

# Edward Hartley Angle's Contributions to Orthodontics Revisited

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## Abstract

In order to develop a clear understanding of orthodontics as the oldest specialty of Dentistry, it is important to study the life and times of an outstanding contributor Edward Hartley Angle, whose dream and passion established the specialty of Orthodontics, though he was not without criticisms amongst his contemporaries. This paper explored his historical profile, philosophy and many of his contributions to the specialty of orthodontics

**Key words:** Edward Hartley Angle; Orthodontics; Historical profile; Philosophy, Orthodontic contributions

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*"Not to know what has been transacted in former times is to continue always as a child" –Cicero, Roman Senator*  
*"Honouring our past, building our future" - (AJODO, 2015)*

## Introduction

The history of orthodontics as a significant clinical and medical science as well as the oldest specialty of Dentistry cannot be

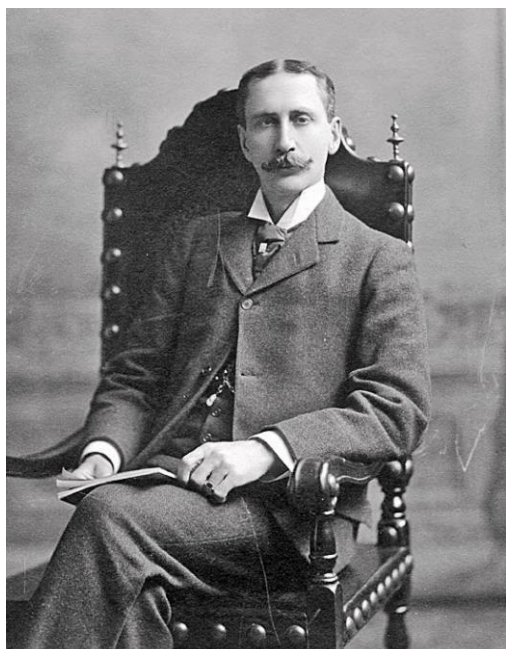


Figure 1: Portrait of E.H. Angle Aged 43 Years

completely told without reference to Edward Hartley Angle who lived from 1855 to 1930 (Figure 1). His dream was to make 'orthodontia' a self-standing division of medicine through the creation of a specialty school of orthodontia, organizing a society of orthodontic specialists, initiating a scientific journal exclusively for the specialty, writing and publishing volumes of books and inventing innumerable instruments and appliances.

It is pertinent to know that when a group of people do not know where they were coming from definitely are unlikely to have a clear idea of their destination. Therefore, this review explored Edward Angle's historical profile, his philosophy and contribution to the specialty of orthodontics.

## Edward Hartley Angle family background and early childhood

Edward Hartley Angle was one of the most dominant, dynamic and influential figures in the specialty of Orthodontics<sup>1</sup>. His early years reflected elements of a classic American success story of his era. A young man with humble background, no remarkable heritage, but having a considerable aptitude, grace and blazing trails in pursuit of his visionary goal<sup>2</sup>.

He demonstrated an archetype that is worthy of emulation. No wonder he is referred to as the father of modern orthodontics<sup>1,3</sup>. Some notable people like Samuel Clemens (Mark Twain), a poet-story teller James Whitcombe Riley, George Catlin, Benjamin Franklin, Rembrandt van Rijn were among his favourite heroes<sup>2</sup>; all these creative achievers and resolute personalities with humble background and with great connections to everyday people.

He never forgot his farm-boy life in Northwest Pennsylvania that helped shape many of his

outstanding qualities and quirks in adulthood. Edward H. Angle was born in Herrick Town on June 1, 1855 in a modest, white woodframed house near the crest of a hill on his father's 200-acre dairy farm<sup>4</sup>. He grew up at District No. 1 of Herrick Township in Bradford County (Figure 2). This area was nicknamed "Ballibay" in the 1820s by the new group of settlers from the town of Ballibay, County, Monaghan, Ireland.

Edward H. Angle was the fifth of six children, and the third son to Philip Casebeer Angle and Isabel



Figure 2: Dr Edward Angle Family House in Pennsylvania

Erskine Angle<sup>4</sup>. His father's roots were primarily of Dutch descent and his mother was born in Ireland. From childhood, he was fondly called "Hart" by his family, close friends and associates. The Angles had a seventh child, William, a bright lad, who died of illness at age of 11. Teen-aged Hart was hurt terribly by the loss of his younger brother Willie, his favourite sibling.

Hart neither showed enthusiasm in school activities nor on the farm to the utter dismay of his unsympathetic father. He was always behind in his learning especially mathematics and avoided farm work as much as possible<sup>4</sup>. He was a natural tinkerer, a whittler, a maker of things. History has it that when his father needed a rake for his farmwork and 11 year-old Hart successfully invented one. He never got any reward for it. However, someone applied and was awarded the patent for the instinctively clever work. Hart cherished and enjoyed his boyhood friendships throughout his life. He never lost contact with many of his Herrick friends. In his registered correspondence with his hometown friends, little Angle often related to them in the playful tones of a kid still horsing around the farmyard.

### His adventure into the field of Dentistry

In 1874 at age of 18, Edward Hartley was

pleasingly persuaded by his understanding mother, Isabel to study Dentistry. She did this in recognition of his nascent mechanical skills. His mother was able to secure for him a dentist in nearby Herrick town as an office apprentice. He got well with the programme as it appeared instantly to his keen manual and visual senses, his need for tools as well as his need for orderliness. His mother was able appreciate his abilities in positioning him for the future. In other words, his mother appeared to have contributed immensely to his early development in life.

Two years later, in September 6, 1876, he made an enquiry and applied to the Baltimore Dental College. According to his personal writings, his English constructions and spelling were rather crude for a schooled 21 year old. He eventually enrolled at Pennsylvania College of Dental Surgery in Philadelphia for his DDS programme. This programme was arranged in two 6 month terms spaced over 2 years. In 1895, Angle completed his MD degree from Marion Sims College. Angle alluded to his college experiences years later in a friendly letters with two of his classmates EL Townsend and Charles J. Tibbets. After dental school graduation in 1878, Angle set up a mechanical dental practice in Towanda, Bradford County. He advertised in the local newspaper "The Sullivan" and appeared rapidly successful. Here, he developed his first interest in mechanisms for tooth alignment or "regulation".

At Towanda, Angle experienced declining health and was diagnosed with pleural pneumonia that was referred to today as tuberculosis. One popular treatment option then was that the sufferer needed to move to an open place with fresher and cleaner air.

### A short break from Dentistry

After 3 years of dental practice in Towanda, in spring of 1881, 26 year old, Dr Angle abandoned dentistry and took a train to Minneapolis, Minnesota on a physician's advice in search of better health.

In Minneapolis, he heard that sheep farming in Montana was a lucrative business and where much money could be made (Figure 3). In the fall of that year, he returned to his home state Pennsylvania to entice and recruit some of his old farm friends in setting a lucrative sheep farming business. He invested all his hard earned savings into the sheep-farming project. A year later, Angle was confronted with another serious challenge, a great blizzard with a record breaking deep freeze wreaked havoc and killed off the entire herd. After the incident, all his

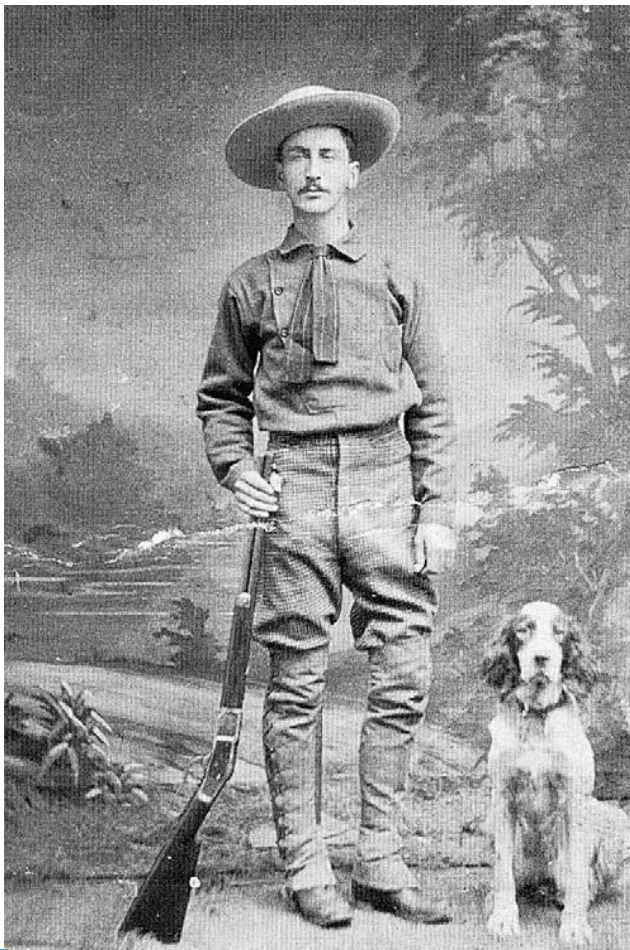


Figure 3: Young 'Hart' in a Hunting Kit

invited friends returned to his home state empty handed. A defeated Angle, feeling physically better, but mentally and economically depleted returned to Minneapolis by mid 1882 looking for work again in dentistry. For his health sake, Dr Angle was considering permanent retirement from dentistry in favour of work that was less confining and more outdoors.

### Angle returned to clinical dental practice

Angle got back to dental practice and returned to his creative thinking and tinkering with tooth-regulating appliances that he began in Towanda. Within a couple of years, Angle inquired at the Dental Department of Minnesota Hospital College in Minneapolis regarding Faculty employment.

Impressed with what he had to offer, the College administration tailored a position to suit his skills and their needs. In 1886, the 31-year old Edward Angle was appointed a Professor of histology and lecturer on Comparative Anatomy and Orthodontia. A few years later, after the merger of the Hospital College and University of Minnesota, he was elevated to

Professor of Orthodontia, a rare position in those days when orthodontia was a neglected part of the prosthetics department at dental Colleges. At the same time, keeping his 'eye on the ball', he quickly ascended through the ranks to become president of the Minneapolis City Dental Society in 1888.

He also maintained a small private dental office. While in dental practice, Angle experimented more and more with the novel approaches in orthodontic mechanisms. Through resilience, industriousness, and good fortune, Angle seemed to have landed on his feet psychologically and financially from Montana get-rich-quick debacle a few years earlier. His big breakthrough came in 1887 when he was permitted to speak at the 9th International Medical Congress convened in Washington DC. On the 4th day of the meeting, precisely on Thursday September 8, 1887 at the section on "Dental and Oral Surgery", the 32 year-old Angle was the youngest of the session speakers. He demonstrated the classification of tooth movements and his novel orthodontic devices such as piano wire in a soldered "pipe" tube and the jackscrew and traction screw. His presentation created an uproar, as many well known dentists such as John Farrar and Victor Jackson accused him of falsely claiming originality.

### Angle's professional career in Orthodontics

The year 1892 was a watershed in Angle's professional career when he announced he would be practising orthodontia to the exclusion of other dental therapies. With this decision, he became the first acknowledged exclusive specialist in Orthodontics in the world.

He later resigned his Faculty appointment and concentrated his energies on experimentation in orthodontia and the development of marketable prefabricated new treatment appliances. He also needed time to work on the third edition of his textbook, his first real book of 51 pages, which was 20 pages longer than his 1890 edition.

He hired Anna Hopkins, a bright young Minneapolis secretariat school graduate to help him with his book and practice.<sup>7</sup> This young lady later became his wife after the dissolution of his first marriage earlier contracted in March 1887 to a 22 year old Florence A. Canning, a sister of his machinist (John E. Canning) when he was 31 year old. Less than 9 months after wedding, their daughter Florence Isabel Angle was born in Minneapolis on December 3, 1887. This was 3 months after her father's disastrous appearance at the Ninth

International Medical Congress in Washington. The couple was grossly mismatched. Angle's wife could not match his ambitious ideas. Angle gradually lost respect for his wife Florence "Senior". He became by default an absentee father to their sickly daughter. It took Angle 9 years to finally deliver an acceptable divorce settlement for Florence in May 1908 which was a year after his father's death at the age of 87 years. Very little was recorded about Edward Angle's daughter who was a school teacher and never got married (Figure 4). She died in 1970 in Morganton, North Carolina at the age of 83 years<sup>4</sup>

In 1908, Angle got married to Anna Hopkins (1872-1957). After being encouraged and groomed



Figure 4: Angle's Daughter (Left) and Unidentified Woman At His Father's 65th Birthday on June 1, 1920

by Dr. Angle, Anna later obtained DDS degree from University of Iowa as well as an orthodontic training in his school.

Anna Angle who is referred to as "Mother Angle" became Secretary of the American Society of Orthodontists, a founding co-editor of the Angle Orthodontist and honorary chair of The Angle Society Executive Committee. She would be best remembered as someone who had the skilled in the transcription of Angle's speeches (especially dictation) an editor, foil and buffer for many downtrodden students who lived from 1872 to 1957. Some orthodontic keen observers have suggested that Anna deserved much of the credit for the high quality of Angle's written records through her significant literary input during typesetting.

Angle was a great art collector, and a lover of American-Indian artifacts. He collected animal and human skulls and osteological materials in plentiful supply from archeologists excavating the burial mounds around St Louis in the United States.

## Angle's major contribution to the field of orthodontics

Orthodontic historians claim that several men deserve the title of being called the "Father of Orthodontics". Pierre Fauchard certainly lifted orthodontics out of the dark ages, but men like Norman Kingsley and John Farrar put malocclusion on the map. It was indeed Dr. Edward Hartley Angle, a prosthodontist, that rightfully deserves to be called the "Father of Modern Orthodontics". He extended the frontier and concepts of prosthetic occlusion to the natural dentition. His interest in creating proper occlusion in natural teeth led to the creation of the specialty of Orthodontics

Dr. Angle took a bold step of popularizing the word "malocclusion" in the late 1890s and his famous landmark work on "classification of malocclusion"<sup>8</sup> published in Cosmos in 1899 which stood out as the most important journal article till date. In October 1900, Angle published the sixth edition of a 315 page work on "Treatment of Malocclusion of the Teeth and Fractures of the Maxilla, Angle System" He was a perfectionist whose painstaking exactness in his scientific thinking and writings became a hallmark of his lifetime of work in orthodontics. He founded the Society of Orthodontists (antecedent of the American Association of Orthodontists) and served as its first president. In the same year, he also founded the Society of Dental Science of St Louis. Vintage Angle developed various appliances and patents<sup>9</sup>. In 1938, he patent a Jackscrew mechanism, the first of 46 patents held by him. This was the first appliance technique developed to treat malocclusion, Angle also patent his expansion archwire mechanism (E-Arch) in 1899. Pin and Tube Appliance was developed between 1901 and 1909 in which all the teeth were banded. Vertical tubes were welded to the bands on the labial surface of the centre of the crown for all teeth in the arch. Archwires were secured with soldered pins that were inserted into the vertical tubes.

Edward Angle introduced Ribbon Arch Appliance in 1910. Ribbon arch was the first appliance to use a true bracket. The bracket has a vertical slot facing occlusally and were attached to the bands at the centre of labial surface of teeth, The last appliance to be patent by him was Edgewise arch mechanism in September 15, 1925, five years before his demise in August 11, 1930.

He established the Angle School of Orthodontia in 1908 in New York and later moved to Pasadena,

California.<sup>1-3</sup> (Figure 5). In November 17, 1930, The Angle Orthodontist Journal was born 4 months after his death in his memory. His philosophy of non-extraction created a lot of enmity for him in the orthodontic world at that time. He had an uncompromising position against extraction and this pitched him against the likes of Calvin Case, Bernstein, Theodore Adler, Frederick Noyes, Tom Graber and other<sup>10</sup>.



Figure 5: Edward and Anna Angle In Their Pasadena Home

Though Angle died in 1930, his influence is still felt strongly in Orthodontics till today<sup>2,4</sup> Even his real and perceived enemies recognised the many contributions made by him.

Most of the acquired archeological and ethnographic collections were donated to institutions and museums in their lifetimes. Almost 300 of such valuable collections were given out by Anna Hopkins Angle after her husband's death. This charity also continued till 1959, two years after her own death to the Museum of Claremont College, now the Pomona College Museum of Art in Los Angeles<sup>2,10</sup>

This was the characteristic remark made shortly before his death and goes thus "I have finished my work. It is as perfect I can make it"

Recently in 2015, during the centenary celebration of the American Journal of Orthodontics and Dentofacial Orthopaedics, Angle portrait appeared on the cover page of the very first edition (January 2015 issue) as a mark of honour to someone who had contributed most significantly to the Orthodontic world (Figure 6). He would definitely

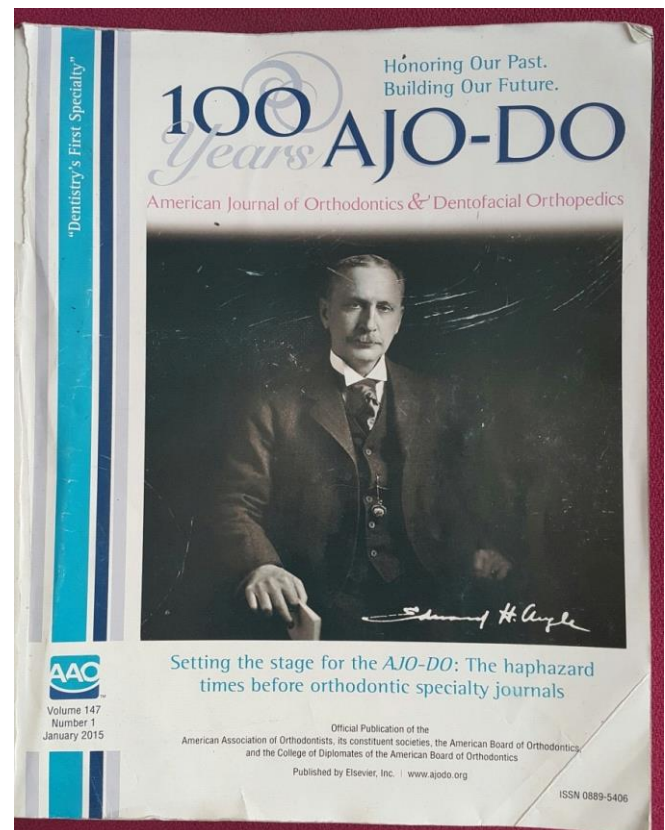


Figure 6: Honouring Angle With the Cover Page of the First Issue of Ajodo At Centenary In 2015

go in history as the most dominant, dynamic and influential figure in the specialty of orthodontics, the oldest specialty of Dentistry.

### Contributors

OOD initiated the review and took part in the writeup.

SOA and ODO assisted in literature search and writeup.

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### Conflict of Interest

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