THE EDITOR'S CORNER

The Semmelweis Reflex

Ignaz Semmelweis (1818-1865) was a Jewish Hungarian obstetrician who has been credited with the discovery that handwashing is an effective method to reduce the prevalence of disease. In 1847, Semmelweis observed that puerperal fever, also known as childbed fever—a deadly infection that affected women soon after childbirth—could be virtually eliminated if the doctor washed his hands. Today, Semmelweis is lauded as the "father of infection control," but at the time, his contemporaries ridiculed his radical views.

Until the mid-19th century, physicians believed in the miasma theory of disease. According to this concept, diseases such as cholera, chlamydia, and the plague were caused by polluted vapors and evil spirits rising from the ground and entering the body. Even the etymology of malaria comes from the Italian phrase *mala aria,* meaning "bad air." Under the miasmatic theory, since diseases were the product of environmental factors (such as contaminated water or foul air), infection could not be passed between individuals.

Nevertheless, Semmelweis remained curious. He wanted to understand why so many women were dying from puerperal fever, so he conducted an experiment in which he observed two maternity wards in the hospital: one staffed by male doctors and medical students, and the other by midwives. He discovered that the mortality rate was significantly higher in the doctors' ward. The only difference was that the doctors and medical students were performing autopsies between caring for patients.

He hypothesized that the doctors and medical students were getting unknown "cadaverous particles" on their hands during the autopsies; when they returned from the autopsy room to deliver babies, these particles were transferred to the mothers, who would develop the deadly disease. Semmelweis ordered his medical staff to begin washing their hands and instruments with a chlorinated solution. Months after this handwashing was implemented, the death rate in the doctors' ward dropped to nearly zero.

Unfortunately, Semmelweis's findings and theories were largely ignored by the medical community. Doctors were insulted at the suggestion that they could be responsible for transmitting disease. Semmelweis was quickly removed from his hospital position, and the book on his research was rejected. Unable to cope with the criticism of his life's work, Semmelweis suffered from rapid cognitive decline and violent mood swings. He was soon placed in a mental asylum, where he died at age 47.

The reflexive rejection of Semmelweis's overwhelming empirical evidence can be traced to the concept of "belief perseverance," the psychological tendency of people to maintain their beliefs even after they are presented with facts that refute those beliefs. In the medical field, belief perseverance is also known as the Semmelweis reflex, an automatic reaction in which new information is rejected if it contradicts dogmatic beliefs. The renowned psychiatrist Thomas Szasz described it best as "the invincible social power of false truths."

Not orthodontists, you say. Many of us still tell new patients that two-phase treatment is more efficient, that expansion obviates the need for extractions, that self-ligating brackets work faster, or that orthodontics can influence a patient's airway, despite overwhelming evidence that proves otherwise. We tell ourselves the stories that we want to hear—feelings over facts. If complications occur in treatment, we look outward for something to blame. The problem with ignoring our Semmelweis reflex is that it slows scientific progress.

Semmelweis's contribution to medicine was finally recognized 20 years after his death, when Louis Pasteur's and Robert Koch's germ theory of disease offered an explanation for Semmelweis's observations. The Semmelweis story is often taught in philosophy courses to demonstrate the virtues of empiricism or experimental science in clearing the way for the acceptance of new ideas. The Semmelweis reflex teaches humanity why healers can sometimes cause harm, particularly if they refuse to look at the evidence in their hands.

NDK

Thomas F. Mulligan, 1933-2023

I first came to know Dr. Tom Mulligan in the spring of 1968, when he presented a paper for membership in the Southwest Angle Society of Orthodontists. His presentation was a tour de force that flummoxed and bewildered the audience of Angle members, plus faculty and residents of the Baylor University Orthodontic Department. Hardly anyone in attendance knew anything about Burstone biomechanics, but Tom deftly explained how such topics as cantilevers, force-created moments, moment-to-force ratios, off-center bends, center bends, static equilibrium, and Newtonian physics applied to orthodontic therapies.

Afterward, I approached Tom and asked if he would mind mentoring me in biomechanics, and he eagerly accepted the challenge—which perplexed and bemused him over several decades, as he contended with my congenital confusion and misunderstanding. But Tom never tired of helping me, and for that I am eternally grateful.

Tom's sense of humor was remarkable, and it stayed with him until the very end. When someone would ask him his age, he would reply, "I am 89, and I should be 91, but I was sick for two years."

Tom was born in Grand Forks, North Dakota, the third of 10 children. He attended Saint John's University in Minnesota and left in 1953 to serve in the U.S. Army until 1955. He then attended Phoenix College, where he met Maria Teresa de Boas from Caracas, Venezuela, whom he married in 1957 at the end of his first year in the Marquette University School of Dentistry. Upon graduating from Marquette, he enrolled in Indiana University, where he graduated with an MSD in orthodontics. He then opened a practice in Phoenix and treated patients for 55 years.

Tom's knowledge of and fervor for orthodontics resulted in more than 600 lectures and university courses in 32 countries. He published more than 25 articles in journals and authored three books, and all of this while maintaining a flourishing private practice.

Tom and Teresa had a splendid life together for 66 years, and they loved their six sons, two daughters, 22 grandchildren, and 18 great-grandchildren, along with all the spouses. Everyone who met Tom came upon his brightness of spirit and joy for life. The acuity of his wit was inflected by his grand generosity of time and experience.

Tom was the pillar of fire before the camp, and his family, friends, and colleagues, chastened by the dimensions of the void that will replace him, stand bereaved and chilled in the dark—but fully confident that his legacy of kindness, generosity, fidelity, and high purpose will reignite our own personal commitments and enliven our service to others.

In a famous prayer, Cardinal John Henry Newman asked God to grant him each night "a safe lodging, a holy rest, and peace at the last." It is that "peace at the last" that we wish for our friend Tom Mulligan.

LARRY W. WHITE, DDS, MSD