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## Use of Mnemonics in Prehospital Education and Training. By Jim Crabtree, MICN, CEN, Paramedic Instructor

I have to start this article by stating my bias. Personally I do not like the use of keyword mnemonics in prehospital educational training programs. The last issue of TOES had a comment and information from Ralph Shenefelt that seems to support the use of mnemonics by citing four articles from the ERIC database and concluded that there are no studies that found that mnemonics are ineffective. I feel that this 'conclusion' is based on the Shenefelt's bias in favor of the use of mnemonics. In analyzing any articles to show the value (or lack there of) for mnemonics in prehospital teaching, I feel that there should be some established ground rules;

### 1. We do not teach children.

CPR and first aid classes may be given to school children and some participants in prehospital training may be adolescents and not yet be full adult learners. However, to extrapolate the value of mnemonics from a pediatric educational situation into a learning environment that should be mature and adult is not applicable. Unfortunately very few of the ERIC abstracts related to mnemonics clearly indicate the age of the students evaluated.

The cited article by Levin (1980) had two concluding statements that clearly show that this particular study is generally flawed and that it has no relevance for prehospital education

"Most children enjoy using mnemonics"

"Many teachers believe in the value of mnemonics"

Clearly these are not scientific conclusions based on any experimental research. Rather they represent nothing more than the biased opinion of the author.

### 2. We do not teach handicapped, disabled or the learning impaired.

Many studies related to the use of mnemonics and teaching involved this special population. While there are certainly some people who take a prehospital educational course who might meet the standard of being 'disabled' it is not realistic to assume that our classes have many attendees who are developmentally disabled or have severe learning disabilities. Even IF there were such persons in a class, they would be in a

minority and to gear the teaching methods to meet their needs would be a great disservice to all the 'normal' people who are enrolled.

### 3. Define "mnemonic"

Most people think of a mnemonic as being a keyword or key phrase. Every medical student knows the phrase "On Old Olympus Towering Top, A Finn And German Viewed A Hopp" as a mnemonic for remembering the names of the 12 pair of cranial nerves. A companion phrase identifies their function (Motor, Sensory or Both). In prehospital care, keywords such as SLUDGE for recalling the symptoms of organophosphate poisoning are well established.

Oftentimes 'keyword' is what people mean when they say 'mnemonic' but in applying any study the consumer of the information must be clear about exactly what was being evaluated. There are other mnemonics and mnemonic devices that exist and some of them perhaps do have value in prehospital medical training programs.

Do you remember what you had for dinner two nights ago? Probably not. Do you remember what you had for dinner at your wedding? You probably can. Why? Because of the strong emotional ties connected to the event. The wedding day is a 'mnemonic' for the menu.

Other mnemonics involve visual associations. These have long been used for remembering somebody's name. My last name is Crabtree, I am 6'7" tall. People do not seem to forget my name. The association between my physical height and that of a tall tree is a perfect mnemonic.

Other mnemonics or memory keys, can be associations between specific locations and situations. I only use my ATM card at a bank ATM machine. I never use it at markets or points of retail sales, except once. I was in a store without cash and attempted to use my card. I could not for the life of me remember my PIN code. It was very embarrassing, I did not complete the sale and the clerk probably thought the card was stolen. I could only remember my PIN code when standing in front of a bank machine. (I later wrote it down for 'emergencies')

In prehospital care it is not important to be able to recite everything you know about a particular drug until you are ready to give it. A very good paramedic may not remember anything about a drug until it is needed by using situational mnemonics. This paramedic may score low on a formal written test but might be very good in the field. Conversely a student may score 100% on a pharmacology test by using keyword mnemonics but not be able to recognize those situations in the field when a particular drug should be used.

### 4. Do we teach material that can be adapted to mnemonics?

Are keyword mnemonics an appropriate pedagogy for prehospital educational programs? You cannot 'mnemonic' your way through a skill. Either your hands can perform the task or they can not. Much of prehospital education IS skill training. (i.e. taking a blood pressure) I could not find any research that supported the use of mnemonics for skill training. (Is there mnemonic for applying a traction splint?) I do not see where mnemonics have a place in psycho-motor learning, the type of learning most often used in prehospital training programs.

There is support concerning the use of mnemonics for 'learning' completely academic information. Desrochers, Alain, et al (1989) ERIC # EJ396041 found mnemonics to be of great value in teaching French speaking university students the grammatical gender of German nouns.

However, I do not know of any prehospital situation that requires a level of understanding to be this technical or exacting. Prehospital care is a process of applying what has been learned, not memorizing isolated facts.

The Patient Assessment skill is undoubtedly the most difficult skill for students to learn. To master this skill there is a certain amount of memorization required. For example; during a post-trauma total body check memorizing the fact that the assessment is performed from the head to the toe and knowing what to check at each part of the patient's anatomy must be memorized. I have however seen many a student expend so much energy memorizing a BTLT type assessment and reciting "DECAP-BLS" that they are not really looking for injuries, not really visualizing potential problems and not really trying to predict injuries based on mechanism of injury.

When a student checks the feet of a patient who has a chief complaint of SOB for "pulse, motor and sensation" (PMS) they are just reciting a mnemonic and clearly have NOT learned the concepts. I have tested ACLS many times and have had students tell me they are going to 'treat' PEA by considering "MATCH x4 ED" but when you ask what those situations are, or how to rule in or rule out the treatment of each, they quite often fall flat, unable to apply the information.

Another question to ask in this area is; Do keyword mnemonics interfere with the point of what is being taught? Do the mnemonics conflict with other learning?

In teaching people how to deal with a fire situation there is a mnemonic RACE. The letters standing for either; Rescue Alarm Confine Extinguish or Rescue Alert Confine Evacuate. First off note that the mnemonic itself is not consistent. If you are involved in a fire situation should you stay & Extinguish the fire or protect yourself by Evacuating? Two conflicting ideas are within one mnemonic.

If the point of the RACE mnemonic is to encourage the people you are teaching how to protect both lives and property during a fire, then RACE is not a good phrase to instill. If the goal is to encourage people to stay near the fire location and use an extinguisher then this is a bad association. The mnemonic itself implies "RACEing" for the exit as quickly as possible. This self preservation reaction would probably be reflexive for anyone facing a fire situation. The mnemonic itself does not reinforce the purported concept of staying and controlling the situation.

I am also not certain of the value of a learning theory that implies that during the panic of a fire situation somebody is going to be able think clearly enough to mentally unzip the mnemonic RACE and apply it by performing all the involved tasks. Deep cognitive processes in a life & death situation do not seem to be very realistic. This is a place however where mnemonics can receive further study.

Contrary to the comments by Shenefelt, there are studies related to the use of mnemonics that might be extrapolated to show that mnemonics are indeed ineffective in the prehospital environment;

Wang, Alvin; Thomas Margaret (1995) ERIC # EJ517169. "Effect of keywords on long Term Retention: Help or Hindrance?" (Study involved 176 college students). The keyword mnemonic produced superior immediate performance but after two days, higher levels of delayed recall were associated with semantic context learning not mnemonics

Miller, Gerald (1967) ERIC #ED011088 "An Evaluation of the effectiveness of mnemonic Devices as Aids to Study" (Study involved High School Freshmen) Mnemonic devices led to a marked improvement in test scores. This raised the question of whether textbooks should contain mnemonics. The author suggested the use of mnemonics may decrease in effectiveness as the number of mnemonics used by any one student increases.

Wang, Alvin et al. (1989) ERIC # ED317959 "Do Mnemonic Devices Lessen Forgetting?" (Age of participants not clearly identified) Results indicated that subjects using mnemonic devices forgot at a faster rate than subjects rote rehearsing the same information. Thus contrary to widely held expectations, mnemonic devices do not appear to confer any long term advantage to the retention of material so learned.

My experience with mnemonics in prehospital education at both the EMT and paramedic levels is that mnemonics do NOT prepare a student for actually performing the tasks demanded from a practitioner once they complete their program and begin working. My feeling is that their short term increases in retention and test scores do nothing but give a false sense of accomplishment to both the instructor and the student. I believe that mnemonics can very easily become crutches to compensate for poor teaching and poor studying. Crutches that fool both students and instructor into wrongly believing a mastery has occurred when in fact it has not. Clearly more research into mnemonics is needed. However for application and extrapolation in the prehospital setting, these studies should only involve adult type learners and involve both cognitive and psycho-motor type material.

Jim Crabtree first became an EMT in a rural volunteer department in 1981 and acquired an Associates degree RN in 1986. Obtaining a Bachelors degree in Nursing From Cal State Long Beach in 1992 (BSN) he began his nursing career in the emergency room at Martin Luther King hospital in Watts, CA where he stayed for 5 years before moving to LA County's Paramedic Training Institute (PTI) where he taught & coordinated paramedic training classes full time for 6 years.

PTI is a section of the Los Angeles county EMS agency. For the past year he has been in charge of approving AED programs in LA County among other things. He teaches CE classes on special subjects and recently has been involved in starting a training program to teach Nuclear Biological and Chemical weapons (NBC, weapons of mass destruction) information to every paramedic in LA county. (~4000 people) He serves on the committees to rewrite & update LA's EMT curricula and a CA state EMT skills task force.

He is currently certified as a Mobile Intensive Care Nurse (MICN) and a Board Certified Emergency Nurse (CEN) as well as have instructor cards for the AHA stuff (BLS, ACLS etc.)