

Shift Work, Circadian Rhythm and Satisfaction—Surviving Your Month in Emergency Medicine

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This is probably the first time that most, if not all, of you have attempted to work on rotating shifts. Regardless of how many nights you were up during your surgery and OB-GYN clerkships and how many “all nighters” you pulled to get through your preclinical years- this is different! Shift work is one of the most difficult and stressful parts of emergency medicine. Unlike your other experiences, which mainly involved fatigue, you are now asking your body to adapt to a completely new physiologic environment. If you do not understand how your body adapts to changes in its sleep-wake cycles, you will find that you are chronically tired, irritable and even sick most of this month. Understanding the physiology of circadian rhythms will definitely improve your sense of well-being and enjoyment.

We know that shifting the sleep-wake cycles is bad for the body. Unfortunately, emergency medicine is a 24 hour a day job. There is never a “safe” time to leave the ED unattended so we can relax and get some much needed sleep. Furthermore, it’s difficult to get physicians to agree to work only night shifts because of problems with family life and professional growth and development. Most medical staff meetings, CME activities and family activities are in the day. I have yet to go to a hospital committee meeting scheduled for 3 am! When 108 emergency physicians were polled in 1985 about the stresses in their practice by the ACEP Behavioral Emergencies Committee, what do you think they listed as their #1 stress? Dealing with sudden death? No! High volume and high acuity patients? No! Malpractice? No! You got it- shift work.

The problems of shift work are a modern ailment. When I was a child in the 1950’s and 60’s, no one thought of buying gas in the middle of the night and gas stations were not open. Who would have dreamed then you could do your grocery shopping in the middle of the night and go to Wal-Mart at 3 am to get your aunt’s birthday present. Emergency “Rooms” closed in the evenings and were staffed by “on call” nurses. If the nurse thought you were sick enough to need attention, he or she would call the doctor for orders to get you through the night and the doctor would see you on rounds in the morning. That was less than 20 years ago! Today, shift work has become common-place. Many industries remain open all night and I do most of my shopping from 24 hour a day catalogues when I’m on night shift.

We know well the problems of shift workers from industry studies, mostly police and the airline industry. 60-80% of shift workers complain of chronic sleep disturbances. Stomach disorders are 4-5 times more common with an eight-fold increase in gastric ulcers. 80% of shift workers complain of fatigue. Depression is more likely and physicians who work shifts (emergency medicine and anesthesia) are more likely to be impaired. Shift workers have more accidents, especially over weekends when they try to stay up all day to be with their families. They have more automobile accidents on the way to and from work. Divorce and abuse are higher among those who work night shifts. There is a higher cardiovascular mortality in shift workers (equal to smoking 1 pack per day of cigarettes). Hypertension is more common in shift workers and there is decreased fertility in women and a decreased sperm count in men.

Furthermore, length of sleep is a good predictor of survival. People who sleep an average of 4 hours a day have 10 times the mortality of those who sleep 7-8 hours a day. Surveys tell us that people who do all night shift work sleep on the average of 4 1/2 hours a day, whether in industry or medicine. They have a 5-10 year shorter life span than the normal population. Oversleeping does not help. Sleep cannot be made up. The “best” sleep is 7-8 hours a day. People who sleep 10-12 hours a day also have increased mortality. **It is obvious that sleep is an art that must be mastered if we are to survive shift work.**

Who then can do shift work? When polled, 20 % of the population of shift workers say they have “no problem” doing shift work. 60% admit that they have a problem and struggle with rotating shifts but are able to do their jobs. About 20% of the population have extreme difficulty with shifts and about half of those are unable to tolerate shift work at all. People who tend to be evening or “night people” (owls or extreme owls) tend to

tolerate shifts better than larks or extreme larks. When you are on vacation, if you stay up to 2 or 3 am, you are an extreme owl and will probably adapt relatively easily to shifts. If you are like me, and get up with a cup of coffee at 5:30 to watch the sun rise- you will struggle with shift work as I have for the most part of 25 years. People who do well on rotating shifts tend to be those who handle tension and stress better and have greater social adaptability. They tend to have a high work efficiency and a high view of responsibility toward their work. They also have fewer children and little to no child care responsibilities.

Let's look at sleep stages. Stage 1 is a transition period. Normally it takes about 10 minutes for the non-sleep deprived worker to fall asleep. Longer delays are a predictor of a sleep disorder. Shorter delays (1-3 minutes) are a predictor of sleep deprivation. Stage 3 (delta sleep) is the most important. This is restorative sleep and is the first to be made up after deprivation. This is the stage when hormones are secreted and many of the body's homeostatic mechanisms are active. REM sleep is dream sleep and is important for a sense of well-being. REM deficiency causes moodiness and loss of mental alertness. Insufficient time spent sleeping can cause REM deficiency as will alcohol and many sleeping aids. Frequent interruptions in sleep will also cause REM deficiency, like a noisy environment (in a call room or motel) or frequent beeper calls. Just because you slept long, does not mean you slept well. Fragmented sleep can be caused by sub-arousal noise, caffeine, benzodiazepams, alcohol and food.

Is there any good news here, or do I need to reconsider and go into dermatology? Actually, there are many mechanisms that can help the shift worker. Attention to good sleep and health habits can drastically improve your sense of well being and productivity. First, shorter shifts are better. Even though you may have to work an extra shift to "make up the time", the 8 hour shift is preferable to the 12 hour shift. This gives you more time to rest and adapt to the changes. No one works 24 hour shifts anymore and surgeons are the only people in the world I know who think they are invincible enough to work 36 hours straight! No one in industry would even consider this. Clockwise rotation is the best method. Start with a morning shift for several days, advance to the evening and then to the night shift. Make sure you have several days off before starting the rotation again. It is easier to delay sleep than to advance it. It takes a worker about 6 days to adjust to a new shift so this is the minimum anyone should be on a particular shift. Actually, for those doing chronic shifts, a rotation schedule spread over 6 weeks to 2 months seems best. With a longer clockwise rotation schedule, industry reports as high as a 90% increase in employee satisfaction and a 20% increase in productivity. Sleep difficulties may be down as much as 50%, accidents are down as are the use of alcohol and sleep aids. Some emergency medicine groups are experimenting with longer rotations. I heard of one group that worked 1 year of nights. In exchange for that year, they were guaranteed no more nights for the next 6 years. Industry is going to continuous coverage on the same shift. They are hiring people for a particular shift and offering incentives (money, extra vacation etc.) for those willing to work nights. This is evolving into the circadian "gold standard" of industry and some emergency medicine groups are adopting this as well. For those not able to adopt a longer rotation, the "isolated" night shift may be an alternative. Simply stated, each worker takes 1 night a week. While this is hard while you are working your night, it does not shift your circadian rhythm and after a day or so, you are back into your normal routine (until the next night).

There are a few other ways to be kind to your body. You can try "anchor" sleep. This is a period of sleep that one gets every day regardless of rotation. For example, you are working a series of nights and sleep from 8 am till 4 p.m. during your string of nights, on your days off, try to sleep from 8 am till noon. These four hours will be the same regardless of your shift. Sleep will be more physiological and you will be sleeping at least half the time during time normally reserved for sleep. Another alternative is "split sleep". This is best for a short series of nights like those worked during a one-month rotation in the emergency department. Since a short series of nights will not allow for effective shift of the sleep/wake cycle, the goal is to prevent body rhythms from shifting into night. During "split sleep" you will sleep in 2-4 hour cycles adjacent to your normal sleep time. After working a night shift, go to bed immediately and force yourself to get up in 4 hours. Sleeping longer will retard the next night's sleep. Go about your normal daily activities. If you must work again that night, sleep another 2-4 hours before going into work. This disrupts the rhythm less and you will feel more rested. Another method is to take advantage of a nap. The best napping time (siesta) is during your body's normal metabolic

low, between 2-3 in the afternoon and 2-4 am in the morning. Sleep is of better quality during these hours and is more “restorative”. Short naps can be helpful as well. Pilots on transoceanic flights found that napping during the day or night for 30-40 minutes can cause increased mental alertness. Beware, napping longer (1 hour) can cause “sleep inertia” and actually decreases performance.

What else can be done to make shift work easier? First, make sure you have a quiet place to sleep. Noisy environments cause sleep fragmentation. Even though you may not awaken because of “sub-arousal” noise, your sleep may be fragmented by constant shifting sleep stages. Fragmented sleep is not good sleep. Avoid alcohol, sleep aids and fatty foods before sleep all of which tend to fragment sleep. Beware of that pizza at 4 am. You cannot be responsible for childcare and sleep at the same time. You will do a poor job at both! Ear plugs or “white” noise may be helpful if you do not have a quiet place to sleep. Buy a message machine and turn off the phones and beeper! Second, make sure the room temperature is conducive to sleep. The best temperature is around 75 degrees. Too hot an environment or too cold a room will result in poor sleep and unpleasant dreams. Third, moderate exercise improves sleep. Exercise not only improves sleep and overall general health, but psychological well being as well and should be a lifetime commitment for everyone, regardless as to whether they are shift workers or not! Vigorous exercise has been shown to decrease the time to shift circadian sleep/wake cycles from 8 to 1.5 days in the animal model. Fourth, make sure your bedroom is conducive to sleep and develop and maintain a sleep ritual. Remove the TV and computer from bedroom and do not work in bed. If you do, you are likely to take your work to bed with you or to have the violence on TV upset or effect your sleep. Fifth, very bright light for several hours after awakening decreases the time needed to shift the circadian rhythm. The bright light improves your sense of alertness and refreshment after awakening. Try an outside activity in the bright sun light after awakening. This might even be combined with exercise. You will feel refreshed. Conversely, bright light and exercise before sleep may inhibit sleep. Lastly, work with family and friends to make sure you have quality time with each. If you are happy, you will adapt to shifts better. Your family and friends will never understand the way you feel after working shifts- so don’t expect them to. They expect you to live a normal day lifestyle after working nights. Even though my wife is a physician and I have been working shifts for many years, she still doesn’t understand the way I feel after a string of nights. But our lives are better when I have protected time with my family each evening before I return to the hospital.

Understanding some of the stresses of shift work, as well as the coping mechanisms, will make your rotation easier and less stressful not to mention healthier. There is no reason why, with attention to some of the above details, you can not only survive the next month, but actually look forward to it with enthusiasm and anticipation. This will be a different experience for you. Use this month to experiment with some of the above suggestions. No matter if you never do another month of shifts, you will be a better person for it. Some of us have been doing this for more than 20 years and are still happy, healthy, productive and looking forward to our next shift in the emergency department.