

**FEATURES
SECTION**

Orthodontics round the World

Orthodontics in China

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Introduction

The People's Republic of China is located in the east of Asia on the west coast of the Pacific. China is the third largest country in the world and has a land area of about 9.6 million km², which is nearly as large as the whole of Europe. There are 23 provinces, five autonomous regions, four municipalities (Beijing, Shanghai, Tianjing, and Chongqing), and two special administration regions (Hong Kong and Macau). The population of 1.2 billion contains 56 ethnic groups. However, 90 per cent are of the Han nationality.

China is an ancient country with more than 5000 years of history. It has developed its own traditional medicine for thousands of years. This is different from western medicine, from concept to treatment method, and has been found to be effective in treating many diseases. Traditional and western medicine now both exist in Chinese hospitals. In dentistry, some Chinese herbal medicines are used for the treatment of some mucosa diseases and some herbal remedies are included in toothpaste.

Dentistry and dental education in China

The first dental school was established at the beginning of the twentieth century and now there are 40 dental schools (departments). The five most well known schools are located in Beijing, Chengdu, Shanghai, Xian, and Wuhan. Figure 1 shows the new Outpatient Building at the Dental School in Wuhan.

Most dental schools have at least four departments: endodontic dentistry, oral surgery and oral pathology, prosthetics, and orthodontics. Paediatric Dentistry is usually a small separate department.

Dental education can follow two different routes:

- 1 After graduation from high school, students can go to a local college and after three years of training, they become technicians or dental nurses.

- 2 The other pathway is through university where it takes 5 years to obtain a bachelor degree.

In their studies, undergraduate students in all dental schools use the same textbooks and nearly every branch of dentistry has a textbook edited uniformly in the whole country.

In the first three years comprehensive courses in basic medical knowledge are taken. In the fourth year the students study all the branches of dentistry and do some observation in clinic. It is not until the final year when they get practical experience of treating patients. Following graduation and a further year of internship in addition to a final exam, they become qualified as dentists.

While all dentists may practice as orthodontists, specialty training is similar to other countries. Figure 2 shows the outpatient orthodontic clinic at Wuhan Dental School. A student can choose to do a 3-year Masters degree, then perhaps a 3-year Ph.D. programme. It is not uncommon for a student to enter a specialty programme immediately following graduation as a dentist. In the past all dentists were educated in China. But now, things are changing because of increasing communication with the rest of the world.

In the past 50 years, Chinese dentistry mainly developed separately from other countries. Since the policy of opening in the early eighties, communication with other countries has become more frequent and as a result dentistry has developed dramatically. Private practice is not common in China, but will be a trend in the future. Foreign companies are also co-operating with Chinese authorities or hospitals in joint venture dental centres. However, there are still not enough dentists in China with a dentist:population ratio of 1:40,000.

Orthodontics in China

There are 700 orthodontists in China and approximately 1300 dentists who carry out some orthodontic treat-



Fig. 1 A panorama of the Hospital and Dental School, Wuhan University.

ment.¹ A qualification system for orthodontics is now being gradually introduced. In the future, a person can only become an orthodontist following specialist training. Since 1985, a national orthodontic meeting has been held every 3 years and orthodontists from all over the country can attend. The development of orthodontics in China is reported at every meeting and orthodontists present their research studies. Some orthodontists from other countries are invited as well.

The Chinese Committee of Dentistry was established in the 1950s and different branches of dentistry have different associations. In 1997, the Chinese Association of Orthodontics was established (originally a group under the Chinese Committee of Dentistry).

There are more than ten different kinds of Chinese dental journals and the *Chinese Journal of Dentistry* is the most authoritative. In 1994, the *Chinese Journal of Orthodontics* was first published.

Orthodontic education

Regular orthodontic education began in the 1970s. At that time, there were four dental schools (departments), which had a department of orthodontics educating undergraduate students, but there was no postgraduate education. Now there are 37 dental schools that have a department of orthodontics. Fourteen are qualified to educate orthodontic postgraduate students,¹ and 54 masters degrees and 24 PhDs in orthodontics were



Fig. 2 One of the orthodontic clinics at Wuhan

awarded up to 1994.² There have been no published figures for these degrees since 1994.

In the late 1980s, a group of authoritative Chinese orthodontists began to edit the official orthodontic textbook for undergraduate students. The contents mainly cover craniofacial growth and development, diagnosis of malocclusion, removable and fixed appliances, treatment and treatment considerations, etc. It aims to teach the general dentist basic orthodontic knowledge and skills. Topics such as orthodontic prevention and surgical orthodontics are also mentioned. It is updated every few years and the third edition was published last year.

Mostly, the orthodontic teaching curriculum lasts one term (one academic year is divided into two terms in China), around 60 teaching hours in the fourth year, including some laboratory technique teaching and observation in clinics.

As for continuing education in orthodontics, there are some dental schools that hold qualification refresher courses. This kind of course mainly contains 6–12 months of full time study. Some short courses are being organised by the committee as well.

Epidemiology of malocclusion in China

Several important investigations were carried out during the 1950s by different dental schools. They found that the percentage of malocclusion of permanent dentition ranged between 29.33 and 48.87 per cent.³ The results vary between studies because each researcher has chosen his own definition for malocclusion. In 1985, another investigation found that 74.25 per cent of the child population had a Class I malocclusion, 4.75 per cent Class II, and 3.69 per cent Class III.⁴

Orthodontic techniques in China

The early 1980s was a milestone in Chinese orthodontics, because prior to this date removable appliances dominated. Along with the opening to the world, first Begg, then the edgewise technique were introduced, and now the pre-adjusted technique is also very popular. At present, the removable appliance is mainly used to correct the malocclusion at the stage of primary and early mixed dentition, or as a retainer. Functional appliances are also very popular. The types used include activator, bionator, Frankel, Twin-Block, and Herbst.

Cephalometric analysis was introduced in orthodontics in the 1960s and now has become a basic diagnostic method. Recently, the computerization of cephalo-

metric analysis has become developed and the normal cephalometric values of Chinese in different part of the country have been published.

Orthodontic surgery was introduced in the 1970s and now many of the larger conurbations have the ability to treat patients with severe skeletal problems. Nearly every kind of orthognathic surgery is provided, including Lefort III osteotomy.⁵

Chinese orthodontic products

Unfortunately, both patients and orthodontists in China cannot afford the high price of imported orthodontic materials. Nevertheless, we can produce most of the necessary orthodontic materials within China. An orthodontic patient can, therefore, be treated from the beginning to the end without using any of the foreign products.

Direct bonding agent

The first report of a Chinese direct bonding agent used in clinic is in 1978. The enamel bonding agent was produced soon after and now it can be used by most Chinese orthodontists.

NiTi archwire

The experimental and clinical research of NiTi alloy were in the late 1970s and the NiTi archwire was invented in the early 1980s. Because of its superb properties and cheap price, it became so common that many Chinese orthodontists have never used multi-strand archwires or bent stainless steel wire in the aligning phase. It is also exported to other countries.

The pre-adjusted appliance

Research began in the late 1980s and in the early 1990s the unitary pre-adjusted bracket and molar tube were first produced. According to the research, the bracket parameters, as well as standard archwire form suitable to Chinese people were established.⁶

Problems of Chinese orthodontics

In the last 20 years, the Chinese economy has developed dramatically. The 'one couple one child' policy has become popular and people are getting wealthier. They have also become more concerned with their appearance

and the demand for orthodontic care is growing rapidly. Although there are great developments, there are still some problems.

There are not enough qualified orthodontists for the population. Many patients are treated by general dentists, some even by technicians. Furthermore, dentists tend to stay in big cities because they can earn more money. As a result, people in rural areas cannot obtain quality care.

Orthodontic treatment in China is not free. In the past the costs for some dental treatment, but not orthodontic treatment were met by the government, but now a new system of health insurance is being considered. However this will probably not include orthodontic treatment that is relatively expensive. This excludes the poor from treatment.

Although the materials made in China are not always of the highest quality, they are generally sufficient for use in hospital clinics. However, there is not enough variety of products and this limits improvements in the efficiency of treatment.

Many Chinese orthodontic scholars have been sent abroad for advanced study, mostly going to America, Japan, and Europe. However, this type of communication is still not enough. Foreign publications are relatively expensive to Chinese, so only in large dental schools can we find foreign journals such as *AJOCO* (The American Journal of Orthodontics and Dentofacial Orthopedics), *EJO* (The European Journal of Orthodontics), *AO* (The Angle Orthodontist), etc. Importantly, other important literature and sources of information in Chinese are also lacking. This is really an obstacle to Chinese orthodontics.

Although many laboratory and clinical studies have been carried out which have greatly benefited Chinese

orthodontics, lack of research funding is a problem and many questions remain unanswered.

Conclusions

- As a result of overcoming many problems, orthodontics in China is developing quickly and the demand for orthodontic care is increasing along with improvements in the economy.
- More types of appliance are now being made in China. This has allowed the pre-adjusted appliance to become as popular as the edgewise appliance. The trend is for it to replace the edgewise appliance in the near future.
- Increasing numbers of scholars are going abroad to advance their knowledge and this will continue with the further expansion of co-operation with different countries.
- Hospital reform is ongoing and the environment is becoming more favourable for orthodontics.

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