

History of orthodontic braces

This is part of The Encyclopedia of History of Dentistry.

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Initially submitted 28 March 2023; accepted for publication 15 April 2023

Please cite this article as: History of orthodontic braces. In: Encyclopedia of the History of Dentistry. Forrai J, Spielman AI eds. 2023. Doi: [10.32558/encyclopedia.dentistry.9](https://doi.org/10.32558/encyclopedia.dentistry.9); [10.17107/KH.2023.26.31](https://doi.org/10.17107/KH.2023.26.31)

Abstract: Crowding of teeth is a condition mentioned in the Corpus Hippocraticum.

Keywords: obturator, restorative dentistry, pediatric dentistry, orthodontics, arch extension, bite adjustment

Crowding of teeth is a condition mentioned in the Corpus Hippocraticum. The Roman (Greek) physician Celsus (50 B.C. – 25 A.D.) suggested digital pressure to rectify malpositioned teeth and selective tooth extractions to relieve the crowding of dental arches. Plinius Secundus and Galen recommended filing extruded or larger teeth for the same condition. During the Middle Ages, the removal of crowded teeth was recommended, for instance, by Hyeronimus Fabricius d'Aquapendente (1619) (1). Pierre Fauchard is the first to provide a scientific description of orthodontics (2). He recommended placing irregular teeth in metal splints and repositioning teeth in torsion, if necessary, sometimes loosening them first with a pelican, the precursor to the modern dental forceps. Étienne Bourdet, a contemporary of Fauchard in 1757, recommended removing bicuspids to reduce dental crowding. Alternatively, he suggested using a lingual bar to expand a narrow dental arch (3). The first classification of malocclusion came from Joseph Fox (1818). He also recommended the timely removal of deciduous teeth, using devices for treating a deep bite, and using chin caps for various malocclusions.

Joachim Lefoulon, a French dentist, gave the name to the specialty of orthodontics. In 1841 he coined it *Orthodontosie* (4). He recommends the simultaneous use of labial and lingual arches for maxillary and mandibular expansion. In his first publication on orthodontics in 1841, J.M. Alexis Schange used rings instead of screws. The following year, after the vulcanized rubber invention, Schange used rubber rings and defined the term *anchor*. The 19th century saw rapid developments in orthodontics. Leonard Koecker recommended early orthodontics by ligating individual teeth. Instead of intraoral devices, J. S. Gunnell was the first to invent an extraoral, occipital anchorage for headgear in 1822 (6). Amos Wescott focused on treating crossbites using a chin cap (1859), while C.R. Coffin, in 1871, invented the spring with his name. The first specialist in orthodontics was Eugene S. Talbot, while Norman W. Kingsley was the first to specialize in facial and intraoral deformities during the 1880s.

The Father of Modern Orthodontics was Edward Angel (1855-1930), who established the Angle School of Orthodontia and the first orthodontic society, the American Society of Orthodontists. He classified malocclusions, a classification still in use. Angle had 37 patents and was the first to design customized devices. In 1893 using traction via intermaxillary elastic bands, he achieved the movement of individual teeth. Angle pioneered fixed orthodontics; that is, he incorporated archwire (a.k.a. the edgewise technique).

Today's multi-band technique was introduced by William E. Magill in 1868 when he first glued orthodontic archwire on teeth. George B. Crozat of New Orleans and his German colleague, Albert Wiebrecht Crozat, designed the oldest system of removable orthodontic devices. They were developed when fixed arch appliances made of precious metal were used. Tooth extraction was standard due to crowded teeth. To do this, the fastening straps of these braces were replaced with retaining clips, as they were already known in fixed prosthodontics. This method, introduced in 1919, primarily made it easier for the patient to maintain oral hygiene and for the specialist to adjust the appliance. It reduced the risk of root resorption due to excessive orthodontic forces and was also suitable for patients with periodontally compromised teeth. In Oslo, Viggo Andresen and Karl Häupl investigated the effect of oral muscles on the development and movement of malpositioned teeth, an advance that led to functional appliances and the activator as standard treatments.

At the end of the 19th century, the dental polyclinic in Berlin merged with the specialized training institute for Operative, prosthetic, and orthopedic dentistry to create a comprehensive clinic. Alfred Körbitz headed it. Körbitz introduced the Angle system in Europe and advocated *biological orthodontics*, in which teeth movement required minimal force.

Charles Hawley invented the retainer in 1920, a device worn after the treatment to stabilize the teeth in the new target position. The same year, Alfred Kantorowicz founded the Department of Orthodontics at the Rheinische Friedrich-Wilhelms University in Bonn from a previously private dental institute (5). In 1927, he was the first to integrate orthodontics into dental school clinics, providing access to a broader population and increasing the number of treated cases (5). Based on his experience with prosthetics and associated materials, Charles F. Nord developed inexpensive orthodontic devices, the so-called *popular orthodontics*. After 1930, Artur Martin Schwarz and his colleagues developed several versions and built various screw elements that patients could adjust themselves following simple instructions.

In 1977 Percy Raymond Begg developed the so-called Begg technique (light-wire differential force method) and introduced new brackets and unique steel arches to move teeth with minimal force. At the same time, Robert M. Ricketts used the edgewise technique to achieve optimum aesthetics, the essential goal according to him. He professed that individual treatment plans and facial aesthetics are more important than proper occlusion. Furthermore, he claimed that biology, facial orthopedics, differential diagnosis, and systematic biomechanical knowledge are the most critical components in orthodontic practice. Ricketts introduced the *visual treatment objective with growth* (VTO) based on cephalometric analysis. In 1989 Lawrence F. Andrews published his book: *Straight-wire, the Concept, and Appliance*, a seminal work. More recently, Wick Alexander provided new perspectives in orthodontics in 2008. The latest orthodontic devices can

move in 3D in the masticatory plane, horizontally and vertically, as imagined initially by Pierre Joachim Lefoulon and described by Fujita in 1981. Research into new devices continues.

References

Fabricius Hd'A. *Operationes chirurgicae in duas partes divisa, quibus adjectum est pentateuchon antea editum et alia*. Italy: Paulus Megliettus. p.32. 1619.

1. Fauchard P. *Le Chirurgien-Dentiste, ou traité des dents*. Pierre Jean Mariette, Paris, 1728. <https://dental.nyu.edu/aboutus/rare-book-collection/book-12.html>
2. Bourdet E. *Recherches et observations sur toutes les parties de l'art du dentiste*. Paris chez Jean Thomas. 1757. <https://dental.nyu.edu/aboutus/rare-book-collection/18-c/etienne-bourdet.html>
3. Lefoulon PJ. *Nouveau traité théorique et pratique de l'art du dentiste*. France, Fortin, Masson et Cie. p.175, 1841.
4. Kantorowicz A. *Klinische Zahnheilkunde*. Hermann Meusser, 1924.
5. Gunnell JS. A remedy for the protrusion of the lower jaw. *Am J Dent Sci*. 1842; (3):65-67. United States: William Gird Beecroft.



1. Figure: J. S. Gunnell, 1822 occipital headgear (Ref. 6).