

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.e-jds.com

Correspondence

Oral health in the children's literacy book "Kuei Pen Tui Hsiang Ssu Yen Tsa Tzu" from the early Ming dynasty



KEYWORDS

Oral health;
Children;
Tooth;
Toothbrush;
Dentistry;
Ming dynasty

With the founding of the first dental college in the United States (Baltimore College of Dental Surgery) in 1840, the modern oral health, dental treatment, and dental education systems gradually developed into what they are today. Simultaneously, the advances in anesthesiology and the invention of radiation accelerated the development of dental prostheses, endodontics, and oral and maxillofacial surgery.^{1,2} In terms of oral self-care, cleaning teeth with a toothbrush is a daily routine for modern people. However, what did the toothbrush, a common tooth cleaning tool today, look like in ancient times? This is not common in research related to the history of dentistry, and descriptions of tooth cleaning tools are also rare in historical documents. By unearthing historical materials, dental history research still has the opportunity to glimpse the appearance of ancient tooth cleaning tools. This article reported on illustrations and texts related to oral health from the "Kuei Pen Tui Hsiang Ssu Yen Tsa Tzu", a book published in the early Ming Dynasty. This is a children's book that teaches children to recognize words through pictures. It contains a total of 308 pictures, each group of four related words, and each picture corresponds to one word.

The "Kuei Pen Tui Hsiang Ssu Yen Tsa Tzu" was published in Nanjing in the fourth year of Hongwu in the Ming Dynasty (1371), more than 650 years ago. The book bears no editor's

name (Fig. 1A). The images analyzed in this study are from the 1920 Japanese reprint of the Yonezando edition, now housed in the Mochizuki Library at Tokyo Gakugei University. In ancient Chinese classics, "Tsa Tzu" (miscellaneous characters) is a common children's literacy textbook. This book contains 308 pictures with corresponding words, compiling commonly used characters (single-word and two-syllable words) from daily life at that time. The text is arranged with the pictures on the left and the words on the right, and each item in the picture corresponds to a Chinese word. There are 224 pictures with one picture for one Chinese character, and 84 pictures with one picture for two words, totaling 392 Chinese characters. Although this book is often used by calligraphy enthusiasts to study calligraphy from the Yuan and Ming dynasties, the images also provide valuable research materials for understanding the life and culture of the Ming dynasty.

From a modern dental perspective, this book contains seven pictures related to oral health or oral and maxillofacial structures. The pictures related to the external appearance of the oral and maxillofacial structures include the head (Fig. 1B), the face (Fig. 1C), and the mouth (Fig. 1D), while the pictures related to the internal structures of the oral cavity include the tongue (Fig. 1E), the animal teeth (Fig. 1F), and the human teeth (Fig. 1G). This learning material could have helped children gain a

<https://doi.org/10.1016/j.jds.2025.10.033>

1991-7902/© 2026 Association for Dental Sciences of the Republic of China. Publishing services by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

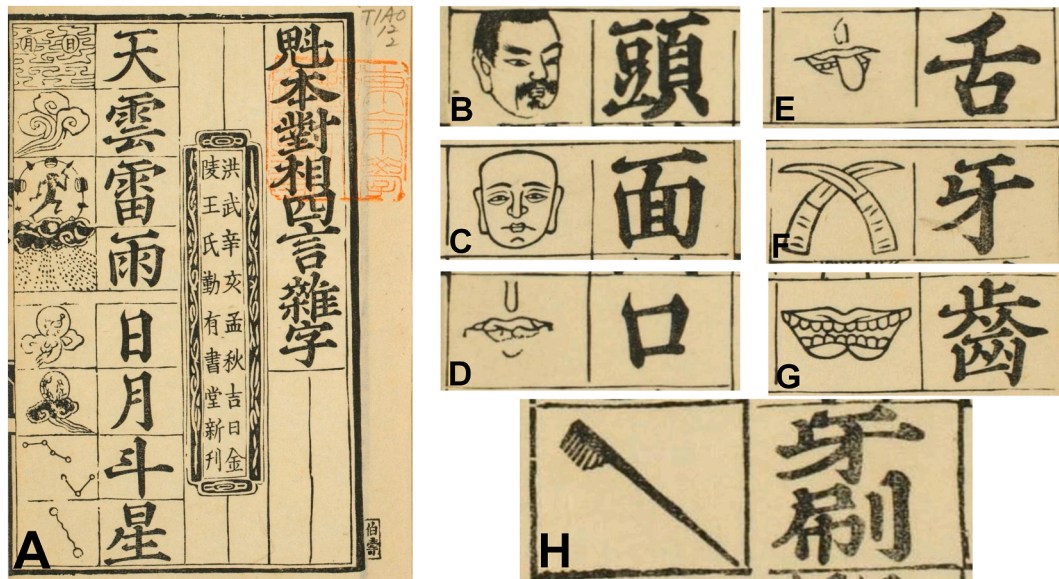


Figure 1 The images were obtained from the “Kuei Pen Tui Hsiang Ssu Yen Tsa Tzu”, housed in the Mochizuki Library at Tokyo Gakugei University. The first page of this book stated that it was published in Nanjing in the fourth year of the Hongwu reign of the Ming Dynasty (1371) without editor’s name (A). In this book, the pictures related to the external appearance of the oral and maxillofacial structures included the head (B), the face (C), and the mouth (D), while the pictures related to the internal structures of the oral cavity included the tongue (E), the animal teeth (F), and the human teeth (G). Furthermore, the book included the picture of a toothbrush used by the Chinese at that time, which was similar in appearance to the modern toothbrushes, both featuring a handle (H).

preliminary understanding of the structure of the mouth and face. Interestingly, in ancient Chinese characters, animal teeth (Fig. 1F) and human teeth (Fig. 1G) are completely different and are not the same character. This has been demonstrated in our previous research.³ Furthermore, the book includes a picture of the toothbrush used by the Chinese at that time. The appearance of the toothbrush is similar to that of modern toothbrushes, both with a handle (Fig. 1H). The inclusion of the toothbrush in the children’s picture-based reading material suggests that brushing teeth was a common practice for people in the early Ming Dynasty. This also shows that toothbrushes have long been a common tool for dental cleaning, rather than a new thing. However, in ancient times, only a few families could afford to provide their children with a reading environment. In fact, it still needs further historical research to clarify whether the use of toothbrushes was truly widespread among people of all classes in the early Ming Dynasty.

The “Kuei Pen Tui Hsiang Ssu Yen Tsa Tzu” utilized a visual-textual correspondence format, making it the earliest extant Chinese children’s literacy textbook to employ this approach. By combining common vocabulary with the pictures, the book served to teach children about literacy, the human body, and practical skills. This book pioneered a new teaching method, using visuals to support text and helping children to connect words with physical objects through the visual memorization. This format allowed the reading and writing process to serve as both a foundation of knowledge base and a vehicle for daily life. In particular, by linking oral-facial structures with the

identification of dental cleaning tools, children’s word learning process may subtly promote the improvement of their oral health concepts and self-care awareness.

The correspondence between the illustrations and the text in this book marks an important milestone in the development of illustrations in ancient Chinese textbooks. This is of great significance in the study of educational history, demonstrating the role of teaching methods that combine pictures and texts in improving children’s cognitive efficiency. However, this article proposed a new approach to the study of the history of dentistry. Since ancient people also suffered from dental problems, both medical and general historical records are likely to include references to dentistry.^{4,5} By excavating historical materials, we extract content related to oral medicine, and analyzed and interpreted it from the perspective of dentistry professionals. This reconstructed the landscape of oral health development during the period described in these historical records.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

Acknowledgments

This work is sponsored by “Higher Education Sprout Project” of National Taiwan Normal University and the Ministry of Education (MOE) in Taiwan.

References

1. Cheng FC, Huang GF, Wang YL, et al. The implication of integrating pediatric education into a pediatric dentistry course for undergraduate dental students. *J Dent Sci* 2023;18:1794–803.
2. Cheng FC, Wang LH, Ozawa N, Wang CY, Chang JYF, Chiang CP. Dental technology of Taiwan during the Japanese colonial period. *J Dent Sci* 2022;17:882–90.
3. Cheng FC, Taso CY, Chiang CP. Dentistry or stomatology (oral medicine)? The name changes in the department of dentistry of National Taiwan university hospital and its predecessors from 1906 to 2024. *J Dent Sci* 2025;20:1280–2.
4. Cheng FC, Wang YL, Chang WC, Chiang CP. The evolution of arsenic-containing traditional Chinese medicine prescriptions for treatment of toothache due to tooth decay. *J Dent Sci* 2024;19:1251–4.
5. Wang LH, Cheng FC, Chiang CP. A preliminary study on dental practitioners of traditional Chinese medicine in Taiwan during the early days of Japanese colonial period. *J Dent Sci* 2024;19:688–90.

Feng-Chou Cheng
Chia-Te Dental Clinic, New Taipei City, Taiwan
School of Life Science, College of Science, National Taiwan
Normal University, Taipei, Taiwan

Ling-Hsia Wang
Center for the Literature and Art, Hsin Sheng Junior
College of Medical Care and Management, Taoyuan, Taiwan

Shiang-Yao Liu**
School of Life Science, College of Science, National Taiwan
Normal University, Taipei, Taiwan

Graduate Institute of Science Education, College of
Science, National Taiwan Normal University, Taipei,
Taiwan

Chun-Pin Chiang*
Department of Dentistry, National Taiwan University
Hospital, College of Medicine, National Taiwan University,
Taipei, Taiwan
Graduate Institute of Oral Biology, School of Dentistry,
National Taiwan University, Taipei, Taiwan
Department of Dentistry, Hualien Tzu Chi Hospital,
Buddhist Tzu Chi Medical Foundation, Hualien, Taiwan
Institute of Oral Medicine and Materials, College of
Medicine, Tzu Chi University, Hualien, Taiwan

** Corresponding author. Graduate Institute of Science Ed-
ucation, College of Science, National Taiwan Normal Uni-
versity, No. 88, Sec. 4, Ting-Chou Road, Taipei, 11677,
Taiwan.

E-mail address: liusy@ntnu.edu.tw (S.-Y. Liu)

* Corresponding author. Department of Dentistry, Hualien
Tzu Chi Hospital, Buddhist Tzu Chi Medical Foundation, and
Institute of Oral Medicine and Materials, College of Medi-
cine, Tzu Chi University, No. 707, Section 3, Chung-Yang
Road, Hualien 970, Taiwan.

E-mail address: cpchiang@ntu.edu.tw (C.-P. Chiang)

Received 25 October 2025
Available online 11 November 2025