The dance marathons of the early 20th century were created for entertainment, but for the contestants, it was anything but entertainment. Contestants danced around the clock, resting only 10 minutes every two hours. The shortest marathon lasted 27 hours; the longest marathon was 5 months, 6 days. As a result, the contestants developed severe sleep deprivation. This paper will use modern sleep research to explain their sleep deprivation symptoms.

According to dance contestant Frank Calabria, during the early morning hours, contestants would experience hallucinations. One woman was disqualified from a contest when she ran out of the dance hall while hallucinating that a roomful of men with guns was waiting to shoot her. Hallucinations are common during sleep deprivation. In a modern 42-hour sleep deprivation study, 8 of 10 healthy subjects experienced hallucinations and disorientation.

Between the hours of 2-7 a.m., there is a natural circadian propensity to sleep. During those hours, a person’s energy is at its lowest and the drive for sleep is at its zenith. The dancers’ resistance to their natural circadian rhythm’s drive for sleep during the early morning hours forced many contestants to the breaking point. Marathon nurses and trainers were not seriously concerned about the resultant hallucinations since they disappeared after a short time, though they could continue for several hours. The timing of the hallucinations may have affected their duration. Hallucinations occurring early in the nadir period of the circadian rhythm would last several hours—events occurring in the latter part of the nadir period would cause only minutes of disassociation from reality. Core body temperature has a robust circadian rhythm. Its nadir temperature is around 6 a.m. The rising circadian rhythm may have brought the contestants out of their altered state.

The most obvious consequence of sleep deprivation is excessive sleepiness. According to Mr. Calabria, “To maximize their sleep time, some contestants practiced a form of self-hypnosis: as soon as they lay down for their 10 minute break, they trained themselves to fall into a deep sleep.” He is describing an extremely quick sleep latency, perhaps into REM or SWS. One modern study found a 60% reduction in sleep latency after only one night of total sleep deprivation.

SWS predominates recovery and is the most restorative sleep stage. The human body will conserve SWS at the expense of other NREM and REM sleep. One modern study found that depriving a person of SWS is more difficult than depriving them of REM sleep. As sleepiness and sleep fragmentation increase, the more the arousal threshold is heightened. Under normal circumstances, subjects in SWS are very difficult to awaken. Add days, weeks and months of sleep deprivation and arousal can become unattainable. During one marathon, Joseph Tartore instructed his partner Helen Schmidt to sock him in the jaw if he began to get groggy. Several times Helen punched him and kicked him in the shins to awaken him, but Tartore was unarousable and the couple was eliminated.
The first death during a dance marathon was 27 year old Homer Morehouse who dropped dead from heart failure as he left the dance floor after dancing 87 consecutive hours. Activation of inflammatory processes during sleep loss is one potential mechanism linking chronic sleep restriction and increased cardiovascular risk. The dancers experienced stress, tissue damage and infection during their marathon ordeals. Stress, tissue damage and infection all release inflammatory cytokines, and a chronic elevation of inflammatory proteins can contribute to cardiovascular disorders. In a modern 40-hour sleep deprivation study, it was found that only one night of sleep loss triggered a stress response that included stimulation of inflammatory proteins in healthy young subjects. It can be seen how cardiovascular risks could increase over time for these dancers.

The marathon contestants ate a staple diet every three hours, continuing to shuffle as they ate at tall table tops. It was estimated that marathon dancing was equivalent to walking 40 miles a day. Although contestants were expending huge amounts of energy to keep moving, they gained weight. A modern study found that sleep is a major modulator of hormonal release and glucose regulation. There is a link between sleep deprivation and hormones that play a major role in the central control of appetite and energy expenditure, such as leptin and ghrelin. Reduced leptin and increased ghrelin levels correlate with increases in subjective hunger when individuals are sleep deprived.

Automatic behavior is defined as continuing to perform a routine task without conscious awareness after falling asleep. Automatic behavior occurs in subjects who are exceedingly sleepy. An extreme form of automatic behavior occurred at the marathons. After about 500 hours of dancing, dancers would sleep with their heads resting on their partners’ shoulders but keep their feet barely moving to avoid elimination. This acquired automatic behavior of simultaneously sleeping “on their feet” and shuffling enabled the dancers to continue to compete. Modern studies have documented that automatic behavior of a simple activity continues after sleep occurs during polysomnogram.

REM sleep deprivation is seen in patients who suffer from badly disrupted, non-refreshing sleep. Modern animal experiments have shown that REM sleep deprivation leads to increased aggression. Dance contestants would claw at their partners’ faces and break into fist fights. However, REM deprivation may have actually helped the contestants stay awake. A modern MSLT study revealed that REM deprivation enhanced alertness in their sleep-deprived group.

One advantage of dancers’ extreme exhaustion was that it permitted doctors to perform painful procedures, such as incision of abscesses, without using anesthetics. In a modern 40-hour sleep deprivation study investigating pain levels in SWS and REM sleep deprivation, it was revealed that both SWS and REM deprivation tended to decrease pain thresholds (making the subject feel more pain). However, recovery sleep, after SWS interruption, produced a significant increase in mechanical pain thresholds. The continual dancing increased the pain thresholds and acted as an analgesic effect on pain. Perhaps the contestants getting restorative SWS during their 10-minute breaks and as they slept on their partners’ shoulders created this higher pain threshold.
Sleep is all that is required to reverse the effects of sleep deprivation in almost all circumstances. In a 1928 New York Times article about recovering from contest sleep deprivation, medical advice encouraged contestants to “break into their sleep in easy stages.” In a modern study, subjects participating in a 48 hour sleep deprivation group recovered 42% of their total amount of sleep lost in a 24 hour recovery sleep period. It is evident that subjects recovering from sleep deprivation need more than one night of sleep to recover completely, but they don’t need to ease into it as early 20th century physicians advised.

In the early 20th century, sleep medicine did not exist. Since the 1950s, sleep medicine has taken huge strides. It is unfortunate that data on these dancers’ extreme sleep deprivation experiences could not be gathered and analyzed, as it would have gone far to expand our scientific sleep research base.
References


