# An Investigation Into the Disease Profile and Healthcare Costs of Inpatients Treated at a Major Oral and Maxillofacial Surgical Center

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**Objective:** This study is a retrospective review which reported on the treatment records of oral and maxillofacial inpatients treated at a medical institution with the largest scale of oral and maxillofacial specialist services in China, to reflect on disease profile, healthcare model characteristics and the medical status of oral and maxillofacial surgery in China.

**Patients and Methods:** Information on 25,825 patients hospitalized between 2008 and 2013 was collected to analyze the mean length of stay (LOS) and preoperative LOS, expenditure patterns, and payment status.

**Results:** The overall mean LOS and preoperative LOS were $10.0 \pm 4.9$ days and $4.3 \pm 2.1$ days, respectively. The main costs composed of surgery charges and material costs (47.4%). The proportion of nonlocal patients was 76.34% and the majority of patients used their basic medical insurance (57.74%), and the proportion of patients self-paying showed the largest increase over time. Rising charges for inpatients in this institution did not cause an aggravation of medical cost burden of residents. Cost burden of oral and maxillofacial malignancy surgery patients was higher than in developed countries.

**Conclusions:** The overall mean LOS and preoperative LOS were higher than that of similar patients globally. Compared with medicine and material costs, medical income is lower and the value of medical personnel labor is not fully appreciated. The proportion of patients who actually enjoy the benefits of the basic medical insurance in China is lower than the coverage.

**Key Words:** China, disease profile, healthcare cost, healthcare system, oral and maxillofacial surgery

Oral and maxillofacial surgery, as a specialty in China, was established in 1954. It is a grade 2 subject of stomatology that ranks with orthodontics, prosthodontics, and parodontology. In the United States and European countries, medical practitioners of oral and maxillofacial surgery must have a dual degree (DMD and MD), but the practitioners in China complete their medical and dental medicine education concurrently in the stomatology school.[1] On the basis of this education model, oral and maxillofacial surgery settings are mainly in the stomatological specialist hospital. The advantage of this is that dental-related problems can be solved comprehensively; however, a drawback is lack of treatment for medical-related issues. In China, the professional scope of oral and maxillofacial surgery is wide. In addition to alveolar surgery, it also includes the management of oral and maxillofacial infections and osteomyelitis, oral and maxillofacial reconstruction, benign tumors and tumor-like lesions, salivary gland tumors and nontumor lesions, oral cancer, head and neck malignancies, congenital cleft lip and palate, craniofacial cleft, and craniofacial deformities.

Peking University School and Hospital of Stomatology is a national Class III, Grade I stomatological hospital with the largest scale of oral specialist services in the world. It won the first place for dental specialty in ''Best specialist ranking list of Chinese hospitals'' for 4 consecutive years from 2009.[2] As one of China's dental medical centers, its source of patients is mainly from the northern China, covering a population of almost 600 million, spread over 10 provinces and 2 municipalities. This study retrospectively analyzed 25, 825 cases of hospitalized patients in the institution from 2008 to 2013, to understand disease profile, healthcare-seeking behavior patterns and consumption patterns of medical resources within oral and maxillofacial surgery services and to gain an indirect reflection of the status of medical system reform in China.

## PATIENTS AND METHODS

### Study Design

This research is a retrospective study. All inpatients were enrolled during a period from January 1, 2008 to December 31, 2013; a total of 25,825 patients were hospitalized at Oral and Maxillofacial Surgery Department of Peking University School and Hospital of Stomatology.

### Disease Classification

According to the International Classification of Diseases (ICD-10) and the classification of Peterson's Principles of Oral and Maxillofacial Surgery (written by Michael Miloro),[3] the patients were divided into 7 categories. These were oral and maxillofacial infection, oral and maxillofacial trauma, benign tumor and tumor-like lesion, malignant tumor, congenital cleft lip and palate and craniofacial cleft, craniofacial deformity, and other conditions (hereafter referred to as infection, trauma, benign tumor, malignant tumor, cleft lip and palate, craniofacial deformity, and other, respectively). Suppurative osteomyelitis, radiation osteomyelitis, and bisphosphonates osteomyelitis were classified as infections; temporomandibular joint ankylosis was classified as trauma or other condition which based on the cause; and removal of internal fixation implants was classified as craniofacial deformity, trauma, or tumor according to the original disease; phase II repair and reconstruction of tissue defect was classified as infection, trauma, benign tumor, or malignant tumor according to the primary pathogeny; non-neoplastic lesions of salivary gland and other diseases that could not be included in the first 6 categories were classified as "other."

### Data Sources

All inpatients' information was obtained from their medical record. The data are not available without signing a data use agreement with the institution. The corresponding author had signed this agreement. And this study was approved by the ethical committee of the Peking University School and Hospital of Stomatology. (Ethical approval number is PKUSSIRB-2012059).

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## Data Illustration

Basic information data of patients were collected, including the number of inpatients, the number of operations, and the number of and reasons for nonoperations. The mean length of stay (LOS) and preoperative LOS were recorded according to disease classification.

For healthcare consumption, the hospitalization expenses of patients in the different disease categories over the 6 years were recorded. The hospitalization expenses were divided into 6 categories: surgery charges, material costs, medicine charges, investigation charges, nursing costs, and bed costs. Surgery charges referred to operation charges and anesthesia charges. Investigation charges referred to radiology charges, biochemical assay charges, and other investigations. Nursing costs referred to the costs of nursing-related care and procedures. Material costs referred to the costs of disposable supplies used in investigations and treatment, and the costs of surgical implant material.

The patients' home location was categorized as local or nonlocal according to the census register. Local means the patient's census register is in Beijing, and nonlocal means the patient came from the area outside of Beijing. The payment of medical expenses was divided into 3 categories: basic medical insurance, publicly funded free medical service, and self-paying.

## Statistical Analysis

Microsoft Excel 2007 and SPSS17.0 were used to record and analyze the data, with frequency, mean, and constituent ratio used as statistical indicators.

# RESULTS

## Basic Inpatient Information

The results showed that the number of patients of all categories increased year by year—patients with benign tumors, cleft lip and palate, and malignant tumors consistently forming the largest total numbers (Fig. 1). This indicates there was little annual change in the disease spectrum. The largest increase in patient numbers over time was for malignant and benign tumor.

Over the 6 years of the study period, nonoperated patients were 2501 cases (accounted for 8.7% of all inpatients): 1616 cases of tumor (64.6% of the nonoperated patients total) is the biggest part, 149 cases of craniofacial deformity (6.0%), 146 cases of trauma (5.8%), 197 cases of cleft lip and palate (7.9%), 310 cases of infection (12.4%), and 83 other cases (3.3%). The reasons for nonoperation were the general condition of the patient was unsuitable for general anesthesia, or malignancy had transferred to other sites, with a total of 1053 cases (42.1% of the total of nonoperated patients), mainly in malignant tumor patients; the disease itself required no surgery, such as severe soft tissue contusion or infection (531 cases; 21.2%); a contraindication to surgery developed after admission, such as common cold, menstrual period of female patients, and so on (815 cases; 32.6%); other reasons, such as changing the treatment options or abandoning treatment (102 cases; 4.1%) (Table 1).

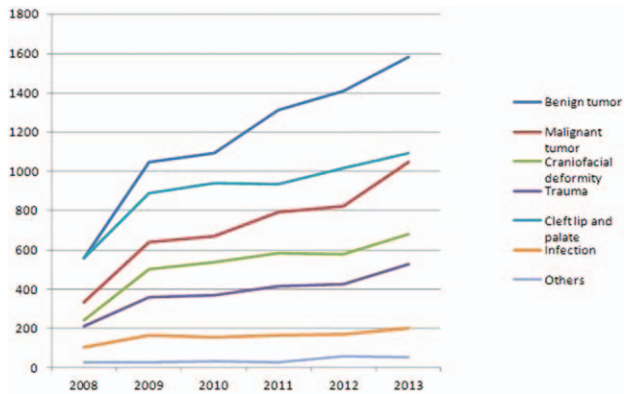


**FIGURE 1.** Graph showing the disease profile of oral and maxillofacial surgical cases across the study period of 2008 to 2013.

## Mean Length of Stay and Preoperative Length of Stay

Over the 6-year study period, mean LOS and preoperative LOS for all 7 categories did not change significantly. Overall, mean LOS and preoperative LOS increased then decreased again, reaching a peak in 2011 and 2012 (Table 2).

Table 3 and Table 4 show the hospitalization expenses.

## Medical Care Costs of Inpatients

Most inpatients were nonlocal, and the increase in numbers during the 6-year period was much higher than that of local patients. Patients whose costs were paid by basic medical insurance were the majority throughout the total period, with the proportion of patients self-paying increasing the most over the period. The smallest constituent ratio was patients publicly funded for free medical services, which initially showed a slight increase, and then decreased (Table 5).

## Cost Burden

The proportion of individual medical expenses per capita disposable income is an important index to evaluate medical cost burden.[4,5] As the payment method of population and the proportion of medical insurance payment are varying in this study, and literatures showed that the total expenditure on health in China is still an individual financing based.[4,6] So, the study compared total hospitalization expense and per capita disposable income of residents to reflect the medical cost burden of patients using oral and maxillofacial surgery services.

The comparison between hospitalization expenses in this institution and per capita disposable income of the Chinese population in the same year (Table 6) showed that the total cost of hospitalization increased year by year, but the average annual increase was lower than the increase in per capita disposable income for the same period. Therefore, hospitalization expenses per capita disposable income decreased over time.

The hospitalization cost for oral and maxillofacial malignant tumor was used as an example to compare the cost burden for this category of disease across different countries (Table 7). Large differences were revealed, for example, in Canada, the United States, France, and other developed countries, with hospitalization expenses as a proportion of annual capital income being no >40%, whereas in India and in our institution the proportions were >120%.

# DISCUSSION

## Mean Length of Stay and Preoperative Length of Stay

The mean LOS and preoperative LOS are comprehensive management indicators that reflect the work efficiency of a hospital and the level of medical care. In China, for Class III, Grade I hospitals, the mean LOS of surgical patients was required to be shortened to ≤11 days in 2011.[16,17]

**TABLE 1.** Basic Information on Inpatients Admitted Between 2008 and 2013

| | No. of Inpatients | No. of Operations | No. of Patients Not Operated | Proportion of Patients Operated, % | Sex Ratio (Male/Female) | Age ($\bar{x} \pm s$) |
|---|---|---|---|---|---|---|
| 2008 | 2311 | 2029 | 282 | 87.8 | 1.19 | 33.67 ± 22.27 |
| 2009 | 3996 | 3620 | 376 | 90.59 | 1.19 | 33.13 ± 22.07 |
| 2010 | 4211 | 3795 | 416 | 90.12 | 1.16 | 30.73 ± 21.73 |
| 2011 | 4591 | 4221 | 370 | 91.94 | 1.24 | 29.9 ± 22.14 |
| 2012 | 4931 | 4476 | 455 | 90.77 | 1.13 | 33.53 ± 21.76 |
| 2013 | 5785 | 5183 | 602 | 89.59 | 1.12 | 32.07 ± 21.75 |
| Total | 25,825 | 23,324 | 2501 | 90.32 | 1.17 | 32.04 ± 21.96 |
| Change from 2008 to 2013, % | +150.3 | +155.4 | +60.1 | | | |

The mean LOS of craniofacial deformity surgery patients was 3.53 days in Brazil[18] and 10.2 days in this institution. The mean LOS of patients with head and neck malignant tumors was 6.7 days in the United States and 14.2 days in this institution.[11] The mean LOS of patients with free flap reconstruction was 17.9 days in this institution, which was >14.1 days for the same surgery in Canada.[13] The mean LOS of patients with cleft lip and palate repair surgery was 1.9 days in the United States,[19] whereas only the preoperative LOS was 3.3 days in this institution. It is evident that mean LOS in this institution was higher than that of similar patients globally, especially preoperative LOS, which was controlled within 1 day in other countries.[20,21] There are a number of possible reasons for this phenomenon. The first of these is, for patients admitted in hospital under basic medical insurance, expenses during hospitalization are paid by Medicare proportion,[22] meaning that operation-related diagnosis and treatment is begun after hospitalization and the patients discharged after the completion of the entire diagnosis and treatment process, including, for example, the pathologic diagnosis, preoperative examination, surgical follow-up treatment, sutures, and so on. This is significantly different from Western countries, where the general admission process is such that the appropriate preoperative examination is completed before hospital admission, surgery is conducted on admission, and then patients are transferred to appropriate next-level medical care when they are stable.[23] Second, there are hospital factors to consider. This institution is a stomatology specialist hospital, so there is no professional internal medicine examination and treatment. Patients with complicated internal medicine conditions should require interhospital consultation and treatment that will increase LOS. Combined with the previous results mentioned, the main nonoperation reason was that some tumor patients were unsuitable for surgery but surgical contraindication was not excluded until admitted, it is evident that a lack support of internal medicine in general hospitals may be a bottleneck for the development of oral and maxillofacial surgery in the stomatology specialist hospital.

## Hospitalization Expenses

Surgery charges and nursing costs reflect the value of services provided by medical personnel. Using patients undergoing oral and maxillofacial malignant tumor surgery as an example, literature shows that in the United States, nursing and bed costs account for 36.4% of expenses, surgery charges account for 27.3%, material costs account for 15.4%, investigation charges account for 10.5%, and medicine charges account for 8.9%.[24] In India, surgery charges account for 56.56%, nursing and bed costs account for 19.98%, material costs account for 9.95%, and investigation charges account for 8%.[10] In both of these instances, surgery charges, and nursing and bed costs, incur the major proportion of hospital expenses. The proportion of surgery charges and nursing costs in this study was 38.1%, which was lower than that of medicine charges and material costs (47.4%). Chinese Health Statistics Yearbook 2013 showed that Medicine charges of inpatients in Chinese public hospitals accounted for 40.4% of total costs, material costs accounted for 15.1%, and the nursing costs accounted for only 1.9%.[6] At the time of this writing, the income of China's public hospitals consists of 3 streams: financial aid, medical income, and medicine and material costs. Financial aid is paid by the government, accounting for 8.2% of total hospital revenue. Medical income mostly reflects the value of services provided by medical personnel, which accounts for 42.4%, consisting of outpatient income and hospital revenue,

**TABLE 2.** Mean LOS and Preoperative LOS of Surgical Patients for Each Disease Category

| | Mean LOS, d | | | | | | | Preoperative LOS, d | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Total |
| Benign tumor | 8.8 ± 3.9 | 8.6 ± 3.2 | 8.8 ± 4.0 | 8.5 ± 4.5 | 9.0 ± 4.5 | 8.8 ± 4.2 | 8.7 ± 4.9 | 4.5 ± 2.1 | 4.2 ± 2.1 | 4.4 ± 2.1 | 4.2 ± 2.5 | 4.4 ± 2.3 | 4.3 ± 2.2 | 4.3 ± 2.1 |
| Malignant tumor | 16.7 ± 6.4 | 14.1 ± 6.7 | 14.0 ± 7.0 | 13.6 ± 6.8 | 14.4 ± 6.9 | 14.0 ± 6.1 | 14.2 ± 5.3 | 6.5 ± 3.5 | 5.8 ± 2.8 | 5.6 ± 3.5 | 5.4 ± 3.7 | 5.6 ± 2.6 | 5.8 ± 3.0 | 5.7 ± 2.9 |
| Craniofacial deformity | 12.2 ± 5.6 | 12.4 ± 5.4 | 11.9 ± 4.9 | 11.9 ± 5.0 | 10.6 ± 5.0 | 10.0 ± 4.8 | 11.4 ± 5.2 | 5.2 ± 3.2 | 5.3 ± 2.4 | 4.9 ± 2.8 | 4.9 ± 2.9 | 4.3 ± 2.5 | 4.2 ± 2.2 | 4.7 ± 2.5 |
| Trauma | 10.3 ± 5.6 | 10.0 ± 5.3 | 9.8 ± 5.5 | 9.7 ± 5.5 | 10.8 ± 5.9 | 10.0 ± 4.6 | 10.1 ± 4.4 | 4.3 ± 3.1 | 4.3 ± 2.0 | 4.2 ± 2.1 | 4.1 ± 2.9 | 4.3 ± 2.3 | 4.3 ± 2.2 | 4.2 ± 2.1 |
| Cleft lip and palate | 7.9 ± 2.5 | 8.0 ± 3.3 | 8.0 ± 3.3 | 7.8 ± 3.0 | 7.7 ± 3.3 | 7.8 ± 3.1 | 7.9 ± 3.2 | 3.5 ± 1.5 | 3.4 ± 2.0 | 3.5 ± 1.9 | 3.2 ± 1.8 | 3.1 ± 1.7 | 3.3 ± 1.8 | 3.3 ± 1.6 |
| Infection | 10.2 ± 5.7 | 9.7 ± 4.9 | 9.9 ± 5.9 | 9.8 ± 5.8 | 11.2 ± 6.0 | 10.2 ± 5.6 | 10.2 ± 4.7 | 4.4 ± 2.2 | 4.4 ± 2.5 | 4.2 ± 2.2 | 4.3 ± 3.2 | 4.8 ± 2.6 | 4.4 ± 2.4 | 4.4 ± 2.5 |
| Others | 8.6 ± 6.0 | 7.7 ± 5.2 | 7.2 ± 4.9 | 7.1 ± 4.4 | 10.0 ± 7.5 | 11.7 ± 6.3 | 9.2 ± 6.5 | 4.0 ± 2.6 | 3.3 ± 1.6 | 3.4 ± 2.0 | 3.2 ± 1.6 | 4.3 ± 4.7 | 4.4 ± 3.2 | 3.9 ± 2.8 |
| Total | 9.8 ± 4.51 | 9.7 ± 4.72 | 10.1 ± 5.0 | 10.3 ± 5.2 | 10.2 ± 5.1 | 10.0 ± 4.6 | 10.0 ± 4.9 | 4.3 ± 2.2 | 4.3 ± 2.2 | 4.3 ± 2.21 | 4.4 ± 2.5 | 4.4 ± 2.6 | 4.3 ± 2.2 | 4.3 ± 2.1 |

LOS, length of stay.

**TABLE 3.** Hospitalization Expenses of Surgical Patients Admitted Between 2008 and 2013

| Hospitalization Year | All-In Cost ($\bar{x} \pm s$) | Average Daily Hospitalization Expenses ($\bar{x} \pm s$) | Surgery Charges | | Material Costs | | Medicine Charges | | Investigations Charges | | Nursing Costs | | Bed Costs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % |
| 2008 | 2238.9 ± 979.1 | 230.3 ± 91.0 | 707.1 ± 281.3 | 31.6 | 646.4 ± 275.6 | 28.9 | 399.2 ± 138.6 | 17.8 | 236.4 ± 105.8 | 10.6 | 141.6 ± 73.0 | 6.3 | 108.1 ± 40.7 | 4.8 |
| 2009 | 2261.9 ± 1001.5 | 241.2 ± 101.9 | 699.3 ± 308.7 | 30.9 | 618.3 ± 241.1 | 27.3 | 457.8 ± 186.1 | 20.2 | 233.9 ± 113.1 | 10.3 | 147.9 ± 84.0 | 6.5 | 104.8 ± 40.8 | 4.6 |
| 2010 | 2301.1 ± 1048.8 | 233.3 ± 107.9 | 737.9 ± 318.7 | 32.1 | 648.4 ± 306.0 | 28.2 | 433.6 ± 143.9 | 18.8 | 228.0 ± 104.9 | 9.9 | 146.3 ± 85.0 | 6.4 | 106.8 ± 42.6 | 4.6 |
| 2011 | 2367.2 ± 980.7 | 233.8 ± 100.3 | 747.9 ± 348.0 | 31.6 | 698.4 ± 303.2 | 29.5 | 431.7 ± 182.8 | 18.2 | 232.3 ± 100.0 | 9.8 | 146.6 ± 72.1 | 6.2 | 110.3 ± 55.6 | 4.7 |
| 2012 | 2596.9 ± 1038.6 | 265.1 ± 86.4 | 825.6 ± 347.0 | 31.8 | 783.0 ± 279.0 | 30.2 | 443.2 ± 178.5 | 17.1 | 261.0 ± 109.9 | 10.1 | 165.0 ± 69.3 | 6.4 | 119.1 ± 55.0 | 4.6 |
| 2013 | 2624.0 ± 1284.6 | 271.0 ± 98.5 | 848.7 ± 365.6 | 32.3 | 817.2 ± 291.9 | 31.1 | 425.9 ± 152.8 | 16.2 | 258.0 ± 108.1 | 9.8 | 162.5 ± 71.2 | 6.2 | 111.8 ± 42.6 | 4.3 |
| Total | 2430.1 ± 1026.8 | 248.8 ± 99.1 | 772.5 ± 336.5 | 31.8 | 715.9 ± 283.7 | 29.5 | 434.2 ± 169.8 | 17.9 | 243.4 ± 110.1 | 10.0 | 153.4 ± 76.7 | 6.3 | 110.7 ± 48.7 | 4.6 |
| 08/13 nnual variation, % | +18.7 | +17.6 | +20.0 | | +26.4 | | +6.7 | | +9.1 | | +14.7 | | +3.4 | |

The unit for cost is US dollars (USD). The annual average exchange rate of the RMB against the US dollar in 2013 (6.1932 RMB: 1 USD) was used to calculate the costs in USD.

**TABLE 4.** Hospitalization Expenses of Surgical Patients Across Disease Categories

| Disease Name | All-In Cost ($\bar{x} \pm s$) | Average Daily Hospitalization Expenses ($\bar{x} \pm s$) | Surgery Charges | | Material Costs | | Medicine Charges | | Investigation Charges | | Nursing Costs | | Bed Costs | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % | ($\bar{x} \pm s$) | Constituent Ratio, % |
| Benign tumor | 1515.2 ± 720.3 | 181.3 ± 93.9 | 498.0 ± 269.6 | 32.97 | 357.8 ± 166.4 | 23.69 | 257.5 ± 103.3 | 17.04 | 92.1 ± 59.0 | 6.10 | 213.4 ± 98.1 | 14.13 | 91.7 ± 55.4 | 6.07 |
| Malignant tumor | 4203.7 ± 258.4 | 340.2 ± 209.0 | 1191.4 ± 683.4 | 29.21 | 819.7 ± 430.5 | 20.09 | 1217.2 ± 542.6 | 29.84 | 291.0 ± 114.8 | 7.13 | 399.0 ± 248.5 | 9.78 | 160.9 ± 70.7 | 3.94 |
| Craniofacial deformity | 4755.7 ± 2744.4 | 433.3 ± 213.1 | 1634.6 ± 863.4 | 35.21 | 2020.9 ± 245.4 | 43.53 | 395.2 ± 147.5 | 8.51 | 252.1 ± 125.9 | 5.43 | 254.3 ± 115.5 | 5.48 | 85.3 ± 33.4 | 1.84 |
| Trauma | 3108.1 ± 1434.3 | 322.1 ± 160.1 | 638.6 ± 260.9 | 23.07 | 1279.9 ± 668.4 | 46.24 | 354.1 ± 233.6 | 12.79 | 146.3 ± 69.2 | 5.29 | 230.1 ± 120.6 | 8.31 | 110.3 ± 59.6 | 4.30 |
| Cleft lip and palate | 1041.8 ± 520.3 | 139.4 ± 54.5 | 414.2 ± 216.5 | 40.16 | 199.8 ± 86.0 | 19.37 | 129.1 ± 92.1 | 12.52 | 70.7 ± 32.6 | 6.86 | 159.5 ± 77.2 | 15.47 | 58.1 ± 29.3 | 5.63 |
| Infection | 1639.7 ± 1070.8 | 169.2 ± 112.4 | 459.4 ± 249.2 | 28.93 | 359.0 ± 272.4 | 22.61 | 304.1 ± 149.3 | 19.16 | 109.0 ± 63.2 | 6.86 | 242.1 ± 147.3 | 15.25 | 114.1 ± 56.2 | 7.18 |
| Others | 2041.2 ± 1043.2 | 281.6 ± 227.5 | 731.8 ± 489.7 | 36.23 | 374.7 ± 244.1 | 18.55 | 238.6 ± 171.8 | 11.81 | 323.7 ± 162.6 | 16.03 | 219.1 ± 154.9 | 10.85 | 131.9 ± 78.3 | 6.53 |

The unit for cost is US dollars (USD). The annual average exchange rate of the RMB against the US dollar in 2013 (6.1932 RMB: 1 USD) was used to calculate the costs in USD.

**TABLE 5.** Home Location Classification and Medical Care Cost of Inpatients Between 2008 and 2013

| | Census Register Classification of Inpatients | | | | Payment of Medical Expenses | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | Local | Constituent Ratio, % | Nonlocal | Constituent Ratio, % | Basic Medical Insurance | Constituent Ratio, % | Self-paying | Constituent Ratio, % | Publicly Funded Free Medical Care | Constituent Ratio, % |
| 2008 | 807 | 34.92 | 1504 | 65.08 | 1835 | 79.40 | 268 | 11.60 | 208 | 9.00 |
| 2009 | 1020 | 25.53 | 2976 | 74.47 | 2504 | 62.66 | 506 | 12.66 | 986 | 24.67 |
| 2010 | 1022 | 24.27 | 3189 | 75.73 | 2271 | 53.93 | 677 | 16.08 | 1263 | 29.99 |
| 2011 | 1183 | 25.77 | 3408 | 74.23 | 2142 | 46.66 | 946 | 20.61 | 1503 | 32.74 |
| 2012 | 990 | 20.08 | 3941 | 79.92 | 2694 | 54.63 | 1644 | 33.34 | 593 | 12.03 |
| 2013 | 1087 | 18.79 | 4698 | 81.21 | 3466 | 59.91 | 2136 | 36.92 | 183 | 3.16 |
| Total | 6109 | 23.66 | 19,716 | 76.34 | 14,912 | 57.74 | 6177 | 23.92 | 4736 | 18.34 |
| Changes from 2008 to 2013, % | +35.6 | | +220.4 | | +88.9 | | +696.7 | | −12.2 | |

hospital revenue includes fees for registration, beds, inspection, treatment, and surgery. Medicine and materials costs income accounts for 47.1%.[6] It is thus clear that compared with medicine and material costs, medical income is lower and the value of medical personnel labor is not fully appreciated.

Wilson et al have pointed out that nursing costs are a major hospital cost component.[25] In our study the proportion of nursing costs was 6.3%, which was much lower than those in more developed countries. Possible reasons for the low nursing costs include, first, a charging standard lag. Our institution had implemented the charging standard issued by the government in 1999, the consumer price index of China in 2013 had increased by 37.6% from 1999 levels and the top raw material price related to nursing costs had an increase of approximately 67%.[26] The second possible reason is low charging rates. For first-degree nursing, the current price was 7 RMB (Chinese currency) (approximately 1.13 USD) per day. The specific work included visiting patients hourly and recording disease condition, monitoring and recording vital signs, observing catheters in patients and their response after treatment, providing nursing-related health guidance, rehabilitation training, care of daily activities, and so on. Literature has shown that the actual labor cost of first-degree nursing is between 120.78 and 210.26 RMB per day, which is much higher than the actual fees charged.[27] Finally, there may be insufficiency in nursing charges; in the United States, nursing interventions were found to consist of up to 486 items.[28] Although in this institution, nursing-related charges only consisted of 30 items, accounting for 1% of 3971 items recorded in the total charges. Literature also reveals that the overall price of medical services is low, which is an outstanding problem under the current system of Chinese public hospitals.[29]

## Medical Payment

American medical services are provided by market mainly,[23] though they are mainly provided by the government in China. In China there are 3 mechanisms for the funding of health care for individuals: publicly funded free medical services, basic medical insurance, and full self-paying. Free medical services are provided for citizens within government agencies and public institutions with collective ownership and are funded by the national finance. Health system reform began in 1998, and a key objective was to build a health insurance system with full coverage for all residents of China.[30] Since then, publicly funded free medical service has been gradually replaced by basic medical insurance. Only in 2012, 220,000 publicly funded free medical service personnel have been incorporated into the basic medical insurance system in Beijing.[31] This coincides with the study results which showed an overall trend of a decreasing proportion of patients who are publicly funded with free medical services. By 2013, the number of people participating in the basic medical insurance in China was >1.3 billion, and coverage was >90%[32]; this coincides with the study results showing an increasing proportion of patients using basic medical insurance. But the situation is not optimistic, the ratio of the total national health care expenditure to the GDP in China was 5.2% in 2011 which was far >17.9% that of the United States, ranking 135 in the world.[6] Basic medical insurance policy is so strict that results in patients being hospitalized in public hospitals only in the geographic area of their insurance.[22] When hospitalization outside the designated area occurs, specific procedures need to be followed, with a testimonial of transfer of treatment processed within local health agencies. The time to complete transfer of treatment ranges from 30 to 90 days.[33] In addition, due to varying policies, there is a substantial difference in the proportion of basic medical insurance payment across different regions. This manifests as a payment proportion for hospitalization expenses for urban residents of approximately 55% to 65%, whereas it is <30% in the vast rural areas.[34]

This study showed that the proportion of patients with basic medical insurance hospitalized in this institution (57.74%) was

**TABLE 6.** Hospitalization Expenses of Surgical Patients in This Institution Compared With Per Capita Disposable Income of Residents in the Same Year[6]

| | Year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Annual Increase, % |
| Hospitalization expenses, USD) | 2239 | 2262 | 2301 | 2367 | 2597 | 2624 | 3.4 |
| Per capita disposable income of residents, USD | 2545 | 2770 | 3082 | 3518 | 3962 | 4348 | 14.2 |
| Hospitalization expenses/per capita disposable income, % | 88.0 | 81.7 | 74.7 | 67.3 | 65.5 | 60.4 | |

The annual average exchange rate of the RMB against the US dollar in 2013 (6.1932 RMB: 1 USD) was used to calculate the costs in USD.

**TABLE 7.** Hospitalization Expenses of Surgical Patients With Oral and Maxillofacial Malignant Tumor Compared With Per Capita Disposable Income of Residents in the Same Year in Various Countries

| Year | Country | Average Hospitalization Expenses | | Per Capita Disposable Income of Residents | | Hospitalization Expenses/Per Capita Disposable Income, % |
|---|---|---|---|---|---|---|
| | | Value of Number | Unit | Value of Number | Unit | |
| 2007 | France | 2764–7674[7] | Euro | 21,091[8] | Euro | 13.1–36.4 |
| 2011 | Britain | 2275[9] | Pound | 12,607[8] | Pound | 18.0 |
| 2011 | India | 146,092.78[10] | Rupee | 120,000[10] | Rupee | 123 |
| 2012 | The United States | 10,087[11] | US$ | 37,964[12] | US$ | 26.6 |
| 2013 | Canada | 16,564[13] | C$ | 40,500[14] | C$ | 40.9 |
| 2008–2013 | This institution | 26,063 | RMB | 20,898[15] | RMB | 124.7 |

lower than the 90% proportion of the Chinese population with basic medical insurance cover, and the proportion of patients paying their own expenses increased continuously and obviously. This may be due to some diseases not being included within the payment scope of basic medical insurance, such as craniofacial deformities and nonindustrial injury-related trauma. In addition, there is an uneven distribution in medical resources. In 2012, the number of medical and technical personnel per 1000 population in Beijing was 9.48, which was approximately twice the national level of 4.94 per 1000 population.[6] Some areas do not have the ability to treat oral and maxillofacial surgical conditions so patients are hospitalized in other places, which coincides with the finding in this study that 76.34% of patients were nonlocal. Because the procedures of transfer of treatment to patients with basic medical insurance are complex, the waiting time for hospitalization is longer than the period of validity of the transfer of treatment, the proportion covered by the basic medical insurance payment is not high, and the settlement interval of medical insurance is long after a personal payment on account.[35] All of these factors influence some nonlocal basic medical insurance patients to choose self-paying. The literature also shows that the proportion of patients who actually enjoy the benefits of the basic medical insurance in China is lower than the actual coverage.[35]

## Cost Burden

This study showed that rising charges for inpatients in this institution did not cause an aggravation of medical cost burden of residents. This was consistent with Chinese Health Statistics Yearbook 2013 which stated that "in recent years, the proportion of hospitalization expenses per capita disposable income decreased year by year in China, and there was a downward trend in the overall medical burden of residents."[6]

To understand the current medical cost burden in China, oral and maxillofacial malignant tumor is taken as an example to compare the burden of the same disease group in different countries. The results showed a large difference. Patients with oral or maxillofacial malignant tumor treated in this institution bore a heavier medical cost burden, compared with the treatment of similar diseases in developed countries, where the burden of cost is much lower.

There are limitations to this study: the treatment of oral and maxillofacial malignant tumor will have differences in terms of region, length of treatment, and therapy level of hospital, which may directly result in differences in hospitalization expenses. Single-center data were used for this study, which may represent an incomplete picture of national healthcare burden and disease incidence.

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# Le Fort I Disassembly for the Management of Juvenile Ossifying Fibroma Extending To the Skull Base

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**Abstract:** Ossifying fibroma is a rare benign osteogenic neoplasm arising from undifferentiated cells of the periodontal ligament. Ossifying fibroma have a well-defined border that differentiates it from fibrous dysplasia clinically; these tumors manifest as a round or ovoid, expansile, painless, slow-growing mass may displace the roots of adjacent teeth and also cause root resorption. A variety of approaches for resection of the maxilla have been described. Most involve the use of facial and lip-splitting incisions to gain wide access. Surgical approach specifically to the ossifying fibroma located in the midface includes the Le Fort I approach, Caldwell–Luc access, lateral rhinotomy with medial or total maxillectomy, external ethmoidectomy, and endoscopic surgery. The access through Le Fort I disassembly is a versatile approach not only because of the aesthetic potential in using intraoral incision but also due to its minimal invasiveness, lesser complications and gives the possibility of reconstruction in a single operation. Le Fort I disassembly followed by an excision appears to be a versatile, secure, and satisfactory option.

**Key Words:** Fibro-osseous lesion, Le Fort I, ossifying fibroma

The fibro-osseous tumors of the jaw depict a wide variety of lesions in which the osseous components are transformed into a fibrous connective tissue matrix. Ossifying fibroma (OF) of the craniofacial skeleton, as described in WHO classification of odontogenic tumors (2005),[1] are benign fibro-osseous neoplasms characterized by the replacement of normal bone by a fibrous cellular stroma containing foci of mineralized bone trabeculae and cementum-like material that vary in amount and appearance. Ossifying fibroma is rare osteogenic neoplasm arising from the undifferentiated cells of periodontal ligaments. The most characteristic and differentiating feature of OF from the fibrous dysplasia is that it is a well-demarcated benign fibro-osseous tumor with capsule composed of metaplastic bone, fibrous tissue, and varying amounts of osteoid.[2] Conventional OF is slow growing, managed by simple curettage, less recurrent and arises in 3 to 5 decades of life; while juvenile type is aggressive, more chances of recurrence and arises in 1 to 2 decade of life.[3,4] According to the new edition of the

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