SKILL DECAY IN ACUTE CARE SKILLS: WHAT IS THE EVIDENCE, AND HOW CAN CLINICIANS COMBAT THESE EFFECTS?

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March 9, 2017
The views expressed in these slides and during today’s discussion are mine.

My views may not be the same as the views of my institution or my colleagues.

Participants must use discretion when using the information contained in this presentation.
Learning Objectives

- At the conclusion of this presentation, participants will...
  - Explain skill decay as it pertains to acute care clinical skills
  - Report the evidence associated with skill decay in health care professionals, including a timeline for when skills begin to decay
  - Generate feasible evidence-based methods to implement in order to combat skill decay
Background and Significance

- The frequency of medical emergencies in athletics is low.

- Data gathered over 26-year period indicated 1,866 sudden deaths.¹
  - 0.6 deaths per 100,000 person-years
  - 56% were most likely due to cardiovascular causes

- Data gathered over 10-year period reported a total of 182 NCAA student-athlete sudden deaths.²
  - Roughly 6 deaths/year due to cardiovascular causes
  - Many occurred outside the realm of athletic participation

Did you know?
Background and Significance

- Competence is KEY!!!

- AHA Guidelines\(^3\)
  - Emphasis on high-quality CPR
  - Rate = 100-120 compressions per minute with minimal interruptions
  - Depth = at least 2 inches (no more then 2.4 inches)
  - Allow full chest recoil between compressions
Background and Significance

- **Educational Experiences**
  - Emergency response coursework
  - Changes in educational standards through the years

- **Continuing Education**
  - ATs tend to select continuing education based on interests and applicability
  - Is acute care of interest? Is it applicable?
  - Research does **NOT** support that individuals seek out continuing education based on need
Background and Significance

- **Skill decay** refers to the loss or lack of retention of trained or acquired skills after periods of nonuse.\(^6\)
  - *Evidence for significant decay in acute care skills as the length of nonpractice of a skill increases.*\(^5-12\)

- Acute care skills are not often utilized in clinical practice.
Background and Significance

Factors that negatively affect skill retention:

1. Insufficient hands-on practice
2. Inconsistent teaching
3. Unrelated course content
4. Complex instruction
5. Delays between instruction and skills practice
6. Lack of supervision
7. Low instructor feedback
8. Instructor incompetence
Clinical Question

In athletic trainers, is there a decay in acute care skills over time?
SUMMARY OF SKILL DECAY LITERATURE
Yang et al. (Level of Evidence: 1)

- **Purpose:** Identify the retention of adult advanced life support knowledge and skills of healthcare providers following completion of an ALS course.

- **Methods:** Utilized Medline, CINAHL, Cochrane Library, and PubMed to conduct a literature search; retrieved 336 articles, but only 11 were included.

- **Results:**
  - *Duration of knowledge retention is greater than skills retention.*
  - *Patterns of decay increase at 6 months following training, but degree of decay varies.*
  - *There appears to be a relationship between clinical exposure and skill decay.*
Purpose: Evaluate the retention of airway management knowledge and clinical skills in athletic training students.

Methods: Participants underwent baseline assessment of clinical skills, engaged in an educational session, then re-assessed. Participants were divided into experimental group (re-assessed at 1-month, 3-months, and 6-months) and a control group (only re-assessed at 6-months).

Results:
- Knowledge was retained at 6 months.
- Clinical skills decayed significantly at 6-months.
Ruetzler et al.\textsuperscript{9} (Level of Evidence: 3)

- **Purpose:** Investigate skill retention of intubation skills by previously inexperienced paramedics following training using a manikin model.

- **Methods:** Participants watched a standardized video lecture, participated in a practical demonstration, and were assessed (time to intubation, time to inflation, time to ventilation) on 7 different devices. Re-assessed 3 months later (no further training).

- **Results:**
  - Decline in endotracheal intubation skills from 78% success rate to 58% success rate after 3 months.
  - 100% success rate after 3 months for 5 out of 6 supraglottic airway devices, demonstrating that these devices are easy to use for inexperienced healthcare personnel.
Ireland et al.\textsuperscript{10} (Level of Evidence: 3)

- **Purpose:** Investigate the ability of first responders to acquire and maintain competency in the application of an extrication cervical collar over a 12-month period.

- **Methods:** Participants attended a standardized training session followed by hands-on practice. The competency of participants was assessed using a 15-item checklist, and were requested not to practice the application of the cervical collar, and were re-assessed at 12-months.

- **Results:**
  - Only 61\% of participants maintained a level of competence at 12-months following training.
Madden\textsuperscript{14} (Level of Evidence: 3)

- **Purpose:** Investigate the extent that nursing students acquire and retain CPR knowledge and skills following training.

- **Methods:** Participants underwent a pretest, engaged in a 4-hour CPR training program, underwent a post-test and re-testing at 10 weeks.

- **Results:**
  - *Decay in both knowledge and skills were found at 10 weeks following CPR training (compared to post-test scores); however, scores still were improved compared to pretest.*
  - *This study found that participants never acquired the CPR skills necessary for passing.*
Broomfield\textsuperscript{15} (Level of Evidence: 3)

- **Purpose:** Investigate the retention of basic CPR skills and knowledge by nurses following professional development.

- **Methods:** Participants underwent a pretest, engaged in a 3-hour CPR update, underwent a post-test and re-testing at 10 weeks.

- **Results:**
  - *Decay in both knowledge and skills were found at 10 weeks following CPR update; however, scores still were improved compared to pretest.*
  - *No differences between the rate at which skills and knowledge deteriorated, which contradicts most of the literature.*
Curry and Gass\textsuperscript{16} (Level of Evidence: 3)

- **Purpose:** To determine the rate of deterioration of knowledge and skills in CPR among physicians and nurses.

- **Methods:** Physicians and nurses were assessed on CPR knowledge and skills, engaged in CPR training, were re-assessed immediately after, and again at 6 months and 12 months.

- **Results:**
  - After 6 months, skills in both groups decayed to near baseline levels.
  - Skills in both groups reached baseline levels at 12 months.
  - Furthermore, both physicians and nurses incorrectly perceived their skill level, with an illusion of competence.
Conclusions from Skill Decay Literature
In athletic trainers, is there a decay in acute care skills over time?

Answer: Yes, there is sufficient evidence to suggest that acute care skills decay over time in multiple health care professionals, including athletic trainers.

Grade of Evidence: B
STRATEGIES TO COMBAT SKILL DECAY
## Clinical Question

In athletic trainers, what educational strategies can be used to combat the decay of acute care skills?

<table>
<thead>
<tr>
<th>Patient</th>
<th>Athletic Trainers who provide patient care in settings in which acute care skills may be implemented</th>
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</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Educational strategies</td>
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<tr>
<td>Outcomes</td>
<td>ST: Prevent skill decay (i.e. retain skill)</td>
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<td></td>
<td>LT: Provide competent patient care</td>
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</tbody>
</table>
■ **Purpose:** Develop a training program that provides student paramedics with initial knowledge and experience in laryngeal mask airway insertion skills, and also to provide ongoing skill retention.

■ **Methods:** Initial training on clinical skills, randomized into two groups at 6 months: 1) intervention group, 2) control group, and then re-assessed.

■ **Results:**

  – *Intervention group had significantly higher skill performance, shorter time to insertion, and fewer attempts to achieve success.*
Purpose: Determine the effect of pediatric airway management training on self-efficacy and skills to determine which retaining method is superior.

Methods: Self-efficacy was measured prior to and following initial and retraining. Paramedics were trained to proficiency in bag-mask ventilation and endotracheal intubation on manikins. Assigned to one of 4 groups: 1) Control (no retraining), 2) Videotape Presentation, 3) Self-Directed Learning, and 4) Instructor-Facilitated Lecture and Demonstration. Retraining, followed by a second skills assessment.

Results:
- Self-efficacy improved with initial and retraining, but a “gap” was found between self-efficacy and skill retention.
- Noticeable skill decay after 6 months (majority unable to pass).
- Lecture and demonstration format was superior to other retraining methods in this study.
Kovacs et al.\textsuperscript{12} (Level of Evidence: 2)

- **Purpose:** Determine natural history of airway management skill decay and examine the effect of independent practice and periodic feedback on skill maintenance.

- **Methods:** Health science students were initially trained, then assigned to one of three groups: 1) control, 2) independent practice plus periodic feedback, 3) periodic feedback only. Re-assessed at 16, 25, and 40 weeks.

- **Results:**
  - *Independent practice plus periodic feedback group maintained skill over time.*
  - *No differences amongst the other groups.*
Wayne et al.\textsuperscript{11} (Level of Evidence: 3)

- **Purpose:** To evaluate simulation-based educational interventions on the retention of advanced cardiac life support skills of internal medicine residents.

- **Methods:** In a previous study, participants underwent initial training in ACLS using a simulation-based and deliberate practice training program, which resulted in 38% increased skills compared to a control group. There were no additional educational interventions, but simply re-assessment at 6-months and 14-months following training.

- **Results:**
  - Residents maintained their skills at 6-months and 14-months following the intervention.
Conclusions from Literature Related to Educational Strategies to Combat Skill Decay
Let’s Re-Visit our Clinical Question

In athletic trainers, what educational strategies can be used to combat the decay of acute care skills?

Answer: While multiple strategies may be useful, it appears as though hands-on engagement and feedback is most beneficial to maintaining skill.

Grade of Evidence: C
CONCLUSIONS
Conclusions

Skill Decay
- Acute care skills decay significantly at 6 to 12 months following training.
- Self-efficacy does not decay as rapidly as skill.

Educational Interventions
- Simulations may be an effective learning strategy (to prevent decay).
- Hands-on engagement with expert feedback may be the most effective strategy.

Caution:
- More research is needed in this area!
CLINICAL BOTTOM LINE
Educators

- Need to evaluate our teaching strategies.
  - Not all educational techniques are effective.
  - Perhaps simulation-based training will allow for better retention of skills.

- Instill the importance of regular rehearsal of skills with a planned, deliberate approach.
  - Annual in-service training
  - Deliberate practice with supervision
  - Simulation experiences
  - IPE/IPP activities
Clinicians

- Acute care skills decay significantly between 6 months and 1 year after training.
  - Self-efficacy may not deteriorate as rapidly as skill.

- We have an ethical and legal responsible to remain competent.

- Regular rehearsal, utilizing a combination of hands-on practice with expert feedback.
  - Prior to the start of pre-season (e.g. In-Service Day)
  - IPE/IPP activities at the local hospital/clinic
  - Staff training
  - Work with local education programs
Questions?

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References


References


