Development of dental education for medical students in Taiwan during the Japanese colonial period

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Abstract Background/purpose: During the Japanese colonial period, Taiwan had a medical school education system for cultivating physicians, but did not have a dental school education system for cultivating “real” dentists. In this investigation, we collected and analyzed the historical documents related to dental education to study the development of dental education for medical students in Taiwan during the Japanese colonial period.

Materials and methods: This study mainly analyzed the changes in the development of dental
Introduction

During the Japanese colonial period, the medical education system for cultivating physicians was introduced to Taiwan for the first time. The Taiwan Government Medical School was established in 1889. After several stages of development, Taiwan’s medical education system has continued to mature and become an important cornerstone of Taiwan’s medicine and public health. Although the modern medical education system introduced during the Japanese colonial period included the establishment of the legal professional status of physicians and dentists as well as their practice management. The medical education system only cultivated physicians and lacked the function to cultivate “real” dentists in the Japanese colonial period.

In fact, the early surgeon can also deal with dental problems. During the Japanese colonial period, the surgical manual also contained the records of dental treatments, such as tooth extraction and dental stone removal. Although the Taiwan Government Medical School was established in 1889, there was no “Dentistry” subject in the list of subjects that medical students needed to study in those days. However, in 1914, there was a dental teacher in Taiwan Government Medical School, Dr. Kaname Ansawa, for the first time. He was a surgeon graduated from Medical Faculty of Tokyo Imperial University in 1911 (Meiji 44). He came to Taiwan in 1914 (Taisho 3) and served as the director of the Department of Dentistry of Taiwan Government Taipei Hospital. He also served as a teacher of Taiwan Government Medical School to teach medical students the course of “Dentistry and Clinical Practice” under the subject of Surgery. Because oral cavity and teeth are parts of the digestive system and parts of the head and neck anatomic structures, it is believed that the medical courses of anatomy, histology, pathology, and surgery in the medical school at that time were likely to cover the teaching of oral cavity and teeth and their related diseases and corresponding treatments. In fact, in 1918 (Taisho 7), there was an independent subject “Theory of Dentistry” in the subject schedule of medical school, indicating that medical students had been taking “Dentistry” courses since then. Although Taiwan did not establish a dental school education system for cultivating “real” dentists until the end of colonial period in 1945, the dental education for medical students developed vigorously throughout the Japanese colonial period.

Researches on the history of medicine in Taiwan generally focus on the development of medical education for cultivating physicians, the development of clinical and basic medicine, and the improvement of public health issues. The development of dental education has received less attention. This study attempted to dig out the records of “Dentistry” in the literature during the Japanese colonial period, and reconstruct the development of dental education for medical students in Taiwan during the Japanese colonial period.

Materials and methods

This study adopted the historical method to explore “the development of dental education for medical students in Taiwan during the Japanese colonial period”. The history of the development of Taiwan’s medical school during the Japanese colonial period was reviewed to discover the records of dental courses and graduation examinations for medical students at that time. These records of relevant historical materials were systematically organized to describe the general situation of the connotation of dental education for medical students in the various historical stages of Taiwan’s medical school.

The historical materials used in this study were divided into two types: direct historical materials (original historical materials) and indirect historical materials (second-hand historical materials). The direct historical materials were the Taiwan Governor-general’s Archives, which could be searched online from Taiwan Historica. The indirect historical materials included Annual Report of Taipei Hospital, Introduction of Taiwan Government Medical School, Introduction of Taiwan Government Medical College,
Introduction of Taiwan Government Taipei Medical College, and Introduction of Taipei Imperial University, which could be searched online from the Japanese National Diet Library. We studied the dental curriculum and graduation examination related to dentistry subject for Taiwan's medical students during the Japanese colonial period in order to reconstruct the appearance of dental education in Taiwan's medical school during the Japanese colonial period, and to understand the changes in the development of dental education for medical students in Taiwan.

Results

The various historical stages of Taiwan’s medical education institutions

The various historical stages of Taiwan’s medical education institutions are summarized and shown in Table 1. The earliest medical education institution in Taiwan was the Taipei Hospital Affiliated Medical Training Institute (also known as the Native Physician Training Institute) established in 1897. It was a training institution that specialized in training Taiwanese to become physicians. It was designed to quickly supplement the manpower of physicians in the early days of Japanese rule of Taiwan. The enrolled students were expected to study for four years. In 1899, the Affiliated Medical Training Institute was changed to Taiwan Government Medical School. It was the earliest medical education institution in Taiwan’s medical school system. The enrolled students were Taiwan public school (primary school level) graduates. The school implemented medical preparatory courses for one year and medical undergraduate courses for four years, which was vocational school-level medical education. In 1918 (Taisho 7), Taiwan Government Medical School established a special medical department for Japanese students, offering the four-year and college-level medical education. The enrolled students were Taiwan Government high school graduates. It was also the beginning of Taiwanese and Japanese students studying together in the medical school. Then, in 1919 (Taisho 8), Taiwan Government Medical School was abolished and renamed as Taiwan Government Medical College. The enrolled students were also Taiwan public school graduates. It implemented medical preparatory courses for four years and medical undergraduate courses for four years, thus this physician-cultivating system was college-level medical education. In addition, a special medical department was also established for Japanese students only. The enrolled students were the high school graduates, and the physician-cultivating medical education was four-year and college-level. In 1922 (Taisho 11), the medical education system of Taiwan Government Medical College was changed. There was no medical preparatory and special medical department. The enrolled students were the high school graduates on the island of Taiwan and overseas. Finally, the four-year and college-level medical education system was implemented. In 1927 (Showa 2), the Taiwan Government Medical College was renamed as Taiwan Government Taipei Medical College. However, the medical education system maintained and did not change.

Furthermore, Taipei Imperial University, founded in 1928 (Showa 3), established its Medical Faculty in 1936 (Showa 11). The Taiwan Government Taipei Medical College was merged into Taipei Imperial University and was called as Affiliated Medical College of Taipei Imperial University. The Japanese Red Cross Society Taiwan Branch Hospital, which was originally used as an internship site for medical students of Taiwan Government Taipei Medical College, was also purchased by Taipei Imperial University and changed to be the school building of the Medical Faculty and Affiliated Medical College of Taipei Imperial University. The enrolled students of the Medical Faculty of Taipei Imperial University were senior high school graduates, and thus the physician-cultivating medical education was four-year and university-level. However, the enrolled students of the Affiliated Medical College were still high school graduates, therefore the physician-cultivating medical education was four-year and college-level. Two years later (1938 or Showa 13), the Taiwan Government Taipei Hospital was merged into Taipei Imperial University and renamed as the Affiliated Hospital of Taipei Imperial University. It was served as an internship hospital for the medical students of Taipei Imperial University, and also included the Department of Dentistry. In 1939 (Showa 14), the Medical Faculty of Taipei Imperial University added a chair on dentistry. Its chair classroom was called dental classroom (equivalent to dental institute). The chairs were the basic unit of the Japanese Imperial University system, and they had the dual functions of teaching and research at the same time. Therefore, the Chair of Dentistry (so-called Dental Classroom or Dental Institute) of Medical Faculty of Taipei Imperial University became the first official dentistry-related teaching and research unit in the history of medical education in Taiwan (Table 1).

The development of dental education for medical students in Taiwan

The development of dental education for medical students in Taiwan is summarized and shown in Table 2. The dental education for medical students in Taiwan during the Japanese colonial period could be discussed from two aspects: the dental curriculum and the dental graduation examination. As for the dental curriculum, Taiwan Government Medical School established in 1899 did not have a "dentistry" arrangement in its subject schedule. Oral cavity and teeth are parts of the digestive system or parts of the head and neck anatomic structures so that dentistry-related content should be scattered in medical courses such as basic medicine and surgery. In 1914, the medical school hired Dr. Kaname Ansawa to teach fourth-year medical students the course of "Dentistry and Clinical Practice". Dr. Ansawa was the first dental teacher in Taiwan. He graduated from the Medical Faculty of Tokyo Imperial University. He was also a surgeon, belonging to the teacher group of the surgery subject. The dentistry-related content was covered in surgery subjects. However, the number of detailed teaching hours was unknown. From December 1920 to December 1922, Dr. Ansawa was sent overseas to study dental treatments in Europe and the United States, and he finally left Taiwan in 1926 (Taisho 15).
| Time of year | Medical education institutions | Enrolled students | Study time | Education level | Note |
|-------------|--------------------------------|------------------|------------|----------------|------|
| 1897        | Taipei Hospital Affiliated Medical Training Institute | Taiwanese | 4 years | — | Also known as the Native Physician Training Institute |
| 1899        | Taiwan Government Medical School | Taiwanese public school graduates | Medical preparatory 1 year and undergraduate 4 years | Vocational school | Public school is equivalent to primary school. |
| 1899        | Special medical department of Taiwan Government Medical School (Established in 1918) | Japanese high school graduates | 4 years | Junior college | Specially set up for Japanese children |
| 1919        | Taiwan Government Medical College | Taiwanese public school graduates | Medical preparatory 4 years and undergraduate 4 years | Junior college | Divided into medical preparatory, undergraduate, and special medical departments |
| 1919        | Special medical department of Taiwan Government Medical College (Established in 1919) | Japanese high school graduates | 4 years | Junior college | |
| 1922        | Taiwan Government Medical College | High school graduates on the island of Taiwan and overseas | 4 years | Junior college | Not divided into medical preparatory, undergraduate, and special medical departments |
| 1922        | Taiwan Government Taipei Medical College | High school graduates on the island of Taiwan and overseas | 4 years | Junior college | The education system did not change. |
| 1936        | Affiliated Medical College of Taipei Imperial University | High school graduates | 4 years | Junior college | Taipei Medical College was merged into Taipei Imperial University. |
| 1936        | Medical Faculty of Taipei Imperial University (Newly established) | Senior high school graduates | 4 years | University | In 1939, the Chair of Dentistry was added. |
| Time of year | Medical education institutions | Dental education content (Weekly teaching hours) | Graduation examination subjects |
|-------------|--------------------------------|---------------------------------------------|--------------------------------|
| Before 1917 | Taiwan Government Medical School | There was no “dentistry” subject in its subject schedule. In 1914, the medical school hired Dr. Kaname Ansawa to teach “Dentistry and Clinical Practice” for fourth-year medical students. | Anatomy, Physiology, Pathology, Pharmacology, Internal Medicine, Surgery, Ophthalmology, Obstetrics and Gynecology, and Hygiene. |
| 1918        | Taiwan Government Medical School | One-hour “Theory of Dentistry” and irregular time periods of “dental outpatient clinical lectures” per week in the third academic year Half-hour “Theory of Dentistry” and irregular time periods of “dental outpatient clinical lectures” per week in the fourth academic year | Anatomy, Histology, Medical Chemistry, Physiology, Pharmacology, Bacteriology and Hygiene, Pathology, Internal Medicine, Surgery, Dermatology and Venereology, Otorhinolaryngology, Ophthalmology, Obstetrics and Gynecology, and Pediatrics. |
| 1919–1921   | Taiwan Government Medical College | Same as above | Same as above |
| Special medical department of Taiwan Government Medical School | Same as above | Same as above |
| 1922–1926   | Taiwan Government Medical College | Same as above (The “dental outpatient clinical lectures” in the third academic year of 1925–1935 was held frequently every week.) | Same as above |
| 1927–1935   | Taiwan Government Medical College | Same as above (The “dental outpatient clinical lectures” in the third academic year of 1925–1935 was held frequently every week.) | Same as above Modified in 1928: Anatomy (including Histology), Medical Chemistry, Physiology, Pharmacology, Bacteriology, Hygiene, Pathology, Internal Medicine, Surgery, Dermatology and Venereology, Otorhinolaryngology, Ophthalmology, Obstetrics and Gynecology, Pediatrics, Psychiatry, and Forensic Medicine. |
| After 1936  | Affiliated Medical College of Taipei Imperial University | Same as above | Same as above Modified in 1928: Anatomy (including Histology), Medical Chemistry, Physiology, Pharmacology, Bacteriology, Hygiene, Pathology, Internal Medicine, Surgery, Dermatology and Venereology, Otorhinolaryngology, Ophthalmology, Obstetrics and Gynecology, Pediatrics, Psychiatry, and Forensic Medicine. |
| After 1936  | Medical Faculty of Taipei Imperial University | Two-hour “Dentistry, Oral Surgery and Clinical Lectures” and 12-hour “outpatient clinical lectures” (shared by 9 clinical subjects) with an average of 1.33 h for dentistry per week in the fourth academic year | Anatomy, Physiology, Biochemistry, Pathology, Pharmacology, Bacteriology, Hygiene and Tropical Hygiene, Forensic Medicine, Internal Medicine and Tropical Epidemiology, Surgery, Psychiatry, Pediatrics, Obstetrics and Gynecology, Ophthalmology, Dermatology and Urology, Otorhinolaryngology, Dentistry & Oral Surgery, and Parasitology. |
In 1918, the medical school adjusted the undergraduate subject schedule and established a special medical department for Japanese students only. The schedules of the two medical departments (one for both Taiwanese and Japanese students and the other for Japanese students only) had an independent dentistry subject. The dentistry course content included 1-h “Theory of Dentistry” and irregular time periods of “dental outpatient clinical lectures” per week in the first and second semesters of the third academic year, as well as half-hour “Theory of Dentistry” and irregular time periods of “dental outpatient clinical lectures” per week in the first and second semesters of the fourth academic year. After that, the medical school was changed to a medical college in 1919, and the medical college still had two medical departments, the undergraduate medical department (for both Taiwanese and Japanese students) and the special medical department (for Japanese students only). In 1922 (Taisho 11), the medical college combined the undergraduate and special medical departments together, and renamed the new medical college as Taipei Medical College in 1927. The Taipei Medical College was merged into Taipei Imperial University in 1936 and was renamed again as the Affiliated Medical College of Taipei Imperial University. The above-mentioned medical education institutions in Taiwan all had independent dentistry subjects for their medical students at various historical stages, and their content was the same as that of the dentistry subjects in 1918. Among them, the “dental outpatient clinical lectures” in the third academic year of 1925–1935 were given to medical students every week. In addition, the medical college hired Dr. Shizuo Kobayashi as a dental teacher in 1921. He was a dentist and was also the first dental teacher with a dental background in Taiwan. Since then, Taiwan’s medical education institutions consistently arranged dental teachers with a dental background to teach dental courses for medical students in various historical stages. After Dr. Ansawa left Taiwan in 1926 (Taisho 15), dentists were responsible for the dental education for medical students.

Taipei Imperial University established the Medical Faculty in 1936. The subject schedule for medical students contained a “Dentistry” subject. The content of dental course included 2-h “Dentistry, Oral Surgery and Clinical Lectures” and 12-h “outpatient clinical lectures” (shared by 9 clinical subjects) with an average of 1.33 h for dentistry per week in the first and second semesters of the fourth academic year. In addition, the Medical Faculty established the Chair of Dentistry in 1939. A dental teacher, Dr. Heijirou Oohashi, and two other surgical teachers jointed together and were responsible for the Chair of Dentistry. For the first time in the Medical Faculty there were four-year medical students. These three teachers were responsible for the courses of “Dentistry” and “Oral Surgery”, respectively. Thus, the dental education for medical students in Taiwan had entered the university-level medical education.

As for the dental graduation examination, from Taiwan Government Medical School to the Affiliated Medical College of Taipei Imperial University, there was no “dentistry” subject in the graduation examination subjects for medical students in various historical stages of vocational school-level and college-level medical education. However, to take Dr. Ansawa as an example, he taught dentistry in the surgery subject. It could be inferred that the content of surgery subject in the graduation examination might also include dentistry. In addition, it was not until 1940 that the subject of “Dentistry & Oral Surgery” was first included in the graduation examination for the graduates of the Medical Faculty (Table 2). The importance of dental education in the process of physicians training had increased since then.

| Stage | Early stage of medical school | Late stage of the medical school | Early stage of the medical college | Late stage of the medical college | Stage of the affiliated medical college | Stage of the Chair of Dentistry |
|-------|-------------------------------|---------------------------------|-----------------------------------|-----------------------------------|----------------------------------------|-------------------------------|
| Time of year | 1889–1913 Yes | 1914–1917 Yes | 1918–1920 Yes | 1921–1935 Yes | 1936–1945 Yes | 1939–1945 Yes |
| Dental courses | Yes | Yes | Yes | Yes | Yes | Yes |
| Specialized dental teacher | Yes | Yes | Yes | Yes | Yes | Yes |
| Dentistry subject | Yes | Yes | Yes | Yes | Yes | Yes |
| Dental teacher with a dental background | Yes | Yes | Yes | Yes | Yes | Yes |
| Graduate examination subjects including dentistry | | | | | Yes | |
| Official dental teaching and research unit | | | | | Yes | |
The historical stages of dental education for medical students in Taiwan

The historical stages of dental education for medical students in Taiwan are summarized and shown in Table 3. The dental education for medical students in Taiwan had gradually matured after several stages of development. According to several factors, such as whether there was a dental subject in the medical school’s subject schedule, whether there was an arrangement of specialized dental teachers to teach dental courses, the background of dental teachers, and whether there was a formal dental teaching and research unit, the dental education for medical students in Taiwan could be divided into the following developmental stages (Table 3).

1. Early stage of medical school (1889–1913)

When Taiwan Government Medical School was established in 1889, there was no dentistry subject in the subject schedule for medical students. The contents of dentistry were scattered in medical courses such as basic medicine and surgery. Until 1913, there was no arrangement of the specialized dental teachers for teaching dental courses for medical students.

2. Late stage of the medical school (1914–1917)

The medical school hired Dr. Ansawa (the first teacher who taught dentistry in Taiwan) in 1914 to teach the subject of "Dentistry and Clinical Practice" for fourth-year medical students. Until 1917, the school’s subject schedule at this stage did not include dentistry subject. The contents of dentistry were covered in surgery subjects.

3. Early stage of the medical college (1918–1920)

In 1918, the medical school adjusted its undergraduate subject schedule, and further established a special medical department for Japanese students. Both departments had an independent dentistry subject in their subject schedules for medical students. The medical school was changed to a medical college in 1919. Since then, the following stages of Taiwan’s medical education institutions had scheduled independent dentistry subjects. However, before 1920, the medical school and college did not have the arrangement of specialized dental teachers who had sufficient dental background.

4. Late stage of the medical college (1921–1935)

In 1921, the medical college hired Dr. Kobayashi as the teacher of dentistry (the first dental teacher with a dental background in Taiwan). Since then, Taiwan’s medical education institutions began to appoint specialized dental teachers with a dental background.

5. Stage of the affiliated medical college (1936–1945)

Taipei Imperial University established its Medical Faculty in 1936, and Taipei Medical College was merged into Taipei Imperial University to become its affiliated medical college. Thus, Taiwan’s dental education for medical students entered the Imperial University system.

6. Stage of the Chair of Dentistry (1939–1945)

The Medical Faculty of Taipei Imperial University established the Chair of Dentistry in 1939. The fourth grade of Medical Faculty had dental courses such as "Dentistry" and "Oral Surgery", and the graduate examination subjects included the subject of "Dentistry & Oral Surgery". The Medical Faculty enrolled senior high school graduates for the first time in 1939. Thus, Taiwan’s dental education for medical students entered the university-level education.

Discussion

The western medical education system was introduced to Taiwan for the first time during Japanese colonial period. In 1916, the Taiwan Dentist Order and Taiwan Physician Order were promulgated. At the same time, the management system for dentists and physicians was established. However, unlike Japan and Chosen, Taiwan only had one medical school to cultivate physicians, but no dental school to cultivate dentists. Therefore, the particularity of dental education in Taiwan is a phenomenon that focuses on dental education for medical students.

In fact, during the Japanese colonial period, the dental education for medical students in Taiwan was not carried out without function and purpose, but had the function of cultivating dental practitioners; i.e., physicians with dental specialty license or dental practice permission could be allowed to legally engage in dental practice. According to the relevant regulations in the 1918 announcement, physicians who had taken dental courses in medical schools could apply for permission from the government for providing dental services to people living in Taiwan. Furthermore, physicians could go back to the research department of medical school or college to study dentistry or go to the dental department of hospital to receive dental training for getting dental specialty license. The studying period usually lasted for 1–2 years. After completing the training, these physicians could obtain the dental specialty license and had the dentist qualification for providing complete dental services. At that time, there were indeed physicians who obtained relevant dentist qualifications by the above-mentioned ways and engaged in dental practice. In addition to the research department (for dentistry) of medical school or college, the dental department of Taipei Hospital, Tainan Hospital, and Japanese Red Cross Society Taiwan Branch Hospital had also provided dental education or dental training for the physicians.

In 1918, the independent dentistry subject appeared for the first time in the medical subject schedule of Taiwan Government Medical School. Both the undergraduate departments for both Taiwanese and Japanese as well as the special medical department for Japanese had requirements for taking dental courses. Moreover, according to the Japanese government’s announcement of the medical school curriculum standards at that time, there was no requirements for taking dental courses. It was believed that
the addition of dental courses to the medical education for medical students in Taiwan was an intentional arrangement. It might also indicate the particularity and importance of dentistry in Taiwan’s medical education. In addition, Taiwan Government Medical School established a research department in 1918 to provide a channel for medical graduates or physicians to study dentistry in medical school. Although the regulations of issuing dental specialty license to physicians in 1918 only mentioned medical school curricula, there were actually two forms to provide dental education. First, medical students who had taken dental courses in medical school could obtain the permission for parts of dental practice. Second, qualified physicians who had received dental training in hospitals and medical schools could obtain the dental specialty license for complete dental practice. Although the medical school had no dentistry subject and no channel for providing graduate school level dental research before 1918, the earliest record mentioned that the physicians who were trained in the dental department of Japanese Red Cross Society Taiwan Branch Hospital in 1910 could obtain the dental specialty license after 1918.

Therefore, the Japanese colonial government might give priority to the development of dental education for medical students in Taiwan instead of setting up a dental school. After 32-year development from the first dental teacher to Taiwan in 1914 to the end of World War II in 1945, Taiwan’s dental education had some degree of growth in terms of teaching hours, teachers, and the development of dental organization in the medical school.

In terms of the number of teaching hours in dentistry, according to the 1918 medical school curriculum, medical students needed to take a total of 266 credits of courses in four years, of which a total of 3 credits of dental courses was required, accounting for 1.13% (3/266) of the total credits. After years of development, medical students in the affiliated medical college of Taipei Imperial University also needed to take a total of 3 credits of dental courses, while medical students in the Medical Faculty needed to take a total of 6.67 credits of dental courses. The proportions of total dental credits were 1.07% (3/280) and 2.19% (6.67/304), respectively, indicating that the proportion and level of dental education for medical students had increased. From a modern point of view, only 3 or 6–7 credits of dental courses are absolutely not enough for obtaining the qualifications of dental practitioners. However, during the Japanese colonial period, Taiwan did not have dental school education system to cultivate dentists and lacked dentists to take care of the oral cavity and teeth of the people living in Taiwan. Under this special circumstance, it could be regarded as a flexible medical policy of special consideration during the Japanese colonial period.

In terms of faculty structure, in 1914, there was only one dental teacher with a medical background, and after that the dental teacher was switched back to a dentist with a dental background. By 1942, there were 4 dental teachers in the affiliated medical college of Taipei Imperial University and 4 dental teachers in the Medical Faculty. Two of them taught in both departments, that is, there were 6 dental teachers in total. Moreover, 3 of the 6 dental teachers had a doctorate degree in medicine. In addition, there were two other teachers in the Medical Faculty who taught oral surgery. They were surgeons and both had a doctorate degree in medicine.

In terms of the development of dental organization in medical school, the medical school set up a research department (equal to graduate school) in 1918 to provide medical graduates and physicians with a channel for further medical studies, including the study of dentistry. In addition, the unit related to dental teaching and research externally used the dental classroom (or dental institute) as its organization name. Until 1939, the Chair of Dentistry was established by the Medical Faculty of Taipei Imperial University, which was the first official dental organization in the history of Taiwan’s medical education. At that time, there were 9 imperial universities in Japan, including Taipei Imperial University, and only 4 imperial universities had the Chair of Dentistry in their Medical Faculty. The name of dental classroom (or dental institute) was actually used by the dental teachers as their affiliation in the publication of academic papers, although it was not an official organization name in school regulations. After the Chair of Dentistry was established, this name continued to be used.

Regarding the dental education for medical students in Taiwan after the World War II, there was no provision for physicians to obtain dental practice qualifications in the Chinese health system, and dentists were not included in the management of the Medical Law. Therefore, the dental science education for medical students in Taiwan no longer had the function of cultivating dental practitioners after the World War II. Although the post-war Taiwan Provincial Government and the Ministry of Education did not include dentistry in the curriculum standards for the medical school, the School of Medicine of National Taiwan University (NTU) has always had dental courses until 2011. Therefore, medical students of NTU still needed to take dental courses as parts of compulsory courses. This was considered to be a continuation of the historical background of dental education for medical students during the Japanese colonial period. The Chair of Dentistry of Medical Faculty of Taipei Imperial University, which was responsible for dental research, dental education for medical students, and dental clinical practice training, was finally transformed into the facility of dentistry of School of Medicine of NTU after the World War II, and continued to be responsible for dental research and dental education for medical students in NTU. It can be seen that the model of dental education for medical students in Taiwan during the Japanese colonial period was transferred to the School of Medicine of NTU after the World War II. In Taiwan, both medical schools during the Japanese colonial period and medical students of NTU after the World War II needed to take dental courses. This is a unique phenomenon in the history of medical education in Taiwan. The other medical schools established in Taiwan after the World War II did not have dental facilities for medical students. In addition, these medical schools did not require dental courses for their medical students.

In fact, Taiwan’s dental education experienced a difficult time after the World War II. In the first year after the war (1946), there was only one dental teacher in charge of the dental courses for medical students in School of Medicine of NTU. In 1953, the Department of Dentistry was established in the College of Medicine of NTU. Therefore,
the model of dental education in Taiwan gradually shifted from dental education for medical students to dental education for cultivating and training "real" dentists. Then, in 1975, dentists were included in the management of the Medical Law. Finally, in 2011, the medical students of NTU took dental courses for the last time in history. Since the medical school’s dentistry subject became independent in 1918, the 94-year dental education for medical students in Taiwan has officially become a history. To take 2011 as an example, the medical students of NTU needed to take a total of 271 credits of courses in seven years, of which a total of only one credit of dental courses was required, accounting for 0.37% (1/271) of the total credits. The importance of dentistry to medical students is negligible. However, it is claimed that dental education for medical students is still beneficial to the physicians in modern times. In addition to understanding the work of dentists, it also helps physicians make preliminary judgments and referrals for patients with oral and dental diseases in practice. Unfortunately, today’s medical education has removed the majority of dentistry-related courses from the medical curricular structure for medical students. Thus, the function of dental education has been transformed to focus on the training of dentists, dental specialists, and oral medicine research personnel.

To review the development of dental education in Taiwan, it has been more than one hundred years since the first dental teacher came to Taiwan in 1914. Before the World War II, the number of dental teachers has grown to be 6–8. The main functions of dental teachers were dental research, dental services for patients, and responsible for dental education for medical students and dental training for physicians. After the World War II, the main functions of dental teachers were still dental research, dental services for patients, and responsible for dental education for medical students. After the establishment of Department of Dentistry of NTU in 1953, the main functions of dental teachers were also transferred to the teaching and training of dental students and dentists. In the first year after the World War II (1946), Dr. Shwei Kuo entered the School of Medicine of NTU and was responsible for teaching dental courses for medical students. After more than 70 years, the number of dental teachers in the College of Medicine of NTU increased from one to 75 by 2020. Among them, 34 were full-time faculty members and 41 were part-time instructors. With the establishment of departments of dentistry in various schools, there have been 8 departments of dentistry in Taiwan so far. It can be seen that the development of dental education in Taiwan has made a great progress in research, services, and teaching.

It is not correct to think that Taiwan did not have dental education during the Japanese colonial period on the grounds, and therefore there was no dental education system for cultivating dentists in Taiwan during the Japanese colonial period. In fact, during the Japanese colonial period, Taiwan’s dental education activities were extremely rich. At that time, the types of dental education activities were not only the dental education for medical students in the medical school, but also the dental research and dental clinical training for physicians in the graduate institute of medical school or college and the dental department of the hospital. However, there were also examples of dentists entering various laboratories of the medical school or college to do dentistry-related research, and thus obtaining a doctorate degree in medicine. It was also evident that the dental education in Taiwan at that time was already capable of cultivating doctoral research talents in medicine.

Even so, Taiwan’s dental education during the Japanese colonial period was essentially attached to medical education. It mainly provided medical students with some basic knowledge and clinical training in dentistry. Some medical graduates continued to receive clinical training in dentistry after graduation to obtain the dental specialty license for physicians. There were also some medical practitioners who applied for the dental practice permission for performing parts of dental practice services through finishing dental courses in the medical school. It indicated a special phenomenon that during the Japanese colonial period physicians could also be dental practitioners and perform dental practice, but the problem of insufficient manpower for dentists still remained. At that time, the dental manpower was still based on "real" dentists. In fact, Taiwan’s dental education, which truly has an independent and subjective dental system, is gradually expanded and strengthened after the establishment of departments of dentistry in various dental or medical schools after the World War II.

**Declaration of competing interest**

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

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