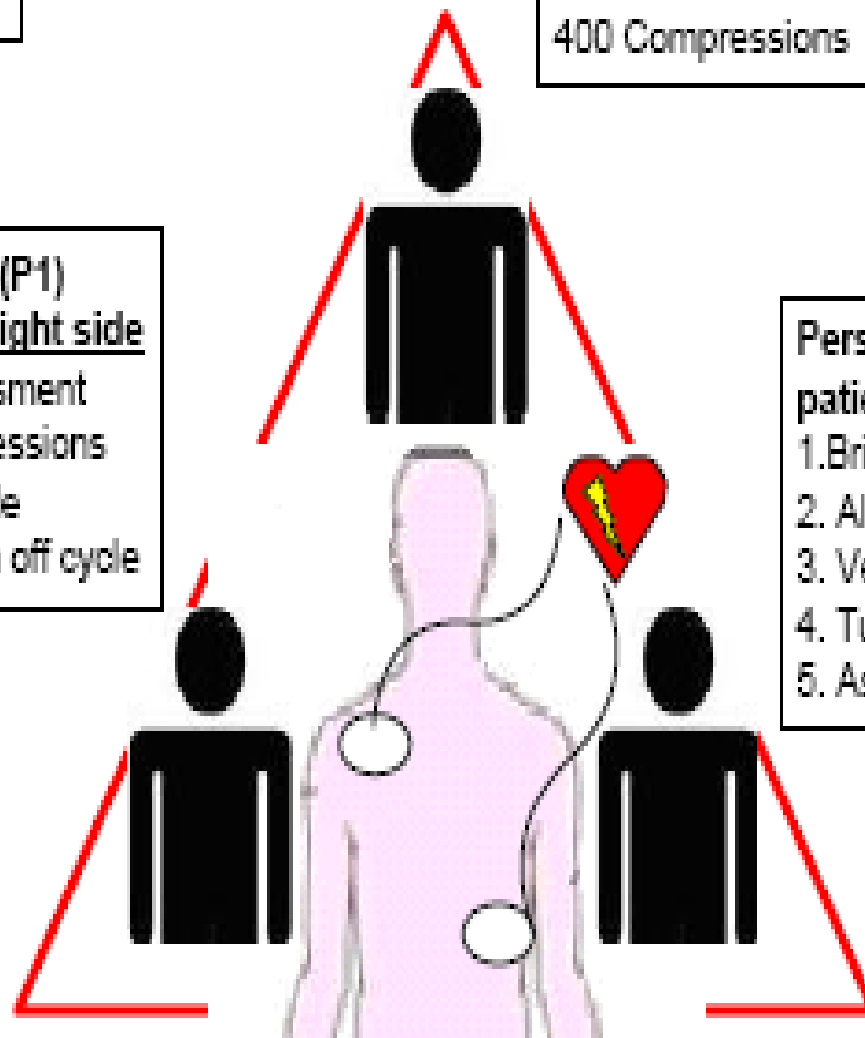
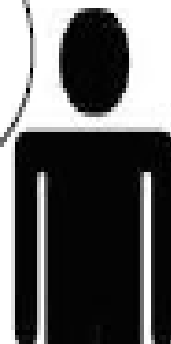
Person in Position 1 (P1)
always on patients Right side

1. Initial patient assessment
2. Initiates 100 compressions
3. Ventilates in off cycle
4. BIAD Preparation in off cycle



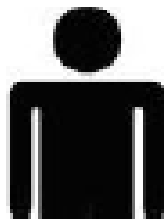
Person in Position 2 (P2) always on
patients Left side

1. Brings and operates AED
2. Alternates 100 compressions with P1
3. Ventilates in off cycle
4. Turns on AED after 200 Compressions
5. Assist with BIAD Preparation if needed



Person in Position 4 (P4) always just outside the "Triangle" of CPR

1. Team Leader Duties
2. May assist with BIAD preparation and securing if needed

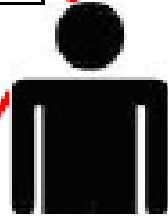


Person in Position 3 (P3) always at patients Head

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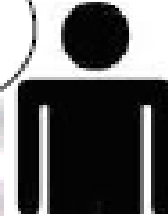
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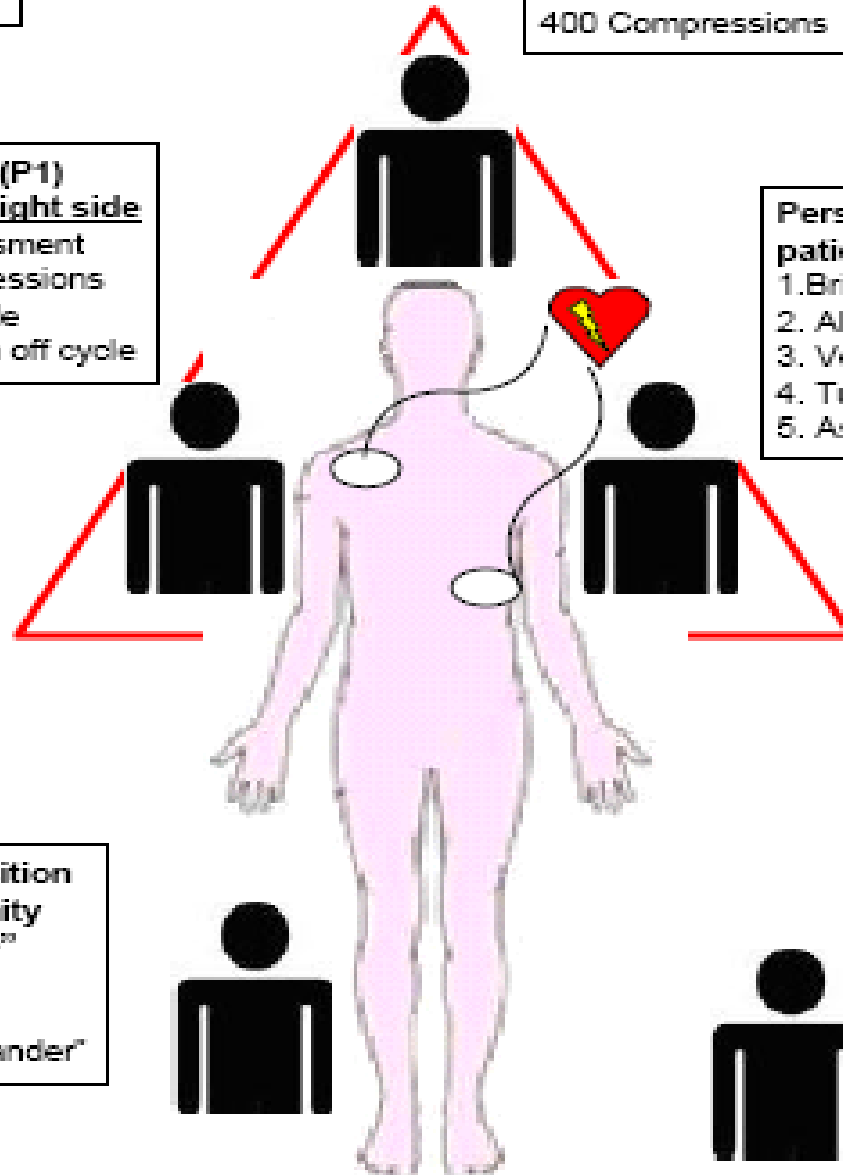
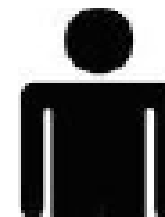
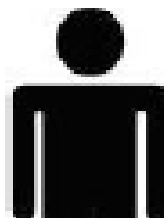
Advanced Provider in Position 6 (P6) always at an area outside the CPR "Triangle" near a lower leg and Operates the Monitor

1. Code Commander
2. Communicates/Interfaces with Team Leader
3. Makes all Patient treatment decisions



Advanced Provider in Position 5 (P5) always at an extremity outside the CPR "Triangle"

1. Initiates IV/IO access
2. Administers Medications requested by "Code Commander"



AMERICAN
AVIATION
←

←
LEARN TO
FLY HERE!
←



Cardiac Arrest Checklist:

- Pit crew positions identified
 - Continuous compressions being performed
 - ITD in place w/light activated
 - BVM is attached to oxygen and flowing
 - Monitor visible and in paddles mode
 - Code Commander is identified and positioned at the monitor
 - BVM mask attached to tubing if not being used
 - ETCO₂ waveform is present and being monitored
 - IV/IO access has been obtained
 - Gastric distention has been considered/addressed
 - Family is receiving care and is at the patients side
- | | |
|---|---|
| <input type="checkbox"/> HYPOVOLEMIA | <input type="checkbox"/> TABLETS/TOXINS |
| <input type="checkbox"/> HYPOXIA | <input type="checkbox"/> TAMPONADE |
| <input type="checkbox"/> HYDROGEN IONS (ACIDOSIS) | <input type="checkbox"/> TENSION PNEUMOTHORAX |
| <input type="checkbox"/> HYPOTHERMIA | <input type="checkbox"/> THROMBOSIS (MI) |
| <input type="checkbox"/> HYPER/HYPOKALEMIA | <input type="checkbox"/> THROMBOSIS (PE) |
| <input type="checkbox"/> HYPOGLYCEMIA | <input type="checkbox"/> TRAUMA |

Take Away

- Choreograph your cardiac arrest
- Focus on priorities
 - Limited interruption
 - Controlled ventilation
 - Timely defib
 - Compressor fatigue
- Continuous reassessment and reengineering

More on Pit Crew at:
atcomdce.org



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