

Research and discussion on the denture manufacturing industry and its market

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Abstract: In recent years, with the rapid development of China's economy, people have paid more and more attention to physical health, and the health and beauty of the oral cavity have gradually gained public attention. The demand for dentistry is also increasing, which has also led to dental with the development of the industry, the denture industry has also made considerable progress. As for the denture manufacturing industry, the technology development of the entire industry is still on the road of development from CNC processing to 3D printing. This article investigates the reasons for its development and the development trend of emerging technologies for simple research and exploration.

1. Research background

Dentures have a long history of use. By the 20th century, denture technology began to mature. Implanted dentures look more like natural teeth in appearance. By the middle of the 20th century, the development of dentures had basically matured, and it was difficult to distinguish the difference between high-quality denture materials and healthy real teeth. With the advancement of materials and denture manufacturing processes, metal materials such as titanium, cobalt-chromium alloys and dental materials such as zirconia and glass ceramics have emerged to meet market demand. However, in the process of industry progress, there are still problems such as long production cycles and high costs (mainly labor costs). In response to this phenomenon, a denture manufacturing method that uses 3D printing to reduce costs and production cycles has been born on the market. Convenient and efficient injection into the original industry.

At present, domestic 3D printing is mainly concentrated in the fields of home appliances and electronic consumer products, mold inspection, cultural creativity and cultural relic restoration, automobiles and other vehicles, and aerospace. In fact, in dentistry, the application range of metal 3D printing has exceeded most people's imagination. At present, 3D printing has been relatively maturely used in denture printing, orthodontic production, crown printing, surgical implant guide production, etc., especially in the field of denture printing, 3D printing technology has gradually demonstrated its own advantages.

2. Current status at home and abroad

(1) Industry scale

With the increasing evidence of aging, my country's denture market has entered a stage of rapid development, but overall it is still in the early stages of development.

(2) Overview of the industry chain

As of the end of 2013, China has 2500 denture manufacturers with legal certificates, and enterprises above designated size", from 151 in 2009 to 177 in 2013, less than 10% of the total number of enterprises. There is no leading enterprise, but The market potential has been initially revealed.

(3) Market size forecast

According to the domestic industry market research report, from 2009 to 2013, the national denture output and market demand increased year by year. From the perspective of denture production, the country produced about 75 million dentures in 2013, an increase of 47% from 53 million in 2009; from the perspective of denture demand, the national demand for dentures in 2013

was about 90 million, 1.4 times that of five years ago . It is also speculated that if my country reaches the level of medical consumption in developed countries in Europe and the United States, the potential scale of the entire oral market will be more than 8 times its current size.

Taking Wuhan as an example, high-end dentures, mainly implants, have grown rapidly at a rate of 10% per year since 2009, with an annual demand of 736,000 and a potential market of approximately 320 million yuan. It is foreseeable that with the improvement of people's material life quality and oral health concepts, especially as my country's pace of aging is gradually accelerating, the demand for dentures in the market will also further expand.

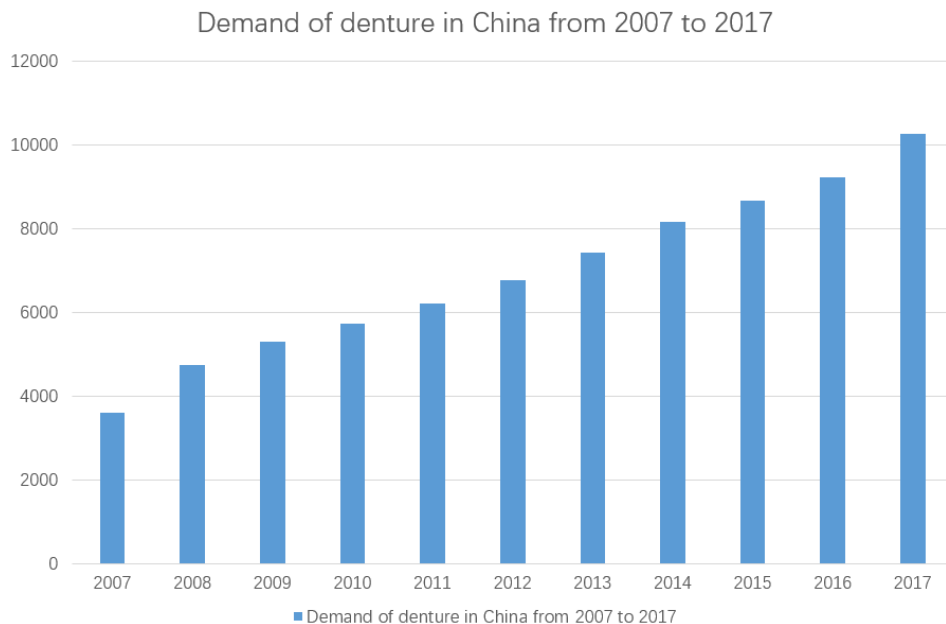


Figure 1 Statistics of demand for dentures in my country

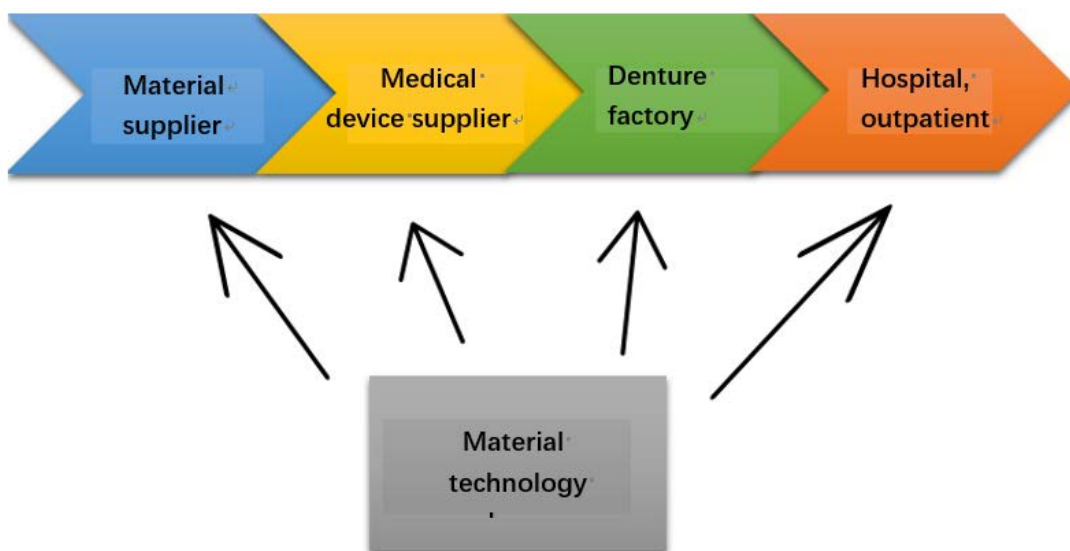


Figure 2 Schematic diagram of the industrial chain

Table 1 Market size forecast

	2019	2020	2021	2022	2023	2024
Denture production	4.28	4.66	5.06	5.47	5.9	6.36
Denture needs	1.33	1.51	1.73	1.98	2.26	2.56
Market size	84.3	93.8	109.3	128.1	147.4	170.1

3. Development trend

(1) Cloudification of denture manufacturing

In the future, one direction of the development of the denture manufacturing industry is to gradually become cloud-based and IoT-based. A cloud-based interconnected denture manufacturing system based on cloud servers will be established. Such systems can use three-dimensional scanning of various data and have High-precision, high-speed, and no need for physical models. At the same time, it combines big data and cloud computing, assisted by remote manufacturing, and builds a denture that is mainly at the transaction and application level and assisted by the data level for clinics, hospitals, etc. Ordering units, and secondly, provide free software management systems for these units to help them manage and analyze the self-organized medical service ecology of patients' preferences.

At the same time, with the help of the cloud processing system, the denture processing factory can also analyze the order preference of doctors or outpatients, predict their future needs, and eventually develop into a more visualized and fast information flow. At the same time, due to the application of weak artificial intelligence, it will Through the simplified operation of man-machine interconnection, 70% of the previous manual processing processes are replaced with automated production and 3D printing technology.

(2) 3D denture manufacturing

In addition to the gradual cloudification and intelligentization of denture processing equipment, its processing technology will gradually undergo major changes. Among them, 3D printing technology will be the primary development. 3D printing is one of the main features of the Industry 4.0 era. In the current development trend of the industry, 3D printing has rapidly developed in the dental industry due to its high degree of automation, precision and individuality, and has solved the following major problems in the denture manufacturing industry:

① Human resource bottleneck. Denture processing companies generally encounter difficulties in recruiting workers. At present, the period required to train a skilled worker is more than three years.

② Difficult to process. Numerous processing links have led to increasing difficulty in quality control. Due to the wide variety of dentures, they all need to be made by hand, which adds difficulty to the quality control in the later stage.

③The cost continues to rise. Due to a large shortage of skilled workers, labor costs are rising rapidly.

After 3D printing technology perfectly solves the major bottlenecks currently facing the dental industry, it also has digital, precise, and personalized production characteristics, which can replace a large number of manual processing and manufacturing links. Due to the massive reduction in labor, the current difficulty in recruiting is partially solved.

4. Summary

In summary, although the aging population and other issues have brought crises to the global economy, they have brought opportunities for rapid development to the denture industry. With the development of the economy, people will only pay more attention to the health and beauty of the oral cavity, which has also driven the development of the denture industry, and emerging technologies such as the cloudification of denture manufacturing and 3D denture manufacturing are under this rapid development trend. , Will also make great progress and breakthroughs in recent years.

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