



Historical Issues in Sleep Medicine

Elliot D. Weitzman MD and early sleep research and sleep medicine in New York



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ARTICLE INFO

Article history:

Received 27 April 2015

Received in revised form 14 May 2015

Accepted 29 May 2015

Available online 23 June 2015

Keywords:

Weitzman

Sleep

New York

History

Research

Montefiore

Elliot Weitzman, past Professor of Neurology and Chairman of the Department of Neurology at Albert Einstein College of Medicine and Montefiore Medical Center in the Bronx, NY, USA, had an illustrious career and was a true pioneer of sleep research and sleep medicine in New York in the 1960s, 1970s, and early 1980s. He created the clinical sleep center at Montefiore Medical Center in New York on 27 April 1977, which was the first sleep center in the United States to be accredited by the American Academy of Sleep Medicine (AASM) (formerly the Association of Sleep Disorders Centers (ASDC)). The center was modeled in part on the first sleep clinic in the country, a clinic dedicated to the diagnosis, research, and treatment of narcolepsy that was developed by William Dement at Stanford University in California in 1964.

Weitzman, who was born in Newark, NJ, USA, in 1929, was originally interested in journalism and joined Iowa State University, but soon transferred to, and graduated from, the University of Iowa with a BA in zoology in 1950. He then went to medical school at the University of Chicago and was in the same class as William Dement. At that time, Weitzman already had an interest in neurology and in 1951 he became an instructor in neuroanatomy (Fig. 1).

Weitzman and Dement stayed in contact after their graduation with an MD degree from the University of Chicago in 1955. Dement studied sleep and dreams in Chicago under the mentorship of Nathaniel Kleitman and moved to New York in 1957 as an intern at the Mount Sinai Hospital, which, at that time, was not yet a medical school, and he worked on sleep with Charles Fisher in the Department of Psychiatry who was performing research on dreams. "I had a sleep laboratory (in my apartment on the West Side!), rent paid for by the NIH. Many of my sleep subjects were recruited from the Radio City Hall dancing Rockettes," said Bill Dement.

Sleep deprivation received a lot of publicity in New York in the 1950s, because of Peter Tripp. He was a Top 40 countdown radio personality from Port Chester, New York. His career peaked with his 1959 record-breaking 201-h *wakeathon* (working on the radio nonstop without sleep to benefit the March of Dimes). For much of the stunt, he sat in a glass booth in Times Square. After a few days, he began to hallucinate and, for the last 66 h, Louis Jolyon "Jolly" West, a NY psychiatrist who had received a National Institutes of Health (NIH) grant to study sleep deprivation, gave him medication to help him stay awake [1].

Weitzman initially did his internship at Kings County Hospital in Brooklyn, and then his neurology residency from 1956 to 1959 at Columbia University College of Physicians and Surgeons. He was in the U.S. Army Medical Corps, Department of Neurophysiology, at Walter Reed Army Institute of Research in Washington DC from 1959 to 1961, where he performed pain research on rhesus monkeys that was published in the journal *Science* in 1961 [2]. After that, he joined Albert Einstein College of Medicine in 1961 and continued his pain research on monkeys. Peter MacGregor, BSc, went with

With contributions from Roger Broughton Charles Czeisler William Dement Christian Guilleminault Daniel Kripke Wallace Mendelson Merrill Mitler Mark Pressman Howard Roffwarg Thomas Roth and Jon Sassin. However any factual errors are solely the responsibility of the author.

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Fig. 1. Elliot Weitzman.

Weitzman from Columbia University in 1961 and became the lead technologist in the research and clinical labs at Einstein College. He founded the Association of Polysomnographic Technologists (APT) in 1978 and served as its first president.

The lab was shared by another young neurologist, named Robert Katzman, who became an international leader of Alzheimer's research, and they sometimes did stereotaxic monkey surgery together.

Howard Roffwarg, who was a research associate with Dement and Fisher at Mount Sinai Hospital in 1961, became an instructor in psychiatry at Columbia University in 1962. He was provided space to create a human sleep research lab at the New York State Psychiatric Institute to further his interest in rapid eye movement (REM) sleep and human ontogeny, which he ran from 1962 until 1966 [3,4].

Weitzman and Dement were very good friends and exchanged research findings. In 1962, Dement and Roffwarg visited Weitzman's rhesus monkey lab at Einstein College and watched a sleep recording from an electrode-implanted sleeping monkey. "It looked just like a human sleep study," said Dement. "The ability to visualize the monkey's eye in sleep could not have been better. We took a movie of typical REMs which was so dramatic, showing binocular synchronization and normal rotational velocity. I have been showing this movie very often until this very day."

In the early 1960s sleep research, particularly research on dreams and REM sleep was being developed by a number of scientists in different parts of New York. Montague Ullman, MD, a psychiatrist at New York University College of Medicine and a Clinical Professor of Psychiatry Emeritus at Albert Einstein College of Medicine, had been studying dreams since 1956 [5]. Ullman, in 1962, after several years of pilot studies in the area of telepathy and dreams, created one of the first sleep research laboratories in the country, the Maimonides Dream Laboratory at Maimonides Medical Center, Brooklyn [6,7]. The lab studied dreams and extrasensory perception (ESP), but was closed in 1978.

In 1963, the second annual meeting of the Sleep Research Society was held in New York, which was hosted by Charles Fisher, MD. In addition to his own publications on dreams and some in collaboration with Dement, Fisher, in 1964, performed the first experiments

at Mount Sinai Hospital on penile erections during REM sleep [8,9]. Collaborators of Dement and Fisher at that time were Judith and John Antrobus, both of whom investigated dreams [10,11]. Dement left Mount Sinai Hospital for Stanford University in 1964 and established the first narcolepsy center that was to become the first American full-service sleep disorders center in 1972.

Daniel Kripke, at the beginning of his third year of medical school at Columbia University in New York, spent the summer of 1963 in Weitzman's laboratory in the basement of the Einstein Medical School building. He already had a summer doing sleep research with Joseph Kamiya at the University of California in San Francisco. Kamiya was one of the Chicago founders of the Sleep Research Society, which was initially called the Association for the Psychophysiological Study of Sleep (APSS). The APSS was the world's first sleep research society and being for many years the only one. Moreover, it was international in membership. Subsequently, the APSS abbreviation was used for the Association of Professional Sleep Societies. Roger Broughton, MD, a neurologist in Ottawa, Canada, who had met Dement and Allan Rechtschaffen in Lyon, France, in 1963 at a sleep meeting hosted by Michel Jouvet, MD, first met Weitzman in 1965 at the fourth APSS meeting in Gainesville, Florida. "I remember Elliot's aura of intelligence, passion for research and commitment to the new field of sleep research and chronobiology," said Broughton. "We became good friends, as we were both neurologists." Broughton subsequently developed his own sleep laboratory in Ottawa in 1968.

Daniel Kripke did some monkey sleep research at Columbia University in his second year of medical school, but went on to work with Weitzman at Einstein College. "Elliot was a hard-working and kind mentor who gave me an excellent project," said Kripke. "Together, we implanted some monkeys with surface and depth EEG electrodes; and then I spent many long nights recording their sleep, while trying to rescore the already-recorded records at the same time. Elliot was generous about sharing the publication of those studies, and he taught me to read the literature deeply." During the day, Charles Pollak, MD, a neurologist at Einstein College, would use some of the same monkeys for studies of arousal thresholds [12]. Kripke did clinical clerkships in his last two years at Columbia University, but kept in touch with Weitzman for finishing up the data analyses and writing up the papers for publication.

In 1965, Kripke did an internship at Bronx Municipal Hospital Center (BMHC), but hardly saw Weitzman in that internship year. After Kripke completed his internship in June 1966, he volunteered for the Air Force in September (all physicians were drafted during the Vietnam War). Weitzman had visited Clyde Kratochvil, MD, PhD, at the Aeromedical Research Laboratory at Holloman Air Force Base in New Mexico, where the Air Force was training chimpanzees for the initial space flights; and he pulled some strings to get Kripke assigned there.

Weitzman subsequently hired Kripke to help start a human phase-shifting project run in the Clinical Research Center (CRC) at the Van Etten portion of BMHC. Weitzman had done some pilot studies by sneaking into the bedroom with a flashlight and drawing repeated blood samples for cortisol levels throughout the night using short indwelling catheters. He received a NASA grant and the first project was an investigation of the switching of endocrine effects from daytime to night-shift work. He performed 24-h studies of cortisol using 10-foot catheters, which went through a hole in the soundproofed wall between the polysomnographic equipment area and the bedroom. They were probably the first through-the-wall endocrine sampling studies ever performed. The catheters were made from tubing and Luer-lock couplers with an elaborate setup of an intravenous heparin drip, three-way catheter junctions, and syringes to withdraw the blood and flush the catheters. In 1966, Weitzman published the initial report on cortisol secretion in sleep using the "long catheter" technique that his team pioneered [13].

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