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Application of Intentional Replantation in Treatment of Severe Periodontitis

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Abstract: Objective: To explore the clinical effect of intentional replantation in the treatment of severe periodontitis. **Methods:** 42 patients with severe periodontitis who underwent intentional replantation from February 2022 to March 2023 in our hospital were selected as study samples. The patients were examined after 1 month, 3 months and 6 months of treatment, respectively. Data were collected and analyzed to evaluate the application effect of intentional replantation in the treatment of severe periodontitis. **Results:** Six months after surgery, the tooth retention rate of the patient was 95%, the periodontal pocket probing depth (PD), plaque index (PLI), gingival index (GI) scores and alveolar bone attachment level of the patient were all decreased compared with those before surgery ($P < 0.05$), and the fixation function and masticatory function of the patient were improved after 1 month, 3 months and 6 months ($P < 0.05$). **Conclusion:** Intentional replantation in the treatment of severe periodontitis can improve the periodontal health and oral function of patients, and preserve the natural teeth to the greatest extent.

Keywords: Intentional replantation; Severe periodontitis; Clinical effect

Periodontitis is a destructive inflammatory disease caused by plaque in the supporting tissue of the teeth. It has become the leading cause of permanent tooth loss in adults today. And because its symptoms are not significant in the early stages, it is often ignored by patients. However, by the time most patients seek treatment, they have developed severe periodontitis. The main manifestation of severe periodontitis is the serious destruction of alveolar bone, tooth loosening and displacement, and even tooth loss, which reduces the quality of life of patients^[1]. In the whole process of periodontal treatment, the most critical and first step is to eliminate the root cause of the disease. Implement effective plaque control and reduce the level of inflammatory response. In addition, for patients with severe periodontitis, the European Society of Periodontology recommends in the S3 clinical guidelines that natural teeth should be preserved as much as possible, and necessary restoration or orthodontic treatment should be carried out in time based on the normative periodontal cascade treatment and the individual needs of patients to promote the functional reconstruction of the affected teeth^[2]. This strategy is designed to maximize the recovery of patients' oral health and quality of life. Intentional replantation for some difficult and difficult teeth, complete extraction after a series of in vitro examination, diagnosis and treatment, and then replantation in situ. Intentional replantation may be the last effective way to preserve teeth with severe periodontitis if conventional root canal surgery fails to eliminate the inflammation.

Based on this, this study mainly studied the application of intentional replantation in the treatment of severe periodontitis, determined its therapeutic effect, and provided a basis for the clinical treatment of severe periodontitis patients.

1. Data and methods

1.1 General Information

Methods A total of 42 patients with severe periodontitis who underwent intentional replantation from February 2022 to March 2023 were selected as study samples, including 24 male patients and 18 female patients, aged between 18 and 44 years old, with an average age of (30.27±5.38) years old. Before surgical treatment, all patients were given a comprehensive and detailed introduction to the advantages and disadvantages of various treatment options, precautions, and related costs. After fully understanding and comparing various treatment options, the patient voluntarily chose this treatment mode and has signed the treatment consent form. There was no significant difference in the general data of the patients ($P < 0.05$).

1.2 Inclusion and exclusion criteria

Inclusion criteria: (1) conical teeth with single roots without curvature and absorption; (2) The bone resorption type was three or four wall subbone pocket, and the gingival health did not significantly shrink; (3) Patients with plaque occupancy $< 20\%$; (4) Patients with adjacent teeth and no obvious loosening of adjacent teeth; (5) Patients with good compliance to the experiment.

Exclusion criteria: (1) patients with other systemic diseases; (2) Patients with abnormal immune and coagulation function; (3) Patients with severe hypertension, uncontrolled diabetes and acute hepatitis; (4) Patients with a history of smoking; (5) Poor self-plaque control ability; (6) Patients with mental illness or cognitive impairment who cannot communicate normally.

1.3 Research Methods

All patients had undergone complete periodontal treatment before surgery and were prepared to undergo intentional replantation. After standard disinfection procedures, the gums were separated under local anesthesia with atocaine and the affected tooth was removed as noninvasive as possible using extractor forceps. Next, an ultrasound tip equipped with sterile saline was used to gently remove residual calculus and large granulation tissue from the root surface while ensuring that the periroot periodontal membrane remained moist. On this basis, a 3mm portion of the root tip was excised using a high-speed mobile phone, and the root canal was backfilled. The whole in vitro operation process is strictly controlled within 10 minutes, and the teeth are treated for 5 minutes, and then the teeth are rinsed with normal saline for 1 minute. The whole root surface treatment process is wrapped with normal saline gauze, and the roots are not touched by fingers. Finally, the affected tooth was reimplanted and temporary loose tooth fixation was performed according to the regulations. The patient was advised to return to the clinic 1 month, 3 months and 6 months after the operation, and the periodontal test data of the patient was recorded.

1.4 Observation indicators and evaluation criteria

(1) The tooth retention rate, periodontal pocket probing depth (PD), plaque index (PLI), gingival index (GI) score and alveolar bone attachment level of patients were observed. The total score of PD was 5, PLI was 0 ~ 3 and GI was 0 ~ 3. The lower the average score, the better the oral condition was.

(2) The oral function of the patients was observed, including tooth fixation function and chewing function. The fixed function and masticatory function scored 0 ~ 10 points in each dimension, and the scores were positively correlated with the functions of each part of the mouth.

1.5 Statistical analysis

SPSS 26.0 software was used for data processing, measurement data were presented in the form of $(\bar{x} \pm s)$, and T-test was used for comparative analysis between different groups. For counting data, percentage (%) was used as the expression, and the difference between groups was compared by 2 test. In this study, if $P < 0.05$, the difference was considered statistically significant.

2. Results

2.1 Periodontal test of the patient

Postoperative PD, PLI, and GI scores were lower than those before surgery, and PD, PLI, and GI scores were lower and lower with the increase of time ($P < 0.05$).

Table 1. PD, PLI and GI scores of patients ($\bar{x} \pm s$)

group	PD	PLI	GI
Before operation	7.13±0.52	2.73±0.38	1.92±0.37
One month after surgery	5.83±0.22	1.91±0.09	0.82±0.34
Three months after surgery	5.45±0.63	0.87±0.02	0.62±0.41
Six months after surgery	5.39±0.67	0.72±0.43	0.18±0.21
<i>p-value</i>	0.002	0.037	0.028
<i>T-value</i>	6.271	8.221	10.537

2.2 The oral function of the patients was observed

The scores of dental fixation function and masticatory function after operation were significantly higher than those before operation ($P < 0.05$).

Table 2. Tooth fixation function and chewing function of patients ($\bar{x} \pm s$)

group	Fixed function	Masticatory function
Before operation	6.63±0.32	6.43±0.67
One month after surgery	9.83±0.42	9.21±0.47
Three months after surgery	9.46±0.73	9.83±0.27
Six months after surgery	9.32±0.47	9.75±0.63
<i>p-value</i>	0.031	0.024
<i>T-value</i>	5.641	8.037

2.3 The patient's tooth retention rate

The postoperative tooth retention rate of all patients was higher than 90% ($P < 0.05$).

Table 3. Tooth retention rate of patients [n, %]

group	Retained affected tooth(n)	Retention rate(%)
One month after surgery	41	97.61%
Three months after surgery	40	95.23%
Six months after surgery	39	92.85%
<i>p-value</i>		0.001
<i>T-value</i>		8.147

3. Discussion

Severe periodontitis with tooth loosening can seriously affect the oral beauty of patients, resulting in patients easy to produce anxiety, inferiority and other negative emotions. These emotions further exacerbate the effects of the disease and are detrimental to the patient's recovery. Therefore, we need to take effective treatment measures to reduce the symptoms of patients, improve oral beauty, so as to better restore health. In this study, intentional replantation was used to treat patients with severe periodontitis, and the results showed that postoperative PD, PLI and GI scores of patients were lower than those before surgery, and PD, PLI and GI scores were lower and lower with the increase of time ($P < 0.05$). PD, PLI and GI are sensitive indicators to detect the periodontal health of patients. The decrease of PD, PLI and GI indicates that intentional replantation can effectively improve the periodontal health of patients and contribute to their recovery. In addition, intentional replantation is performed on the basis of the patient's natural teeth, which can be preserved to the maximum extent and can exercise normal chewing function. According to the data obtained in this study, the scores of dental fixation function and chewing function of patients were significantly higher than those before surgery, and the postoperative tooth retention rate of patients was higher than 90%, with statistical significance ($P < 0.05$).

In summary, intentional replantation has good application value in the treatment of severe periodontitis, which can preserve the natural teeth of patients and improve the oral function and periodontal health level.

References

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