In 1905, the School of Dentistry was opened in the Edward Creighton Institute, a building which had been erected by the University on 18th Street opposite the City Hall. In 1906, the University acquired by purchase the Omaha Dental College, which had been in existence as a private school since 1896. Through this acquisition, some of its faculty were added to that of Creighton University.

The School outgrew its quarters in the Edward Creighton Institute and moved, in the Summer of 1921, into a facility it occupied from 1921 until 1973. At that time the School of Dentistry moved to the Boyne School of Dental Science Building, named in grateful acknowledgment of the action by which Dr. Harry N. and Maude Boyne named Creighton University as the sole beneficiary of their estate. The School of Dentistry moved into this modern facility, located at 28th and Burt Streets, in July 1973. The first clinical patient was admitted to the new clinic July 16, 1973.

In the Fall of 2018, the School of Dentistry moved into a new state-of-the-art dental school facility at 21st and Cuming streets. The more than 200,000-square-foot facility will provide a larger, more modern technological environment and enhance the ability to offer a top-notch, clinically excellent dental education. Ground was broken in September 2016 and new students will enter in Fall 2018.