

Staying Alive:

the use of musical memory aids to
assist laypersons in properly paced
chest compressions

Student EBM presentations

Gareth Davies and William Dace
University of Oxford

October 2014



The question

Scenario: A PE teacher is watching TV and stumbles upon the Vinnie Jones advert. His school is putting on CPR teaching next week and he wonders whether listening to music can help him keep rhythm whilst administering cardiopulmonary resuscitation (CPR).

Clinical question: Can musical memory aids help laypersons comply with the American Heart Association (AHA) CPR guidelines of 100bpm?

| | |
|----------|------------------------------------------------------------------------------------|
| P | Previously CPR-untrained laypersons learning CPR |
| I | Subjects taught to perform CPR to the cadence of The Bee Gees song "Stayin' Alive" |
| C | Subjects receiving a standard CPR educational experience |
| O | Percent of correct compressions (adequate rate, depth, and compression release) |



The search and search results

- Search: Music* cardiopulmonary resuscitation
- Search results:

Death Before Disco: The Effectiveness of a Musical Metronome in Layperson Cardiopulmonary Resuscitation Training.

Hafner JW, Jou AC, Wang H, Bleess BB, Tham SK.
J Emerg Med. 2014 Oct 1; . Epub 2014 Oct 1.

How ABBA may help improve neonatal resuscitation training: auditory prompts to enable coordination of manual inflations and chest compressions.

Roehr CC, Schmölder GM, Thio M, Dawson JA, Dold SK, Schmalisch G, Davis PG.
J Paediatr Child Health. 2014 Jun; 50(6):444-8. Epub 2014



Recruitment

- Students from the University of Illinois at Urbana-Champaign (UIUC), **without CPR certification** were recruited
- 96 students enrolled (50:46 experimental:control)
- Stratified block randomisation in groups of 4. Instructors also randomised
- 88 completed follow-up (4 from each group dropped out)
- No difference in sex or educational level between Exp:Con groups
- Exclusion criteria
 - Age > 80 years
 - Inability to speak/comprehend English
 - Hearing impairment
 - Physical inability
 - Occupation as health care professional
 - Prior formal CPR training



Outcome measures

- Post education, both groups performed 2 min (five cycles) of CPR on a ResusciAnne SkillReporter recording manikin without audio stimulus
- All participants were asked to return at least 6 weeks after their educational experience and again demonstrated 2 min of CPR unassisted on the SkillReporter recording manikin.
- Measured outcomes:
 - Compression rate (cpm)
 - Compression depth (>50 mm considered adequate)
 - Percent of correct compressions (adequate rate, depth, and compression release)



Statistical analysis

- Good:
 - Intention to treat analysis
 - Power test: calculated that 42 subjects from each group would allow them to test difference with 80% at 2-sided significant level of 0.05
 - Data analysed with subject identifiers removed
- Bad:

Main Results

- The mean individual compression rates were grouped for analysis into two groups:
 - 100-120 cpm
 - other cpm
- Immediately following training: higher but non-significant proportion of subjects were able to maintain 100-120 cpm in the experimental group (48% vs. 39%)
- At 6 week follow-up: significantly more of the experimental group were in the 100-120 cpm range (74% vs. 43%)



Main Results

Table 2. Compressions Per Minute between Experimental and Control Groups During the Initial and Follow-Up Assessments

| | Adjustment | Control Group (n = 46) | Experimental Group (n = 50) | Mean Difference or Relative Risk (95% CI) | p Value |
|----------------------|------------|------------------------|-----------------------------|-------------------------------------------|--------------|
| Initial assessment | | | | | |
| n | | 46 | 50 | | |
| cpm | None | 121 (21)* | 109 (15)* | 12 (4 to 19) | 0.002 |
| 100–120 cpm | None | 18 (39)† | 24 (48)† | 1.23 (0.77 to 1.95) | <u>0.386</u> |
| Other cpm | None | 28 (61)† | 26 (52)† | | |
| Follow-up assessment | | | | | |
| n | | 42 | 46 | | |
| Mean cpm | None | 120 (20)* | 111 (13)* | 9 (2 to 16) | 0.014 |
| | Adjusted | 117.6 (22.7)* | 114.1 (22.1)* | 3.5 (–3.1 to 10.3) | 0.492 |
| 100–120 cpm | None | 18 (43)† | 34 (74)† | 1.72 (1.17 to 2.55) | 0.006 |
| Other cpm | | 24 (57)† | 12 (26)† | | |
| | Adjusted | | | 1.76 (1.20 to 2.58) | <u>0.004</u> |

CI = confidence interval; cpm = compressions per minute.

* Values are mean (standard deviation).

† Values are n (%).

Not significant

Significant



Implications

- Currently, CPR performance in and out of hospital most often does not achieve guideline parameters
 - Kern (2002), Rea (2010), Hedges (2005), Abella (2005)
- The use of a music metronome represents an easily taught, cost-effective modality to assist laypersons in performing properly paced chest compressions.
- Additional research on a larger, heterogeneous population, as well as health care workers, is warranted.
- We also do not know whether musical metronomes actually improve mortality/morbidity outcomes after CPR following cardiac arrest

