

# 50TH ANNIVERSARY ISSUE



## COMMENTARY

Larry W. White, DDS, MSD

### Common Sense Mechanics

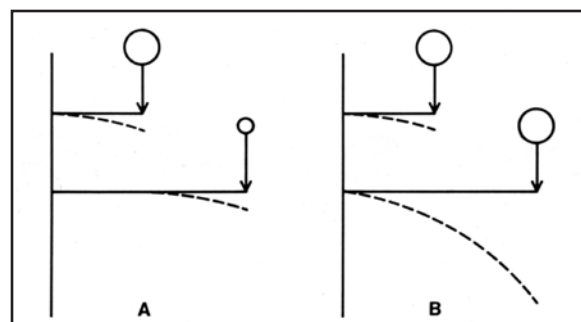
THOMAS F. MULLIGAN, DDS

September 1979-December 1980

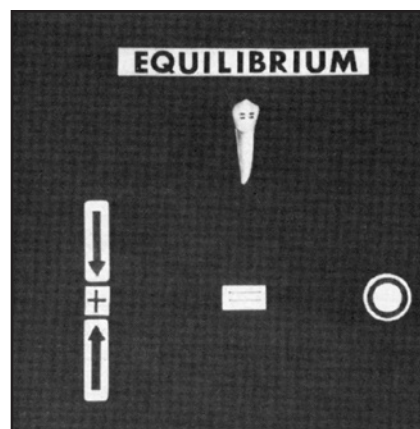
**T**om Mulligan made his presentation to the Angle Society for membership in the spring of 1968 in Dallas. The senior class at Baylor Orthodontic Department were guests, and that was the first time we had exposure to Burstone biomechanics via his able surrogate, Dr. Mulligan.

To characterize Tom's lecture that day as competent minimizes its sensational effect. No one in the Baylor class had the foggiest idea what he was talking about, nor did our faculty, as he deftly handled topics like cantilevers, force-created moments, moment-to-force ratios, center bends, off-center bends, translation of teeth, static equilibrium, and Newtonian physics as applied to orthodontics, among other topics.

Paraphrasing Supreme Court Justice Potter Stewart, who said pornography was hard to define, but he knew it when he saw it,

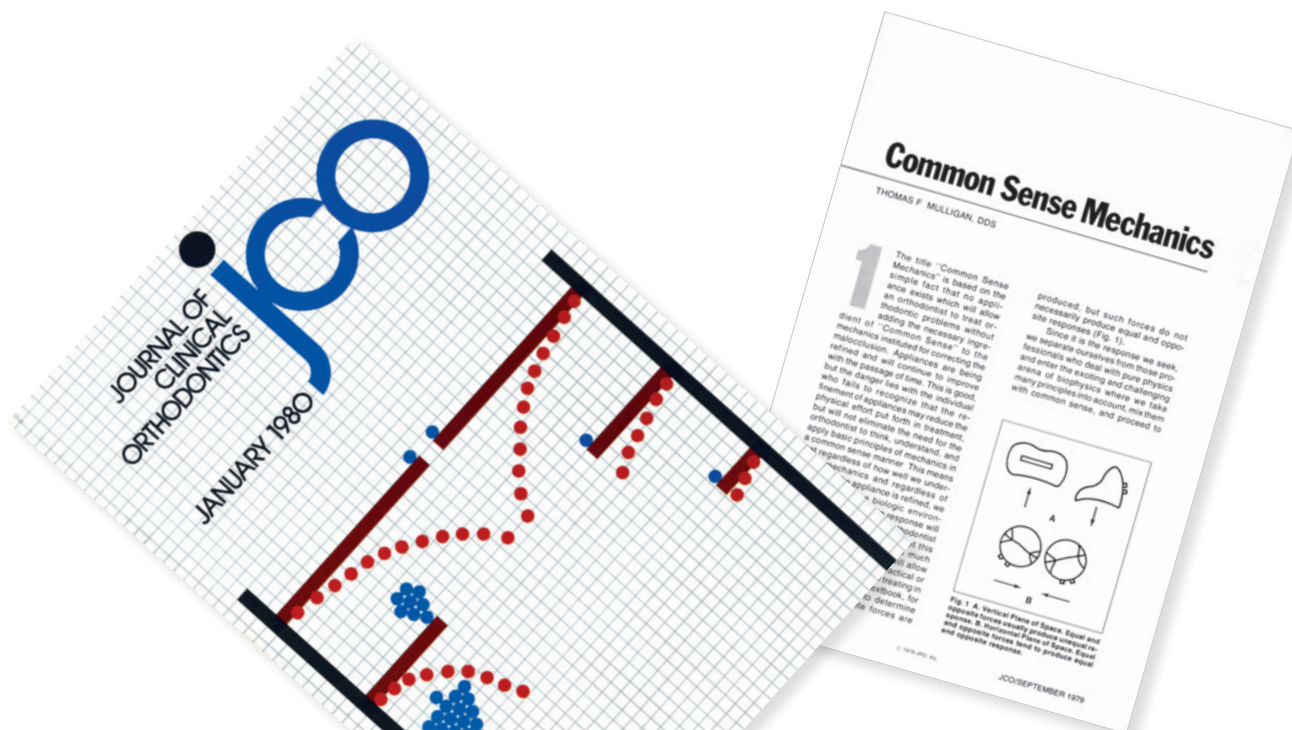


A. When the length of the diving board is doubled, only one-eighth the force is required to produce the same amount of deflection. B. The same force acting at twice the length will produce eight times as much deflection.<sup>1</sup>



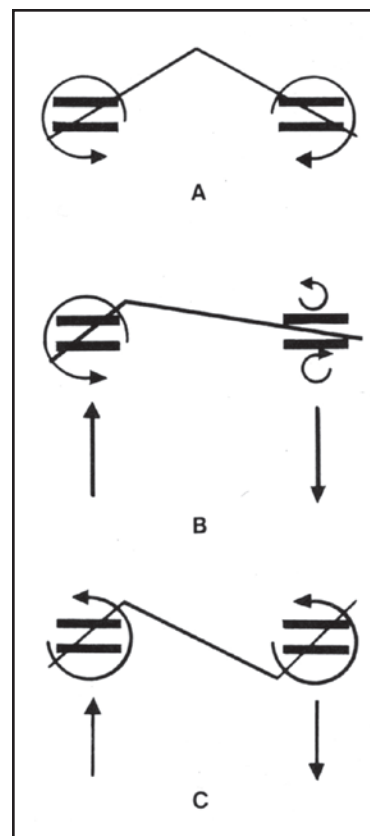
First requirement for static equilibrium. Sum of all vertical forces must equal zero.<sup>2</sup>

## Mulligan: Common Sense Mechanics



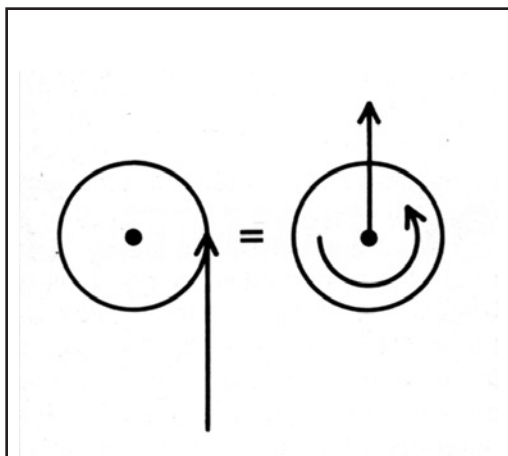
I found it hard to define the genius I witnessed that spring day, but I knew it when I saw it. Afterward, I approached Tom and confessed that although I would graduate in a few months, I didn't understand anything he said and wanted to know if he would consider mentoring me in orthodontic mechanics. That was the beginning of a long and beneficial friendship that has taxed and, I am sure, perplexed Tom, while it has educated me and helped me understand concepts that I would have never appreciated without his generous, patient, and unsurpassed mentorship.

The ability to take complicated engineering concepts defined by trigonometry and geometry and distill their essence to a point understandable by the most mathematically challenged dentist requires a superior mind that can consider their various ramifications and develop metaphors that anyone can easily grasp; for example, the cue-ball concept of tooth movement or a teeter-totter to explain static equilibrium. W. Brian Arthur, the Stanford University



A. Center bend relationship. B. Off-center bend relationship. C. Step bend relationship.<sup>3</sup>

## Commentary: Larry W. White

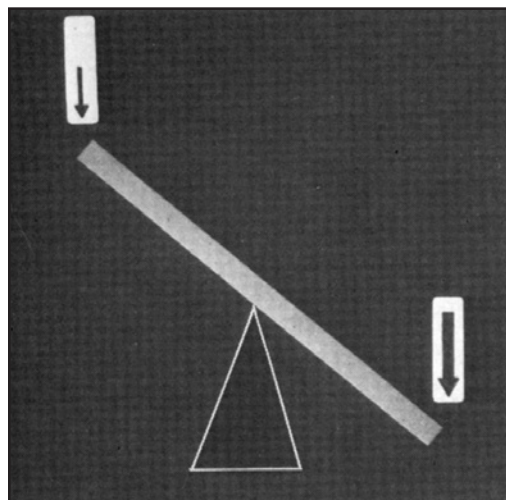


A force off center causes the cue ball to rotate as well as move forward in a straight line.<sup>4</sup>

economist and member of the Santa Fe Institute, has averred that scientists don't conceptualize their theories in the abstract and work by deduction; rather, they think and work mainly in metaphors.

Metaphors may seem trivial, but they contain the essence of ideas and become our mental shorthand for visualizing problems and solutions. Arthur further says that if the metaphor is wrong, the idea cannot be right, and in the orthodontic environment, mechanics and/or treatment planning has had a lot of misconceived and wrong metaphors that some still haven't corrected. For instance, setting up anchorage in the buccal segments so that teeth have positions like tent stakes summons a reasonable mechanical picture until one realizes that a tipped-back tooth can move as readily through bone as an untipped one. Vital osseous tissue isn't equal to inert soil.

Tom, more than anyone I have known, came up with explanations that were precise but not pedantic, clear but not congested, true but not trumped up, and they have



Unequal weights unbalance beam.<sup>2</sup>

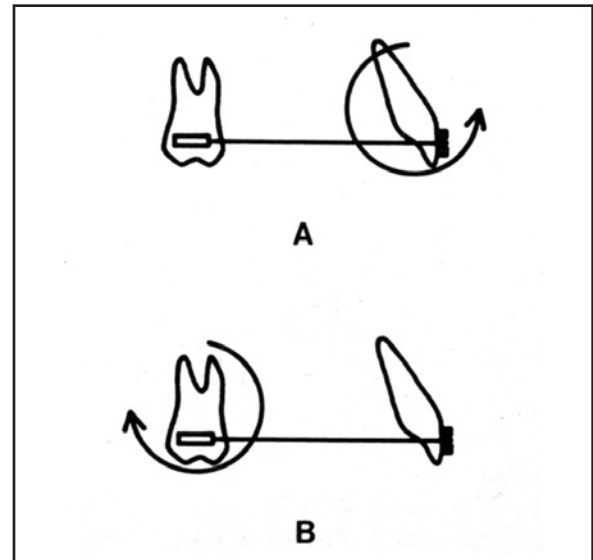
served the profession well. Wherever one travels throughout the world, people have heard Tom's message and responded to it, which has resulted in a profession that can finally understand and apply mechanics that ease their tasks and make them more predictable. Simultaneously, it has made orthodontic therapies more comfortable and acceptable by patients.

Tom accepts the duty of every generation to state an ancient truth in a way the present generation understands; that is, to translate into the language of the living the truths first discovered by the dead. He has done that with élan and energy, conjuring for me the description of the great English intellect, Walter Bagehot: "Occasionally, a man is born whose mission is to clarify the thought of his generation . . . give it speed where it is slow, vision where it is blind, balance where it is out of poise, saving humor where it is dry and such a man was Walter Bagehot." For orthodontics, such a man is Tom Muligan, and knowing, working, and studying with Tom has been one of the good things in my life.

## Mulligan: Common Sense Mechanics

### REFERENCES

1. Mulligan, T.F.: Common sense mechanics: Part 5, J. Clin. Orthod. 14:53-57, 1980.
2. Mulligan, T.F.: Common sense mechanics: Part 3, J. Clin. Orthod. 13:762-766, 1979.
3. Mulligan, T.F.: Common sense mechanics: Part 8, J. Clin. Orthod. 14:265-272, 1980.
4. Mulligan, T.F.: Common sense mechanics: Part 2, J. Clin. Orthod. 13:676-683, 1979.
5. Mulligan, T.F.: Common sense mechanics: Part 7, J. Clin. Orthod. 14:180-189, 1980.



A. "Rowboat effect." Maxillary teeth tend to move forward during anterior lingual root torque. B. Reversing the mechanics results in distalization.<sup>5</sup>



LARRY W. WHITE, DDS, MSD

Dr. White is a member of the Advisory Editorial Board of *Orthodontic Practice US*; a Contributing Editor for the *Orthodontic CyberJournal*; Editor of the Dallas County Dental Society publication, *Connection*; and in the private practice of orthodontics at 6500 Greenville Ave., Dallas, TX 75206; e-mail: larrywwhite@hotmail.com.