Nursing care of a patient with malocclusion undergoing periodontally accelerated osteogenic orthodontics

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Abstract

This article summarized the nursing process of a patient with malocclusion after periodontally accelerated osteogenic orthodontics (PAOO). The key point was to closely observe the condition, find and deal with various complications in time, and pay attention to oral hygiene, medical management, diet care and psychological care. Finally, the surgical area healed uneventfully.

Keywords

Malocclusion, periodontally accelerated osteogenic orthodontics, nursing care.

1. Background

With the improvement of living standards and health awareness, demands for orthodontic treatment is increasing. According to the principle of limited orthodontic movement of Profit^[1], when the buccal bone plate is thin, or there is dehiscence or fenestration, orthodontic movement may lead to gingival recession, increasing mobility, and even result in the teeth moving out of the boundary of jaw. Periodontally accelerated orthopedic orthodontics (PAOO) utilized the regional accelerated phenomenon to expand the space of orthodontic treatment to a certain extent, shorten the treatment cycle, reduce the occurrence of complications and avoid the risk of periodontal tissue during orthodontic treatment, which makes it possible for the treatment of complex cases. In recent years, PAOO has been widely used in clinic^[2].

Before PAOO, we should fully evaluate the periodontal condition. Patients with malocclusion with thin periodontal phenotype and gingival recession can also be improved by soft tissue increment before orthodontic treatment to avoid postoperative gingival recession and provide enough soft tissue to ensure blood supply after hard tissue increment, and achieve tension-free suture and postoperative stability^[3]. Based on the larger operation area, complicated surgical procedure (including cortical osteotomy, bone transplantation and soft tissue transplantation if necessary), there may be complications of bleeding, edema, infection and pain after oral surgery, in addition to lead to gingival recession, pulp necrosis, exposure of bone graft materials, displacement or loosening of graft. At present, the article was the first to report nursing care of patients undergoing PAOO. A patient of Angle II malocclusion was treated in our department, and PAOO with subepithelial connective tissue transplantation (SCTG) were performed. After individualized nursing methods, the patient recovered well. The report is as follows:

2. Case presentation

The patient, a 23-year-old female, was treated in the Orthodontics Department for irregular tooth alignment. After examination, the orthodontist suggested to refer her to our department for PAOO first. The patient was in good health in the past, and denied the systematic history and allergic history. The oral examination showed the maxillary protrusion and mandibular retraction. The patient conducted a better plaque control. Most areas of gingiva appeared healthy in color and texture. Probing depth ranged from 1 mm to 3 mm, bleeding index was from 0 to 2. No obvious mobility was observed. The periodontal phenotype was thin. For tooth 31, the gingival recession was 4mm, the width of keratinized tissue was 1mm, and there was no attached gingiva. It was shown in radiographic examination that dehiscence and fenestration of bone were found in the buccal side of teeth 32-42.

After comprehensive preoperative examination, PAOO and SCTG were performed. After flap elevation and thorough debridement, the buccal alveolar bone cortex of Teeth 33-43 was incised with ultrasonic osteotome. The collagen membrane was sutured and fixed on the vestibular groove direction of periosteum, and bone graft was transplanted. The connective tissue was harvested from teeth 15-16, and fixed on the buccal side of tooth 31. The flap was repositioned and sutured after flushing. The patient recovered well after postoperative anti-infection, detumescence and analgesic treatment. The postoperative follow-up showed that the wound healed well without complications and infection.

3. Nursing evaluation

Postoperative pain lasts for 24 hours and peaks at 6-8 hours postoperatively

Mechanical methods of cleaning cannot be used in the operative area for 2 weeks postoperatively, while the presence of sutures in the operative area causes easy accumulation of plaque, microbial reproduction, and reduced self-cleaning effect and resistance of the oral mucosa.

Postoperatively, patients suffer limited mouth opening, oedema, chewing ability limited to varying degrees. Nutritional supply is inhibited to varying degrees.

The patients lacked detailed systematic knowledge. Although there is a certain understanding for preoperative, intraoperative and postoperative routine knowledge, but the anxiety of the unknown, lack of knowledge were also existed, which makes it difficult to implement home care measures.

4. Nursing diagnosis

PC: bleeding or hematoma formation

PC: infection

PC: rejection response

Pain: related to tissue injury and postoperative swelling.

Risk of oral mucosal changes: related to the difficulty in implementing oral hygiene measures after operation.

Anxiety: related to the pain caused by treatment and the concern about the therapeutic effect. Lack of knowledge: lack of knowledge about home care of related operations.

Risk of malnutrition: lack of knowledge about the condition and signs of complications.

5. Nursing intervention

5.1. Bleeding

Usually, postoperative bleeding occurs in the lip, and occasionally extends to the suborbital or buccal area. When bleeding occurs in the mouth, the patient will feel persistent bleeding. Postoperative bleeding will not only cause the patient's anxiety, but also affect the daily life of the patient. For this possible complication, examination of routine blood test and coagulation function before operation is essential to rule out the contraindication of operation. Minimally invasive operation should always be maintained during the operation. For the wounds of the palate donor site, the nursing staff should pay attention to the observation. After suture, the local bleeding should be compressed with gauze, and the doctor should be informed in time. If necessary, the wound surface should be covered with a blocking agent. After the patient leaves the hospital, if there is a large blood clot or bleeding, nurses need to calm the patients down and help to stop bleeding in time. Then we should ask the patient about the bleeding timepoint and process in detail, give symptomatic treatment according to the cause of bleeding, and inform the surgeon in time. Suture or electrocoagulation hemostasis procedure are suggested to stop bleeding. Also, it is still necessary to inform the patient to see a doctor in the emergency department in time and take or inject hemostatic drugs. The methods to prevent postoperative bleeding and swelling also include local cold compress in the postoperative operation area, and the interval should be less than 15 minutes each time. In addition, in order to reduce the risk of early postoperative bleeding, the patient should be told not to eat overheated and hard food and not to gargle excessively on the day after operation.

5.2. Infection

After simultaneous soft tissue transplantation with PAOO, infection in buccal operation area rarely occurs, and sometimes slight infection symptoms can be observed in palatal donor area, which may be related to the depth and thickness of soft tissue harvested, and local manifestations are gingival fissure or gingival necrosis. In addition, for older patients or patients with basic diseases, symptoms of infection may occur under the condition of poor oral hygiene. In order to effectively prevent postoperative infection, 2g of amoxicillin were taken 1 hour before operation, 1g was taken orally 6 hours after operation, and then 1g was taken twice a day for 5 days.

5.3. Pain

A study^[4] compared the effects of periodontal flap surgery, mucogingival surgery and bone surgery on postoperative complications and the incidence of pain. The results showed that mucogingival surgery was the most related to pain, and the possibility of pain incidence was 3.5 times than that of bone surgery. The duration of surgery was positively correlated with pain. In this case, the patient completed mucogingival surgery and bone surgery at the same time. Before operation, the patient can be instructed to take non-steroidal anti-inflammatory drugs to assist analgesia, or take comfort treatment such as nitrous oxide inhalation. Preventive analgesia is considered to improve the clinical effect of relieving pain. It is helpful to explain in detail to patients before operation to enhance their understanding of pain. During the operation, minimally invasive surgery is adopted, and ultrasonic osteotomy is used to complete the bone cortex incision, so as to reduce nerve injury, avoid soft tissue injury and ensure minimally invasive operation as much as possible. Postoperative pain usually lasts for 24 hours, and the intensity is the highest in 6-8 hours, so ibuprofen can be taken 6-8 hours after operation to achieve postoperative pain relief. Once persistent pain occurs, it can be taken orally every 12h. Therefore, according to the characteristics of periodontal surgery and the individual differences of patients' pain threshold, we need to formulate a personalized nursing plan, and

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try our best to prevent and manage it before, during and after surgery. Good pain management can improve patients' initiative and compliance.

Psychological nursing 5.4.

Dental anxiety is a common instinctive stress reaction in periodontal surgery. The main causes of anxiety are the pain expected by surgery, the concern about the safety and effectiveness of treatment, and the lack of relevant knowledge concerning about postoperative complications and unknown risks. Based on the above factors, nursing staff should give personalized preoperation education to patients, focusing on the treatment plan, possible complications and countermeasures after operation, as well as postoperative home care knowledge, to improve patients' understanding of treatment, and do a good job of explaining before each operation to relieve anxiety. At the same time, the change of illness will also cause patients' worries. Maintaining good communication and giving timely guidance and help when the illness changes may help patients relax.

5.5. Dental care and diet care

The fourth day after operation is very critical for the success of soft tissue transplantation, and it should be closely observed. In order to ensure the success of the operation, the operation area should be completely braked, and auxiliary measures such as brushing teeth and flossing should not be used in the operation area before suture removal. The operation area was cleaned with 0.2% chlorhexidine gargle, 10mL each time, 3 times a day for 2 weeks until the stitches were removed. After suture removal, the surgical area can be cleaned with an ultra-soft toothbrush, chlorhexidine mouthwash is still used one week after suture removal, and interdental brush and dental floss can only be used one month after operation. Patients should also be instructed to pay attention to their diet after operation. They should eat liquid or semiliquid on the day of operation, and only eat soft and chewy food on the second day after operation, emphasizing a small amount of meals and giving a high-protein diet to ensure nutritional supply.

Evaluation of nursing results and effects 5.6.

Patients were followed up after operation, and the pain and anxiety were evaluated quantitatively according to Visual analogue scale (VAS) and Self-rating anxiety scale (SAS)^[5, 6]. Other evaluation indicators included potential postoperative complications (swelling, bleeding, rejection response of transplanted materials, infection and necrosis) and oral function status (chewing and swallowing). At each follow-up time point, the operation area recovered well, and there were no complications such as bleeding and infection. The VAS results were moderate pain (7.2 points), mild pain (3.4 points) and mild pain (1.8 points) on the 1st, 3rd and 5th postoperative days, and the scores on the 7th and later postoperative days showed no pain (0 points). The detailed results were showed in Figure 1 and Table 1. The swelling in the operation area gradually decreased from 1st to 7th days after operation, and disappeared after 10 days. The score of SAS was 54 before operation, 51 on the first day after operation, and decreased gradually after the third day after operation. Therefore, making personalized nursing cooperation for patients can reduce the occurrence of complications to a certain extent, improve patients' satisfaction and experience, and embody the characteristics of humanized and personalized medical care.

6. Discussion

With the development of periodontics and orthodontics, more and more complicated and difficult cases are no longer the absolute contraindication for orthodontic treatment. PAOO and soft tissue transplantation have solved the problem of insufficient soft and hard tissue before

orthodontic treatment, and avoided certain risks. Based on this situation, two operations were completed at the same time in this patient. During the perioperative period, it is necessary to prevent and manage the possible nursing problems according to the characteristics of patients' periodontal tissue, the complexity of operation and the individual differences of patients' feelings. The main manifestations are detailed explanation before operation, soothing language and sedative drugs to reduce anxiety, perfect local anesthesia and minimally invasive operation to achieve the effectiveness and safety of the operation, and attention to the protection of surgical wounds and detailed notification to patients after the operation. Through the individualized nursing management and observation, the occurrence of complications was greatly reduced, the initiative and compliance of patients were improved, the medical experience was improved, and the postoperative curative effect was guaranteed to some extent, which provides reference and evidence-based medical evidence for the nursing of patients related to PAOO and soft tissue transplantation.

7.2 VAS scores 3.4 1.8 Days after operation VAS scores

Figure 1. The VAS scores of the patient during surgery.

| | SAS scores |
|---------------------|------------|
| Pre-operation | 54 |
| 1 d postoperatively | 51 |
| 3 d postoperatively | 35 |
| 5 d postoperatively | 20 |
| 7 d postoperatively | 20 |
| 9 d postoperatively | 20 |

| Tahle 1 | The SAS | scores | ofthe | natient | during | surgery |
|----------|-----------|--------|---------|---------|--------|----------|
| Table 1. | I IIE SAS | 300163 | UI LIIC | patient | uuring | Surgery. |

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