MEDS Public Health and Preventive Medicine (2024)
Clausius Scientific Press, Canada
DOI: 10.23977/phpm.2024.040204
ISSN 2616-1915 Vol. 4 Num. 2

Analysis of Related Factors and Nursing Countermeasures Affecting Early Correction of Young Patients with Orthodontics

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Keywords: Orthodontic Young Patients, Early Correction of Patients, Screening of Correction Related Factors, Factor Screening and Nursing Countermeasures, Nursing Countermeasures for Correction

Abstract: With the development of society and the continuous improvement of people's living standards, great changes have taken place in the diet of human beings. The incidence of malocclusion is also increasing, especially among adolescents and children. Adolescence is the second peak of human development, the middle stage between childhood and adulthood. According to clinical surveys, adolescent patients account for up to three-fifths of orthodontic patients. The psychological characteristics of adolescent orthodontic patients are precocious and immature, but their thinking is incomplete. The psychological performance of teenagers about orthodontic treatment is that due to the formation of their own image, teenagers are eager to correct their jaws that are different from others. Doctors should guide young people out of this misunderstanding in a timely manner, communicate with young people in a timely manner, and master flexible treatment scales. With the popularization of information technology, the public's awareness of oral deformities is gradually improving. People no longer pay more attention to oral health issues just for the sake of appearance, and the number of teenagers who choose orthodontics is gradually increasing, medical staff should strengthen the care of patients, and improve the effect of orthodontics according to the psychological characteristics of patients. In this paper, the algorithm was introduced into the research survey of adolescent orthodontics, and the psychological intervention method had a significant impact on it.

1. Introduction

The best period for adolescents to receive orthodontic treatment is when the young children enter the second peak of physical development, and the body grows rapidly until the growth and development are completed. With regard to the development of the craniofacial mouth, because the position of the maxilla is relatively close to that of the skull, there is a relatively obvious growth in the stage of development, which makes the face gradually transform into the adult face shape. While there are many benefits to getting straightened during the teenage years, our teeth are always

changing, whether they are straightened or not. Therefore, if we want to align our teeth in adolescence, we will inevitably spend a lot of time and effort to wear retainers for a long time, so that we can have neat teeth in the future.

With the development of medical technology, there are more and more studies on orthodontics. The Ching-Wei Chang studied and found that the anterior maxilla was the most severely traumatized part of the oral cavity in childhood. The peak age for these injuries is 9 to 10 years old. For untreatable maxillary anterior teeth, the need for future implants should be considered [1]. Staderini E pointed out that crossbite refers to the reverse sagittal relationship between the upper and lower incisors. According to evidence-based orthodontic triage, AC treatment is indicated if any occlusal disturbance forces the mandible toward a grade III growth pattern. The use of removable and fixed appliances has been suggested to correct anterior crossbite [2]. Soyer Y studied and discovered that maxillary lateral incisor hypoplasia (MLIA) was a disease that affected the aesthetics and function of teeth in young patients. Although there are several treatments, each condition is different [3]. So-Young Y found in the experiment that the amount of tooth movement caused by orthodontic force increased in a time-dependent manner. At 6, 48, and 144 hours after orthodontic tooth movement, Rln1 mRNA levels increased 12, 41, and 263-fold, respectively [4]. Murphy R F found that the mean age of corrective surgery was 6.5 years, and patients underwent an average of 8.15 lengthening procedures over a 69-month period. After the growth procedure, the main coronal plane Cobb was moderately corrected at FF (average 52.4 ° before FF and 37.6 ° after FF, P 50%) [5]. Lee N J divided the patients into a complication group and an uncomplicated group, and used univariate analysis and multivariate logistic regression to evaluate the influence of patient characteristics and surgical characteristics on postoperative outcomes [6]. The above studies on orthodontics are relatively specific, but they do not correlate with the screening of orthodontic-related factors, nor do they point out how to respond to nursing measures during orthodontic treatment.

In the treatment of young patients, it is necessary to actively screen the relevant factors of the patient's psychology, and strengthen the psychological counseling and spiritual encouragement of the patient in terms of nursing. The aim of Aratani S was to elucidate the risk of overcorrection during the treatment of chronic deep hyponatremia, risk factors for overcorrection have not been adequately studied, this was a single-center retrospective observational study [7]. Data obtained by Avakov confirms the drug's role in severe infections. The drug can be used in the comprehensive treatment of such critical conditions to prevent and assist in the treatment of developing complications [8]. Zhang R S studied controversy regarding the treatment of mandibular hypoplasia in patients with craniofacial hypoplasia, especially the role of mandibular distraction osteogenesis. He compared the need for orthognathic surgery in skeletally mature subjects with craniofacial hypoplasia or without early mandibular distraction osteogenesis [9]. Jin HP found that increasing age was closely associated with the occurrence of AKI after Kasai. These findings provide a rational basis for early corrective surgery, early screening for AKI, and interventions to improve the outcome of Kasai's procedure [10]. Pereira R considers stomatology as a highly developed field that aims to use artificial intelligence software to develop methods that aid in diagnosis, treatment improvement and evaluation, and better prediction [11]. Liu P has previously shown that interindividual differences in frailty and CWP are genetically determined. They also reported an association of frailty and CWP caused by shared genetic and shared environmental factors [12]. Kagan S H publishes scientific literature, clinical literature and guidelines for oral screening. As demographics change, there is an increasing need to address oral screening and testing in primary and professional practice [13]. The above studies on the screening of orthodontic-related factors and nursing measures are relatively specific, but they are not related to orthodontic-related treatment.

Orthodontics is to adjust the coordination relationship between faces through correction devices.

The main purpose of correction is to improve facial shape, align teeth, and enhance chewing efficiency. Adolescent orthodontics need to do a good job of oral care to reduce the incidence of dental diseases [14]. The deformity or irregularity of teeth may be caused by congenital heredity, or it may be caused by poor oral hygiene, which affects an individual's facial image and can be improved by orthodontic treatment. Orthodontics is the main surgical method for the treatment of dental and jaw deformities, and the main target of its treatment is adolescents.

2. Factors that Cause Orthodontics

The scope of orthodontics is not only the scope of correcting teeth. Orthodontics is a branch of stomatology, which studies the deformities of teeth, occlusion, jaw, face and masticatory organs, as well as oral problems, pathological diagnosis, orthodontic methods and preventive measures of teeth, occlusion, dentition, jaw, craniofacial and other deformities in the process of growth and development. The purpose of treatment is to achieve the coordination of dentition, skull and facial shape and to improve masticatory function and maxillofacial aesthetics through correction. The magic of orthodontics is that it can correct deformed teeth, make the teeth neatly arranged, and adjust the dislocated occlusal relationship to normal, thereby bringing multiple improvements to patients from function to aesthetics, including mental health, physical health, etc.

Orthodontics is a broad concept that encompasses a wide range [15]. Orthodontic classification includes: 1. Preventive orthodontic treatment is mostly used in the early stage of deciduous teeth. By wearing movable appliances, such as external arches, it can promote the development of the jaw and ensure the normal replacement of deciduous and permanent teeth. 2. Correction treatment is aimed at the initial malocclusion. By wearing a maxillofacial guide plate and other muscle stimulators, it can eliminate bad habits such as finger sucking, tongue sticking, mouth breathing, etc., and stimulate the normal development of the jaw. 3. Fixed orthodontic treatment is to move the permanent dentition and complete the reconstruction of the alveolar bone, thereby establishing a normal overlying relationship. 4. When skeletal malocclusion occurs, it can be combined with jaw surgery to remove excess bone. Because of different ages, so the treatment methods are also different. However, the purpose of orthodontics is the same, which is to achieve the purpose of correcting deformed faces through orthodontics, as shown in Figure 1.

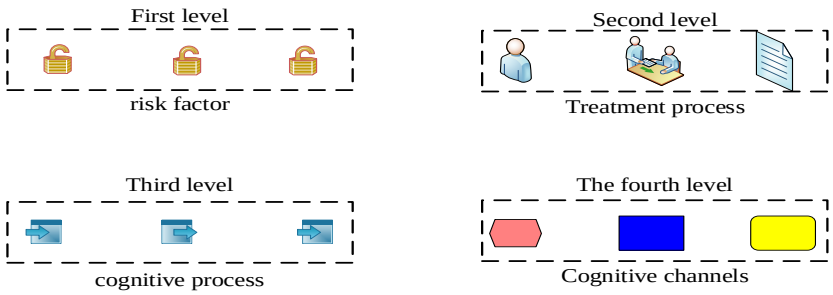

Figure 1: The scope of Orthodontics

3. Factors Related to Early Orthodontic Treatment in Young Patients

Dental malformation is considered to be one of the three major oral diseases. Some studies have used social psychology, teeth, and bones as parameters to conduct surveys. The survey shows that more than 90% of adolescents will have different degrees of dental deformities, and no significant differences between males and females have been found. Oral deformity has a great impact on the oral function and physical and mental health of adolescents. According to research, the actual

number of patients receiving orthodontics is about 20%. The factors that influence adolescents' acceptance of orthodontics are roughly as follows:

(1) Social culture and background

Many studies believe that the aesthetics of teeth and tooth surface is the fundamental reason for orthodontic patients to receive treatment, and having deformed teeth is not the first reason for orthodontic surgery. The study found that the aesthetics of the teeth and the perception of social respect were more able to affect the demand for orthodontics, and the adolescents who were ridiculed had a stronger need for treatment. After comparing the prevalence of oral deformities among adolescents in various countries, no significant difference was found, but for adolescent children, the need for supervisors of orthodontic treatment is greater, some patients with severe oral deformities do not feel the need for orthodontics because of their greater perception of the tooth surface [16]. On the contrary, some adolescents with certain problems with oral bite force raised the need for orthodontics. The subjective feelings of patients are not the same as the objective judgments of doctors, and adolescents are more susceptible to external influences, as shown in Figure 2.

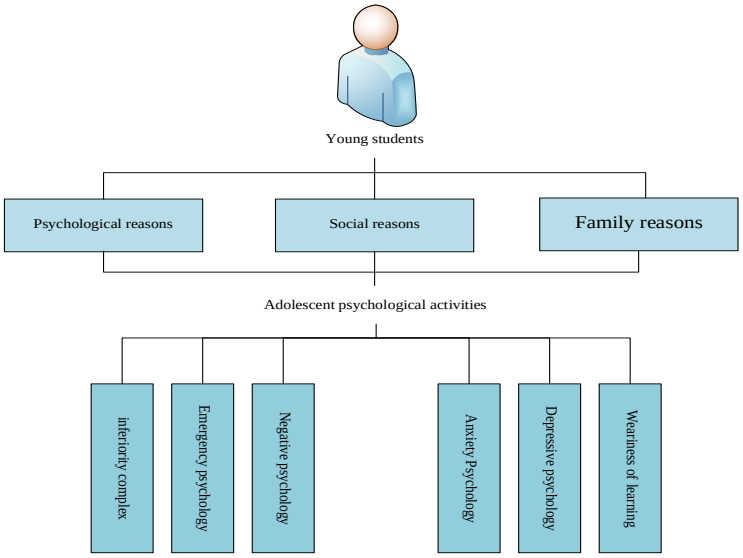

Figure 2: Influence of social culture and background on orthodontic treatment of young patients

(2) The cognitive level and self-perception of adolescents

There is a strong relationship between adolescents' orthodontic needs and their cognitive level. According to the survey, the vast majority of those who think their teeth are poor will take the initiative to request orthodontic treatment. On the contrary, half of the people who think they have better teeth still think they need orthodontic treatment. Both adolescents and adults are not very familiar with orthodontic treatment, in the early period of dental health education, students raised different questions about orthodontics. Most of the students used non-professional vocabulary, which showed that students had insufficient awareness of orthodontics. Adolescents are usually dissatisfied with their teeth. There are obviously different cognitions on the understanding of orthodontics, the aesthetics of teeth, and the differences in the appearance of teeth, as shown in Figure 3.

(3) Gender differences and parental attitudes towards orthodontic treatment

Gender is a major factor that affects adolescents' awareness of their oral cavity and their motivation to treat oral deformities. However, studies have shown that there is no significant difference between genders in seeking orthodontics. Parents' perceptions of satisfaction also affect the need for orthodontics. Parents' judgments about the extent of their children's need for treatment

are significantly different from their parents' educational level. At the same time, treatment needs and parental alignment of children's teeth also affect adolescent orthodontic needs. When the child thinks that his teeth do not need treatment, most parents will agree with the child's opinion, when the child's own teeth need orthodontics, there is a significant difference between the parents and the child's judgment. There are significant differences between parents' subjective perceptions of orthodontic treatment needs and dentists' evaluation of children's dental health.

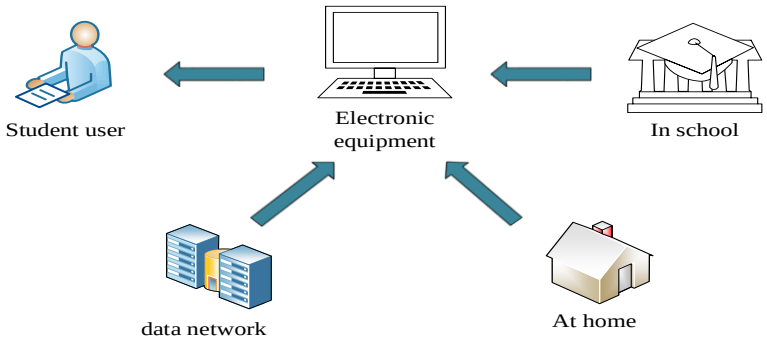

Figure 3: Teenagers' cognitive level and self-perception

4. Nursing Countermeasures for the Treatment of Young Orthodontic Patients

(1) Preparation of parents and patients

Parents should fully understand the relevant knowledge of oral treatment in advance, have a comprehensive communication with the doctor before orthodontic treatment, and improve the patient's oral hygiene awareness, and at the same time warn children about the possible adverse effects of not maintaining oral hygiene [17]. It is necessary to actively adjust the patient's psychological state, to give the patient positive confidence and a stable state of mind. Parents should create a relaxed and lively treatment atmosphere for patients, reduce verbal stimulation and affect the patient's psychology. Parents should inform patients in advance of the purpose and significance of orthodontic treatment, obtain the consent of patients in advance, listen to their opinions patiently, and solve their confusion, so as to eliminate the psychological fear of patients for orthodontic treatment, and at the same time enhance the courage of patients for orthodontic treatment.

(2) Psychological care

Adolescence is the most unstable period of psychological activities. Patients are prone to rebellious, excited and other psychological activities, and are easily affected by the environment and atmosphere. In response to the patient's psychological panic and other problems, it is necessary to actively communicate with the patient to help the patient eliminate psychological barriers. Before orthodontic treatment, it is necessary to educate the patient about the correct use of the function of the oral organs. Orthodontic treatment generally takes a long time, if the patient cooperates better, the treatment effect will be better; poor cooperation will not only prolong the treatment time, but also directly affect the treatment effect. It is necessary to actively mobilize the enthusiasm of the patients, enhance the confidence in treatment, and give more encouragement to those patients who suffer from inferiority complex and anxiety, so as to prevent the patients from falling into an emotional state of anxiety. When the patient sees a doctor, it is necessary to carefully observe the changes of the patient's condition, inform the progress of orthodontic treatment, and make the patient feel warm, so that the patient can be satisfied and healed physically and mentally.

(3) Physiological care

During orthodontics, special attention should be paid to the patient's oral care status. It must

constantly remind and urge patients to pay attention to oral hygiene and cleanliness at all times, carefully explain the importance of oral hygiene to patients, and patiently guide patients on how to maintain oral health during treatment. In the process of orthodontic treatment, patients will inevitably experience different degrees of pain. In this case, the ability to diagnose and treat should be improved first, and the best clinical methods should be mastered to reduce pain from the source. Furthermore, patients should be treated with nursing care during treatment, comfort and support should be given to patients, and the reasons for pain and discomfort should be explained, as shown in Figure 4. The cooperation between doctors and nurses is an important factor in correction, otherwise, it will bring unnecessary trouble to the doctor's treatment and cause more pain to the patient. Nurses must be well-trained, cooperate with each other, strictly implement the "four-hand" operation technique, achieve a tacit understanding of medical and nursing cooperation, complete the treatment procedure smoothly and orderly, and improve the efficiency of medical work.

Due to the long process of orthodontic treatment, it is necessary to fully carry out health education for patients, and set up posters or slogans in the consultation room or hospital corridor to explain the process and treatment methods of orthodontic treatment to patients and their families. It is necessary to explain the problems and preventive measures that will occur in orthodontic treatment, and explain the importance of oral hygiene in orthodontic surgery. It is necessary to communicate with patients, explain the major and difficult points of oral care, strengthen doctor-patient communication, establish a harmonious doctor-patient relationship, and let patients and their families understand comprehensive, systematic and targeted oral health care knowledge in the process of orthodontics, to improve the orthodontic effect. In the orthodontic nursing work, the humanized nursing concept should be poured into the whole process of orthodontic treatment, which can not only obtain the recognition and satisfaction of patients and their families, but also enhance the effect of orthodontic treatment and nursing services. In nursing work, both doctors and nurses must have good professional quality, professional responsibility and professional ethics, as well as a wealth of theoretical and practical knowledge. In the process of diagnosis and treatment, a corresponding treatment plan should be formulated according to the patient's orthodontic condition, and different nursing methods should be adopted in different treatment stages, so that the patient can have a high-quality and high-level orthodontic treatment process.

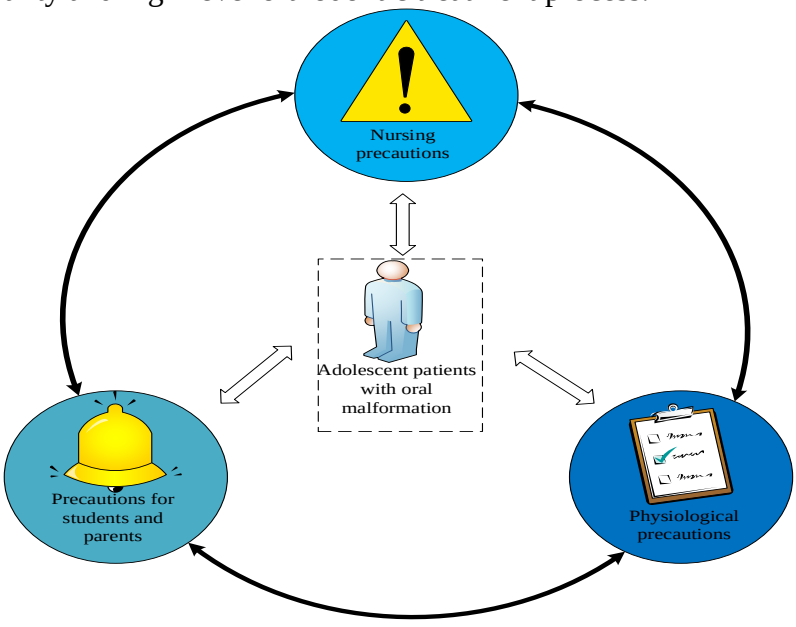

Figure 4: Psychological nursing of orthodontic treatment of young patients

5. Application of Binary Classification Algorithm in Screening Related Factors of Early Orthodontic Treatment in Young Patients with Orthodontics

The general random variable t is a real number, and the other α is an imaginary number, which is calculated by binary classification, and the patient-related psychological factors are valued.

The binary classification model is a conditional probability, it is defined as follows:

$$P(\alpha = 1/t) = \frac{e^{w \cdot t + r}}{1 + e^{w \cdot t + r}} \tag{1}$$

$$P(\alpha = 0/t) = \frac{1}{1 + e^{w \cdot t + r}} \tag{2}$$

Among them, $t \in q^n$ is the input value, $\alpha \in \{0,1,2\}$ is the output value, and $w \in q^n$ and $r \in q$ are the relevant parameters. r is the offset amount and $w \cdot t$ is the intrinsic volume.

First, the event is introduced, the probability of occurrence is h, and we call this q:

$$h = \frac{p}{1 - p} \tag{3}$$

For the probability value of the event, we know $0 \subseteq h \subseteq \beta$, so we are willing to use the value of h to represent the value of function $e^{w \cdot t + r}$, formula $\frac{p}{1-p} = e^{w \cdot x + r}$ can be obtained:

$$h = \frac{e^{w \cdot t + r}}{1 + e^{w \cdot t + r}} \tag{4}$$

h is the probability of the event occurring, that is

$$H(Y = 1/\alpha) = h = \frac{e^{w \cdot t + r}}{1 + e^{w \cdot t + r}} \tag{5}$$

There is a known input value of α, and $P(Y = 1/\alpha), P(Y = 0/\alpha)$ can be obtained from the above dichotomy, and then two of the conditional probabilities are brought into the fractional algorithm, according to the α in the example, it is divided into the category with a relatively large probability value, and w, t is obtained in the dichotomous term.

The known collected data are as follows: $T = \{(\alpha_i, \beta_i) : i = 1,2,..., n\}$, where $\alpha_i = (\alpha_i, \alpha_{i+1}, ...\alpha_{i+n})^T$, let β be a real number, and use the maximum likelihood estimation method to solve the parameters. At this time, the bipartite model is:

$$H(Y = 1/\alpha) = \frac{e^{w \cdot t + r + \beta}}{1 + e^{w \cdot t + r + \beta}} \tag{6}$$

$$H(Y = 0/\alpha) = \frac{1}{1 + e^{w \cdot t + r + \beta}} \tag{7}$$

$$\beta(w,r)=\sum_{i=1}^{m} simp(y,/t_i;w,r) \tag{8}$$

To maximize the bipartite model, the function is expressed as:

$$\beta(w,r)=\sum_{i=1}^{m} simp(y,/t_i;w,r)=\sum_{i=1}^{m}\left(-y_i\beta x^i+sim\left(1+e^t\right)\right) \tag{9}$$

Let $\frac{\alpha\beta(\beta)}{\alpha\beta}=0$, that is

$$P(\beta)=\left(\frac{\alpha\beta(\beta)}{\alpha\beta_i},\frac{\alpha\beta(\beta)}{\alpha\beta_{i+1}},...,\frac{\alpha\beta(\beta)}{\alpha\beta_{i+n}}\right)^T=\frac{0^T}{d+1} \tag{10}$$

Among them,

$$\frac{\alpha\beta(\partial)}{\alpha\beta_i}=\sum_{i=1}^{m}\left(-y_i t^i+\frac{x_i e^t}{1+e^{w\cdot t+\beta}}\right),k=1,2,...,n+1 \tag{11}$$

Using the iterative method to solve for $F(\beta)=0$, and the other

$$A^{-2}=\frac{\alpha P}{\alpha\beta}=\left(\frac{\alpha\partial(\beta)^2}{\alpha\beta_i\alpha\beta_j}\right)d+1,d-1 \tag{12}$$

Among them,

$$\frac{\alpha\beta(\partial)^2}{\alpha\beta_i\alpha\beta_j}=\sum_{i=1}^{m}\frac{x_i^j x_k^y e^{b^t}}{\left(1+e^{w\cdot t+r^2}\right)} \tag{13}$$

According to the iterative formula

$$\beta_{i+1}=\beta_i-A^{-2}P(\beta_i) \tag{14}$$

To obtain

$$p=1,2,...,n \tag{15}$$

$$\alpha=\left(\alpha^1,\alpha^2,...,\alpha^n\right)^T,\beta=\left(\beta_1,\beta^2,...,\beta_n\right) \tag{16}$$

The specific evaluation steps are as follows:

$$i=1,2,...,m.a=\left(e^{w\cdot t+r},e^{w\cdot t+r^2},...,e^{w\cdot t+r^n}\right) \tag{17}$$

$$a=ep\left(\beta_{i=1}{}^n\cdot x\right) \tag{18}$$

$$p(y=1/\alpha)=\frac{e^{w\cdot t+r}}{1+e^{w\cdot t+r}} \tag{19}$$

According to the data, the value range of the dichotomy can be obtained as follows:

$$p = 1,2,\ldots, n+1 \tag{20}$$

6. Practical Application Results Based on the Binary Classification Algorithm

In order to study the related factors screening and nursing countermeasures of early orthodontic treatment for young patients with orthodontics, students of four age groups and their parents' attitudes and views on orthodontics were randomly investigated. The four age groups are: A, B, C, D, including 3-5 years old, 6-8 years old, 9-11 years old, 12-14 years old, and the sample size is 1200. For the cognitive situation of orthodontics, the statistical results are respectively expressed as four levels: very well-understood, relatively well-understood, basically average, and not well-understood.

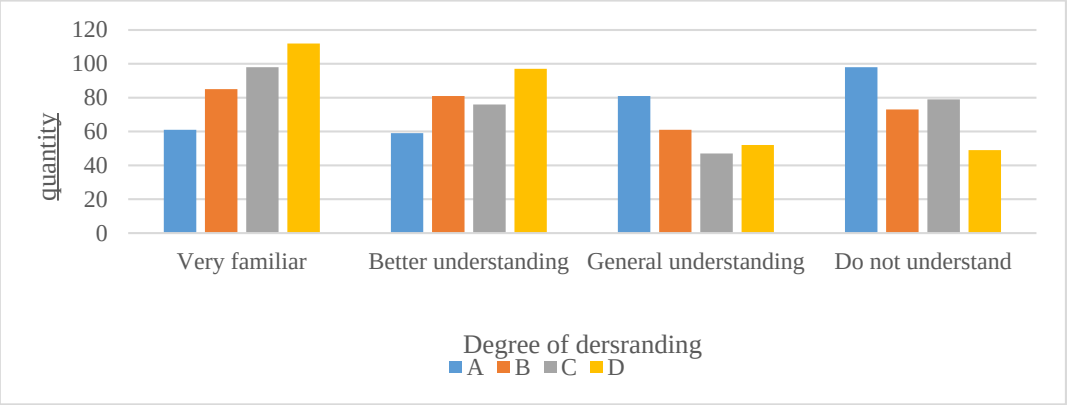

Figure 5: Attitudes and views of students and their parents on orthodontics

As can be seen from the bar chart in Figure 5, the students of the four age groups have more or less understanding of orthodontics. Among them, the older the age, the more knowledge about orthodontics, which reflects that the students in the teenage years pay more attention to appearance. This report also further illustrates the importance of strengthening the publicity of orthodontics, so that students of different ages can have a deeper understanding of orthodontics and enrich their awareness of oral health.

Everything has a process. In order to improve the oral cognition level of students, this paper organizes oral health publicity for students in schools. After the publicity, 1200 students from four age groups were re-investigated. The survey results are shown in Figure 6.

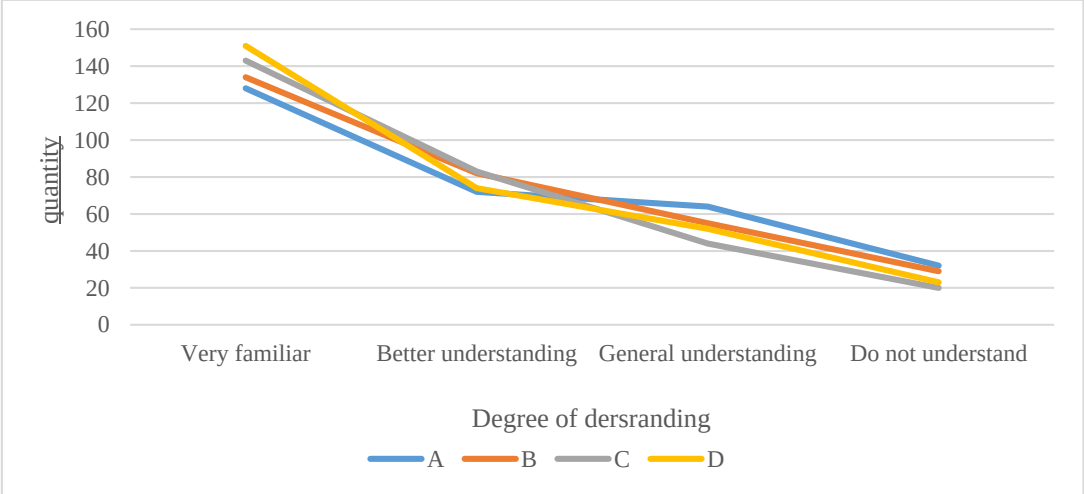

Figure 6: Changes in students' attitudes and views on orthodontics

From the line graph in Figure 6, it can be seen that the awareness of orthodontics among students who have listened to the orthodontic education class is a continuous upward trend. Among the four age groups, 9-11 and 12-14-year-old students had the fastest growing awareness of orthodontics. In general, oral education and publicity have played a great role in helping students understand orthodontics.

When investigating students' awareness of orthodontics, it was observed that many parents' awareness of orthodontics was also uneven. Therefore, this article also investigated the importance of orthodontics to adolescents by parents of students, and surveyed 200 parents. Except for the age group of 5 to 14 years old, the results obtained were roughly classified into four types, namely: good, cautious, positive, and dull. The specific results are shown in Table 1.

Table 1: Parents' attitudes and views on orthodontics

	good	positive	prudent	uninteresting
Parents aged 3-5	1	20	21	8
Parents aged 6-8	2	19	16	13
Parents, aged from 9-11 years old	5	21	15	9
Parents,aged 12-14 years	3	18	17	12

According to the survey results in Table 1, it can be concluded that most parents have a low level of cognition about orthodontics. For adolescent children, parental education is also a very important part, so it is necessary to strengthen the popularization of orthodontic knowledge for parents. It is necessary to help parents initially establish a correct understanding of malocclusion, help them objectively recognize the necessity of corrective treatment and its impact on the future, so that children can psychologically accept and comply with the treatment. After investigating the cognition level of 1200 students about orthodontics, 80 students of different ages who need orthodontics were found out of 1200 students, and the factors affecting orthodontic treatment were investigated. The results are roughly three categories: external factors, family factors, treatment factors, the results are shown in Figure 7.

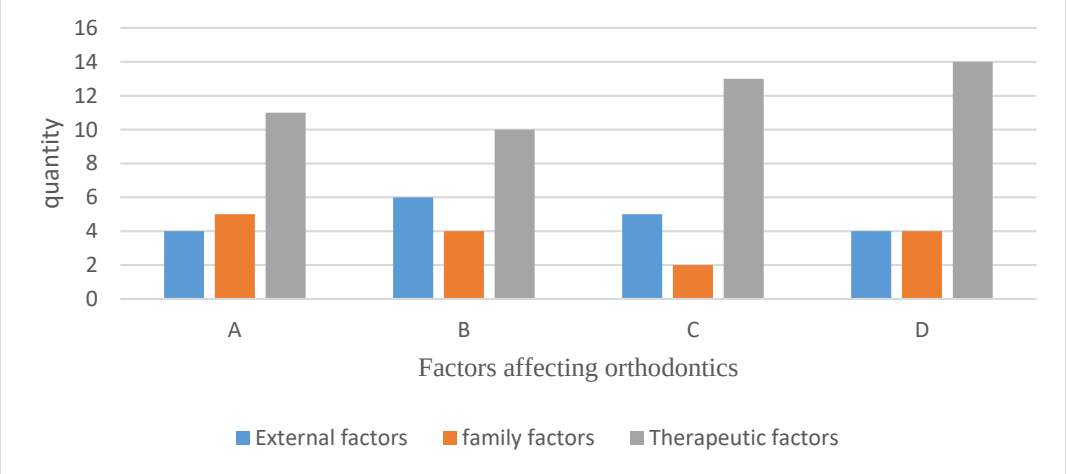

Figure 7: Factors influencing students' orthodontic needs

From the results obtained in Figure 7, it can be seen that the biggest factor affecting adolescent orthodontics is the treatment factor. Most of the patients receiving orthodontics are children and adolescents, who have low psychological capacity, are easily affected by external interference, and lack the initiative of treatment. Pain and discomfort during treatment can increase anxiety and fear in adolescents, and may even be reluctant to undergo further treatment.

7. Conclusion

To sum up, in the face of young orthodontic patients, it is necessary to strengthen their psychological counseling. Many adolescent patients show tension, anxiety, high sensitivity, low tolerance and other psychological barriers during oral treatment. It is necessary to investigate the adolescent's orthodontic needs and his cognitive level, and communicate with the children and their parents in a timely manner. Through nursing intervention, the anxiety and fear, inferiority and shyness, and high expectations of children should be eliminated. Good trust and active cooperation with orthodontic children should be obtained, the doctor-patient relationship should be strengthened, and the curative effect of orthodontics should be improved. Orthodontic care is especially important. Doctors should use psychological knowledge to strengthen communication with children, establish mutual trust, communicate harmonious relationship, and conduct corresponding counseling for different psychological states during the treatment process, to help children establish a correct understanding of oral health and relieve tension.

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