Community Dental Health (2009) **26,** 130–131

doi:10.1922/CDH_2570Peck02

Editorial

The contributions of Edward H. Angle to dental public health

S. Peck

Secretary, The Edward H. Angle Society of Orthodontists (EHASO), The E.H. Angle Education and Research Foundation; Clinical Professor of Developmental Biology, The Harvard School of Dental Medicine, Boston, Mass. 02115, USA.

The genius of Edward Hartley Angle, (1855-1930), the founder of the dental specialty of orthodontics, to create order from chaos in the study and treatment of positional discrepancies of the teeth, jaws and face advanced greatly the cause of dental public health. Angle's innovations that had the most public health impact were (1) his identification of dental occlusion, not simply tooth irregularity, as a prime concern, (2) his development of an uncomplicated classification system for occlusal conditions, (3) his introduction of prefabricated orthodontic appliances and (4) his framing of orthodontics as a dental specialty by organizing the world's first educational program to train orthodontists.

Public health dentistry did not exist as a distinct professional activity in the late 19th century when Edward Hartley Angle, MD, DDS, (1855-1930) was laying the foundations for the specialty of orthodontics. Yet, his genius to create order from chaos in the study and treatment of positional discrepancies of the teeth, jaws and face advanced greatly the cause of dental public health.

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In the 18th century, Pierre Fauchard and other early dentists constructed simple appliances to move teeth into more pleasing positions. They were responding to patients' complaints about crowded front teeth, tooth gaps and displaced teeth. The relationship between the upper and lower teeth – the bite and dental occlusion – was a non-issue until Edward H. Angle came along over a century later. Angle admired and acknowledged the mechanical ingenuity of Fauchard (1728), Fox (1803) and Schange (1841) in moving front teeth. But he went further than his predecessors by saying, "It is not enough to simply move into correct alignment irregular teeth. We should have a proper conception of the denture as a whole." (Angle, 1907)

Angle recognized that some of the commonplace thinking in "orthodontia" (the original name for the specialty until it was officially changed to *orthodontics* in 1938) was superficial and mistaken. The world of orthodontia that Angle entered in the 1880s was one engaged primarily in "tooth regulation," procedures and mechanisms geared to make crooked teeth less irregular. Hardly any attention was given by doctors – or patients – to the association of bite discrepancies with the occurrence of tooth irregularities. Early on, Angle was convinced that anomalies of molar occlusion were prime factors in the development of most orthodontic problems, including dental crowding. (Angle, 1905) Thus, he took the bold step of popularizing the word "mal-occlusion" in the late 1890s, around the time he was creating his landmark work "Classification of Malocclusion." (Angle, 1899) Angle's elegantly brilliant idea was to analyze the dentition from a sagittal viewpoint and divide the upper to lower dental arch relation into 3 easily discerned anatomic classes. In contrast, Clark L. Goddard, Calvin S. Case and other experts in orthodontia at the time advocated convoluted bite classification systems, each with over 20 categories of discrepancy. Published in 1899, Angle's classification article brought order out of chaos, simplicity from existing diagnostic complexity, transformations that his creative mind seemed particularly adept at seeing and doing. In 1900, Edward Angle changed the title of his textbook from a prosaic "The Angle system of regulation and retention of the teeth…," (1887-1899, 1st through 5th editions) to the then ground-breaking concept, "Treatment of malocclusion of the teeth…." (1900, 6th edition; 1907, 7th edition).

Angle's definition of normal occlusion and his classification of malocclusion prevailed, no doubt helped by promotions from his students who usually became the movers and shakers in the early dissemination of orthodontic knowledge around the world. In his 1899 article and 1900 textbook, Angle presented the results of the first epidemiological study of malocclusion, his survey of "several thousand cases" using his new classification system. (Angle, 1900b) This work became a model for future studies of orthodontic conditions in communities and populations. Today, frequencies and prevalence rates of occlusal variations are still largely measured in terms of Angle's basic criteria regarding the anteroposterior position of the lower dental arch in relation to the upper arch: normocclusion (Angle Class I), distocclusion (Angle Class II) and mesiocclusion (Angle Class III). Angle's classification, after over a century of testing and challenges, has remained the de facto global language for dental occlusal epidemiology.

Correspondence to: Professor Sheldon Peck, DDS, MScD, Clinical Professor of Developmental Biology, The Harvard School of Dental Medicine, Boston, Mass. 02115, USA. E-mail: speck@hms.harvard.edu

During the last 50 years, many methods and indexes have been introduced to assess orthodontic treatment need or outcome, qualitatively and quantitatively. Currently, all of these methods build, in some way, on Edward Angle's original concept that occlusion is paramount in the overall evaluation of positional variations of the teeth and dental arches. Most assessment methods use Angle's classification of malocclusion directly or indirectly to communicate sagittal dental relationships with minimum subjectivity in the identification and rating of discrepancies.

The year 1892 was a watershed of Angle's professional development. He announced that he would be practicing orthodontia to the exclusion of all other dental therapies. With this decision, he became the first acknowledged exclusive specialist in orthodontics in the world. Until this moment, none of the authorities on orthodontics worldwide and in history ever mustered the vision and confidence to limit their dental or medical practice to only this emerging type of treatment. At this time also, Angle resigned from his professorship at the University of Minnesota to concentrate his energies on the development of marketable, prefabricated ("ready-made" in his vernacular), new treatment appliances.

In earlier years, orthodontic appliances were hand-made by dentists and physicians who reused materials such as springs pulled from watches and clocks, and pliable and resilient wires from pianos. Angle wanted to advance the materia technica of the field by creating a universal "system" of preformed mechanical components that could be easily assembled for the successful treatment of most orthodontic patients. By 1895, the S.S. White Dental Manufacturing Company, one of the largest dental supply houses in the world, became the exclusive distributor of his prefabricated "Angle's system." In effect, by introducing efficient, ready-made appliances for routine use, Angle inaugurated what has grown into the orthodontic supply industry. As a result, he broadened the recipient base of orthodontic care – as he intended to do – by making comprehensive fixed-appliance orthodontic therapy accessible and affordable to a wider patient demography than ever before possible. (Peck, 2007)

Edward H. Angle also was intent on expanding the expert provider base of orthodontic care. In 1900, he founded in St. Louis, Missouri, "the first and only school of orthodontia in the world" (Angle, 1900a) to train dentists to be specialist orthodontists. Before this bold independent action, orthodontia was given little respect in dental education, being taught within the scope of prosthetics at dental schools. The Angle School of Orthodontia soon became world-famous. Over the next 30 years, the school was relocated with its founder from St. Louis to New York City to New London, Connecticut, and finally to Pasadena, California, where Dr. Angle died August 11, 1930. Then, one of his graduates, Allan G. Brodie, carried the Angle mission of postdoctoral orthodontic education to the University of Illinois. Specialty training in orthodontics has been an important university discipline ever since.

Angle was unusually broadminded for his era in picking his students. He sought bright, ambitious dentists from a wide personal and geographic spectrum to help promote his global vision for the young specialty of orthodontics. Of the 185 official graduates of the Angle School, 7 were women, with the first one from the Class of 1902 and the last, in the Class of 1926. Five Angle graduates were from Canada, and 21 were from outside North America. Fourteen countries were represented: Australia, Austria, Brazil, Chile, England, Finland, France, Germany, Ireland, Italy, Japan, Mexico, The Netherlands and New Zealand. Angle's graduates, many of whom established regional orthodontic societies and specialty teaching programs of their own, invariably became worldwide leaders in orthodontics in the first half of the 20th century. (Peck, 2006)

In this brief examination of Edward H. Angle's powerful contributions impacting dental public health, it is apparent that he was a remarkable visionary and a prime mover in the evolution of modern orthodontics. Angle envisioned orthodontia as "so grand in its possibilities for benefiting humanity" that he led the revolution a century ago to move it "beyond its much-neglected stage and the mere smattering of attention it is receiving, to become what it is destined to be." (Angle, 1902) Today, a global chorus of millions with attractive, healthy smiles could rightly sing out, "Thank you, Dr. Angle."

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