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Observation of the Short-term Nursing Effect of Periodontal Flap Surgery under Microscope Assisted Periodontitis in the Treatment of Moderate to Severe Periodontitis

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Abstract: *In recent years, operating microscopes have been widely developed in the field of stomatology due to their advantages in lighting, magnification, and improving the accuracy of surgical operations. Periodontitis treatment has an important position in the field of stomatology, and research on its treatment is of great significance. Based on this, this article uses a controlled experiment to observe the effect of microscope-assisted periodontal flap surgery (PFS) in the treatment of moderate or severe periodontitis (MoSP), which is more beneficial for the exploration of periodontitis. This article summarizes the advantages of microscope application through data analysis, and proposes relevant countermeasures for periodontitis treatment and nursing. The data showed that TNF-a in the observation group decreased from (41.34±7.41) pg/L to (13.17±3.21) pg/L, and IL-6 decreased from (9.37±2.14) ug/L to (4.57± 1.37) ug/L; control group TNF-a decreased from (41.43±7.43) pg/L to (17.69±4.17) pg/L, and IL-6 decreased from (9.39±2.10) ug/L to (6.21±1.46) ug/L. Experimental data shows that microscopy technology assisted PFS to treat MoSP has a very good effect and can be actively used in actual clinical treatment.*

Keywords: *Dental microscope, Periodontal flap surgery, Periodontitis, Treatment and restoration*

1. Introduction

In recent years, people have paid more and more attention to oral health. Relying on various new technologies, the development speed of stomatology has also accelerated rapidly, and more and more new technologies have been applied to oral treatment [1, 2]. Microscope technology has the function of providing excellent visual guidance, which can improve surgical skills and operating sensitivity in oral treatment, and significantly reduce the pain of patients [3, 4]. Periodontology is a very important and comprehensive branch in the field of stomatology. It is of great significance to explore the nursing efficacy of microscope in the treatment of MoSP with PFS [5, 6].

Regarding the research on periodontitis treatment, many scholars at home and abroad have conducted multi-angle discussions on it. For example, Jain P studied the analysis of various bone grafts used in periodontal valve surgery-an institution-based Retrospective study [7]; Ramanauskaite E research on the efficacy of sodium hypochlorite-assisted non-surgical treatment of periodontitis [8]; Johnson A studied the in vitro antibacterial and anti-inflammatory effects of surfactant-loaded nanoparticles on periodontitis treatment [9]. It can be seen that research on the treatment of periodontitis has received extensive attention from the academic community and the industry.

In this paper, combined with clinical data, the short-term nursing efficacy of PFS in the treatment of MoSP with the aid of a microscope is discussed accordingly. In this study, a controlled experiment method was used to set the observation group with microscope assistance and the control group without microscope assistance. The PD, AL, and BI values of the two groups of patients before and after the operation were collected and analyzed to detect TNF-a and IL-6 concentration, summarize the advantages of the microscope used in the auxiliary experiment, explore the effect of the microscope-assisted treatment, and put forward the MoSP treatment and nursing care points.

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2. Microscope-assisted Treatment Experiment Design

2.1. General Information

43 cases of MoSP patients who underwent PFS under microscope in our hospital from August 2018 to August 2019 were selected as the observation group. During the same period, 42 patients with MoSP who underwent PFS under ordinary vision served as the control group.

Among them, there were 21 and 22 males and females in the observation group, including 19 moderate and 24 severe, with an average age of 44.1 years.

There were 20 and 22 men and women in the control group, with an average age of 44.3 years; 18 cases were moderate and 24 cases were severe. The age and gender of the two groups are comparable, $P>0.05$.

2.2. Inclusion Criteria

(1) All patients meet the relevant diagnostic criteria and relevant indications for surgical treatment of moderate to severe periodontitis in the "Guidelines for the Prevention and Treatment of Periodontal Disease in China (2015 Edition)".

(2) Age: 18 to 60 years old.

(3) The number of teeth remaining in the mouth is ≥ 20; antibiotics have been taken in the past 3 months or during treatment; periodontal system treatment has not been performed in the past 6 months.

(4) The patient is in good physical condition and has no surgical contraindications such as severe bone, systemic bone disease, or mental illness.

2.3. Research Methods

The control group underwent surgery under ordinary visual field and conventional surgical instruments. In the observation group, an operating microscope (Carl Zeiss Meditec AG, Sensera, Germany) was used to assist periodontal minimally invasive surgical instruments to perform PFS. During the operation, the microscope and periodontal minimally invasive surgical instruments could magnify the part by 25 or 40 times. At the same time, patients receiving treatment are required not to use any antibiotics during the entire treatment period.

2.4. Preparation before Treatment

Collect the medical history and general health of the experimental patients, perform imaging examinations on the patients, take preoperative oral clinical color photos, and perform ultrasonic cleaning and oral hygiene at the same time. In the course of treatment, patients are taught the correct oral cleaning measures, and targeted oral hygiene guidance is provided.

2.5. Observation Indicators

(1) Record the probing depth (PD), periodontal attachment loss (AL), molar root bifurcation, etc., to the nearest 1mm; the recording time is at the time of operation, 1 month after surgery, 3 months after surgery and after surgery 6 months.

(2) Bleeding index evaluation standard (BI): Use the tip of a blunt periodontal probe to gently probe the bottom of the periodontal pocket or the bottom of the gingival sulcus. After removing the probe for 30 seconds, observe whether the bleeding and the degree of bleeding. The degree of bleeding is recorded with a score of 1 to 5, and the higher the score, the more severe the bleeding symptoms.

(3) Detection of inflammatory factors: Before operation, 24h and 72h after operation, the patients in the two groups were tested for related inflammatory factors, including serum tumor necrosis factor (TNF-a) and interleukin IL-6 values.

2.6. Statistical Methods

The experimental data was statistically analyzed by SPSS software, and t test was performed. The

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t-test formula is shown in formulas (1) and (2):

$$t = \frac{\overline{X} - \mu}{\frac{\sigma X}{\sqrt{n}}} \tag{1}$$

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}(\frac{1}{n_1} + \frac{1}{n_2})}} \tag{2}$$

In formulas (1) and (2), S_1^2 and S_2^2 represent the sample variance of the experiment, n_1 and n_2 represent the sample size of the experiment, and $\overline{X}$ represent the sample average of the experiment.

3. Analysis of Recent Nursing Data of PFS in the Treatment of MoSP with the Aid of a Microscope

3.1. Comparison of Periodontal Indicators between the Two Groups

The comparison of periodontal indexes between the two groups of patients is shown in Table 1: From the time of operation to 6 months after the operation, the PD of the observation group decreased from (7.28±0.41) mm to (3.08±0.32) mm, and the AL decreased from (4.87±0.34) mm. Reduced to (1.13±0.13) mm, BI reduced from 3.1 to 0.4; Control group PD decreased from (7.33±0.36) mm to (4.01±0.37) mm, and AL decreased from (4.89±0.46) mm to (2.57±1.06) mm, BI decreased from 3.4 to 0.6. The difference was statistically significant (P<0.05).

Table 1: Comparison of periodontal indicators between the two groups ($\overline{X}$ ±s)

Group	Time	PD (mm)	AL (mm)	BI (average)
Observation Group (A)	Operation time	7.28±0.41	4.87±0.34	3.1
	1 month after operation	5.14±0.32	3.47±0.52	1.5
	3 months	3.16±1.17	2.86±1.96	0.9
	6 months	3.08±0.32	1.13±0.13	0.4
Control group (B)	Operation time	7.33±0.36	4.89±0.46	3.4
	1 month after operation	6.12±1.11	3.50±1.49	1.9
	3 months	5.36±1.04	3.03±1.74	1.2
	6 months	4.01±0.37	2.57±1.06	0.6

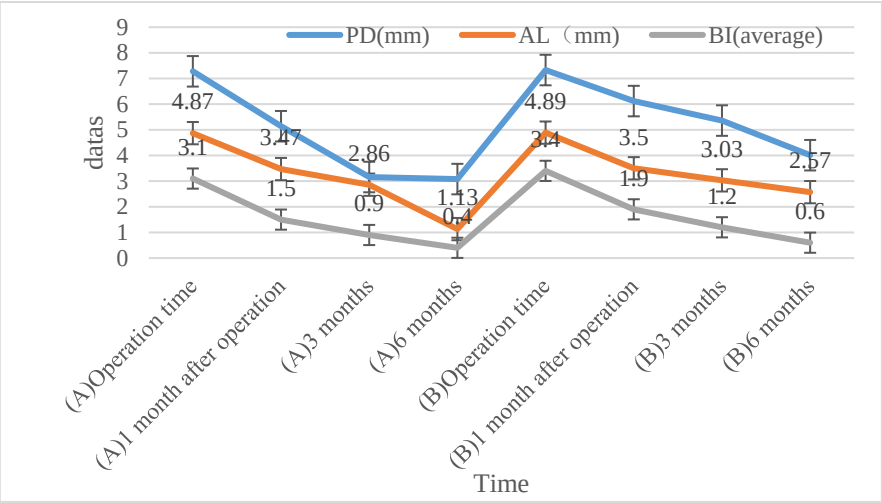

Figure 1: Comparison of periodontal indicators between the two groups

Combining Table 1 and Figure 1, it can be found that the periodontal indicators of the observation

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group changed more obviously, that is, the numerical value decreased more. It can be seen that the PFS treatment of MoSP with the aid of a microscope has a significant effect and can effectively control periodontal inflammation.

3.2. Comparison of Inflammatory Factor Results between the Two Groups of Patients

The comparison of the pain factor results between the two groups of patients is shown in Table 2: TNF-a plays an important role in the local inflammation and destruction of periodontal tissues. Before operation to 72h after operation, TNF-a in the observation group is composed of (41.34±7.41) pg/L decreased to (13.17±3.21) pg/L, IL-6 decreased from (9.37±2.14) mm to (4.57±1.37) mm; control group TNF-a decreased from (41.43±7.43) pg/L to (17.69±4.17) pg/L, IL-6 decreased from (9.39±2.10) mm to (6.21±1.46) mm, and the difference was statistically significant (P<0.05).

Table 2: Comparison of results of inflammatory factors between the two groups (χ^2 ±s)

Group	time	TNF-a(pg/L)	IL-6(ug/L)
Observation Group (A)	Preoperative	41.34±7.41	9.37±2.14
	24h after operation	22.30±6.26	5.12±2.06
	72h after operation	13.17±3.21	4.57±1.37
Control group (B)	Preoperative	41.43±7.43	9.39±2.10
	24h after operation	33.27±5.43	7.69±2.17
	72h after operation	17.69±4.17	6.21±1.46

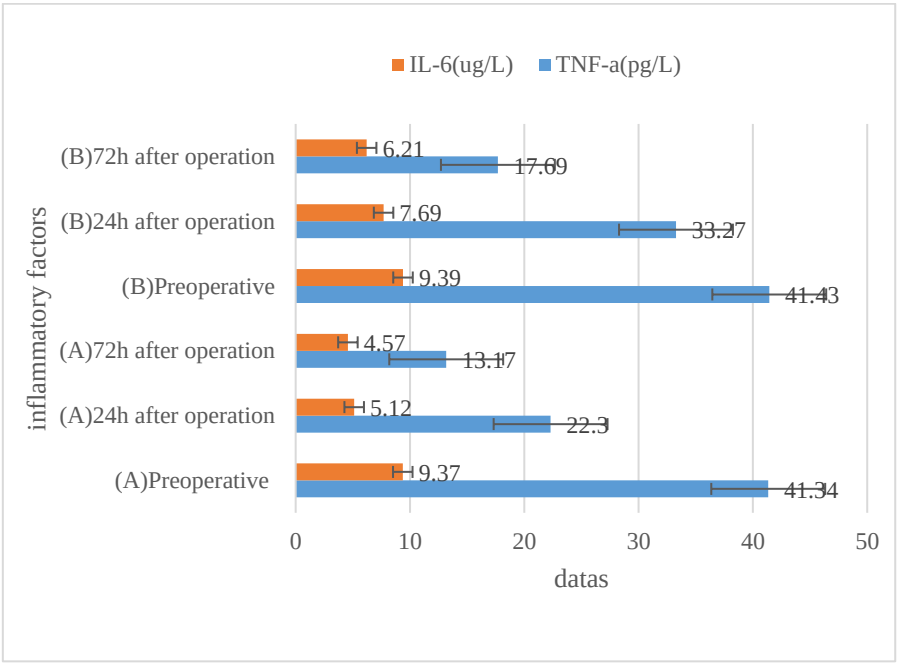

Figure 2: Comparison of results of inflammatory factors between the two groups (χ^2 ±s)

Observing Figure 2 can find that the levels of TNF-a and IL-6 in the two groups were significantly lower than those before the operation, and the control group was lower than the observation group. It can be concluded that the treatment of MoSP with PFS assisted by the microscope can reduce postoperative inflammation.

4. Analysis of the Short-term Nursing Efficacy of PFS in the Treatment of MoSP with the Aid of a Microscope

4.1 Efficacy Analysis

Periodontal microscopy is usually performed under 10-20 times magnification. At 20 times, the accuracy of hand movement is close to 10 μM, and the optical resolution is close to 1 μM, which is far

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beyond the maximum optical resolution that the naked eye can receive [10, 11]. Therefore, at this point, the microscope-assisted PFS surgery has a visual guiding effect, which can also make the PFS surgery less traumatic and help postoperative periodontal recovery.

The data showed that at 24h and 72h after surgery, the levels of TNF-a and IL-6 in the two groups were significantly lower than those before surgery; from the time of surgery to 6 months after surgery, the PD in the observation group decreased from (7.28±0.41) mm (3.08±0.32) mm, AL decreased from (4.87±0.34) mm to (1.13±0.13) mm, BI decreased from 3.1 to 0.4; PD of the control group decreased from (7.33±0.36) mm to (4.01±0.37) mm, AL From (4.89±0.46) mm to (2.57±1.06) mm, BI decreased from 3.4 to 0.6. Compared with patients who did not use a microscope for surgery, the clinical indicators BI and PD values of the patients who assisted in the operation with a microscope decreased more; and, the amount of TNF-a and the concentration of IL-6 in the observation group who used the microscope after treatment Significant decline, and the decline is more obvious than the control group. It can be concluded that the microscope-assisted PFS surgery can well improve the periodontal condition and further reduce the inflammation level of the periodontal tissue. This is because the microscope can provide excellent visual guidance, enhance the sensitivity of PFS surgery, make the incision more accurate, reduce the wound area, and reduce the occurrence of complications such as postoperative inflammation.

4.2 Mosp Care

Periodontal disease is a chronic infectious disease caused by bacteria. Plaque biofilm is the initial factor of disease occurrence and development. Various bacterial products and body cytokines participate in it. Periodontal support treatment is an important part of periodontal system treatment, and patients need to strictly control the growth of plaque [12].

At the same time, for patients, the most intuitive feeling after periodontal treatment is the reduction of gum bleeding. Bleeding gums are usually the main symptom in patients with periodontitis. Therefore, the presence or absence of bleeding after the test is considered to be a more objective indicator for judging the presence or absence of gingivitis. In the care and treatment of periodontitis, regular maintenance treatment can remove infectious materials, control gingivitis, and reduce gum bleeding. For most patients with periodontitis, in the early stages of maintenance treatment, follow-up visits should be performed every 3 months. For those who do not pay much attention to health care and have poor compliance, it is best to see a doctor every 1-2 months.

Most patients with advanced periodontitis are accompanied by sagging and falling teeth. After systemic basic periodontal treatment, after the inflammation is eliminated, the looseness of most teeth can be reduced except for some loose teeth that are difficult to return to normal. Therefore, chewing function is inevitably affected, or secondary occlusal trauma occurs. Repairing loose teeth at this time is also an important part of periodontal treatment. Porcelain combined crown splints can be used for the adjuvant treatment of loose teeth with severe periodontitis. Porcelain combined crown splint can adjust the ratio of elongated and inclined affected teeth and crown-root during tooth preparation. At the same time, it can repair missing teeth, make loose teeth and healthy teeth form a new chewing unit, and promote periodontal restoration and to make the restoration of the tooth tissue more beautiful.

5. Conclusions

Patients with moderate to severe periodontitis are often accompanied by loosening, shifting and falling out of teeth. The loose teeth often need to be removed, which affects the patient's appearance and chewing ability. Therefore, it is necessary to use periodontal flap surgery for treatment. Among them, microscope-assisted therapy is of great significance. According to the results of this study, the PD in the observation group decreased from (7.28±0.41) mm to (3.08±0.32) mm, and the AL decreased from (4.87±0.34) mm to (1.13±0.13) from the time of surgery to 6 months after surgery. mm, BI decreased from 3.1 to 0.4; control group PD decreased from (7.33±0.36) mm to (4.01±0.37) mm, AL decreased from (4.89±0.46) mm to (2.57±1.06) mm, and BI decreased from 3.4 to 0.6; preoperative to 72h after surgery, preoperative to 72h after surgery, the observation group TNF-a decreased from (41.34±7.41) pg/L to (13.17±3.21) pg/L, and IL-6 decreased from (9.37±2.14)ug/ L decreased to (4.57±1.37) ug/L; control group TNF-a decreased from (41.43±7.43) pg/L to (17.69±4.17) pg/L, and IL-6 decreased from (9.39±2.10) ug/L to (6.21± 1.46) ug/L. It can be seen that microscope-assisted surgery can well improve periodontal conditions and further reduce the inflammation level of periodontal tissues.

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