

Short Communication

Treatment of exposed inferior alveolar neurovascular bundle with PRF during surgical removal of impacted lower third molars

Nenad Tanaskovic ^{1*}

¹ Private Practice S-tetik, Banja Luka, 78000, Bosnia and Herzegovina

* Correspondence: tanaskovicn@yahoo.com

Abstract: Surgery to remove impacted lower third molars involves risk for exposing the inferior alveolar neurovascular (IAN) bundle. The platelet rich fibrin (PRF) should be adequate to facilitate healing in self-contained defects and has been widely used in the oral and maxillofacial surgery. Therefore, we used PRF to treat patients whose IAN bundle was exposed during surgery. With a 98% chance of recovery at one-year post-surgery after treatment with PRF, seeing an exposed IAN bundle during impacted lower third molar removal surgery also suggests its close association with the third molar and poses a 20% risk of paresthesia. The use of PRF in such patients could support healing that can lead to promising result.

Keywords: alveolar neurovascular bundle; platelet rich fibrin; PRF



Published: 22.12.2022

DOI: <https://doi.org/10.56939/DBR221048t>

Introduction

It is widely known that the roots of the impacted lower third molar are adjacent to the inferior alveolar nerve (IAN) [1]. Numerous studies have shown that IAN injury during the surgical removal of impacted lower third molars might result in paresthesia [2]–[6]. In addition to the surgeons's experience, the length of the procedure, and the use of multiple sectioning or deep drilling with a bur have all been linked to the frequency of IAN damage [3], [4], [6].

Platelet Rich Fibrin (PRF) is a fibrin matrix in which platelet cytokines, growth factors, and cells are trapped and may be released after a certain time [7]. For that reason, has been widely used in the oral and maxillofacial surgery [8]. There are several types of PRF depending on the time and centrifuge speed such as A-PRF, P-PRF, L-PRF, Liquid-PRF and I-PRF [9]. They can be combined with grafting materials in order to create "sticky bone", which provides improved handling [10]. However, PRF has certain limitations such as lack of rigidity, fast degradation (biodegradability), also has doubtful application as a barrier membrane in GBR due to its poor mechanical properties [11]–[14]. Nevertheless, in a self-contained defect the presence of "free fibrin biomaterial" should be sufficient to support self-healing. Which is why we applied PRF in patients with exposed inferior alveolar neurovascular bundle.

The aim of this retrospective short communication was to include patients where a close relationship between the lower wisdom tooth and IAN was established by radiological examinations. We consequently determined the incidence of IAN paresthesia in patients that intraoperatively had exposed IAN bundle, followed by the duration of paresthesia after treatment with PRF.

Materials and Methods

We included consecutive patients undergoing third molar surgery in whom an exposed IAN bundle was intraoperatively seen in the third molar socket. Data recorded from patients included radiographic findings, surgical method, intraoperative findings, complications, and postoperative sequelae. First a piezo technique was used to open the bony window as well as to separate the crown and tooth roots. Then after roots removal, the visible part of the nerve was covered with PRF clot in several layers (Figure 1). Consequently, the patients were reviewed at 1 week, 1 month, and 3 months after surgery. They were evaluated subjectively and objectively to determine the incidence of paresthesia when the IAN bundle was exposed. Patients with paresthesia were followed for 2 years, or until it was resolved.



Figure 1. (a) Roots removal and exposed nerve; (b) The nerve was covered with PRF clot in several layers.

Results

An exposed IAN bundle was seen in 106 operation sites in 88 patients over a 10-year period. Out of all those cases, 62 patients with 74 operation sites were included in this analysis. We found out that, 38 operation sites (80.3%) showed paresthesia at 1 week after surgery and 20 sites (15.0%) showed abnormal objective assessment results. After 3 months post-surgery, 78.9% of these nerves had recovered to normal sensation, 92.8% of the nerves recovered by 6 months, and 98.1% of the nerves recovered by 1 year. Eight patients were lost to follow-up.

Discussion

This short communication confirms that application of PRF has positive effect in patients with exposed inferior alveolar neurovascular bundle during surgical removal of impacted lower third molars.

Numerous investigations have demonstrated that paresthesia may occur as a result of IAN damage after the surgical removal of impacted lower third molars and various factors are linked to the frequency of IAN damage [2]–[6]. On the other hand, PRF is a fibrin matrix that has been widely used in the oral and maxillofacial surgery [7], [8].

We monitored patients where a close relationship between the lower wisdom tooth and IAN was observed. Here we determined the incidence of IAN paresthesia in patients that intraoperatively had exposed IAN bundle, and which we treated with PRF. About 98.1% of these nerves were recovered by 1 year, which indicates the positive effect provided by the PRF.

Conclusions

Treatment of exposed inferior alveolar neurovascular (IAN) bundle during surgical removal of impacted lower third molars is a challenging task. Platelet Rich Fibrin (PRF) is a “free biomaterial” fibrin matrix that should be sufficient to support healing in self-contained defects. For that reason, we used PRF to treat patients that intraoperatively had

exposed IAN bundle. Sighting an exposed intact IAN bundle during third molar surgery indicates its intimate relationship with the third molar and carries a 20% risk of paresthesia, with a 98% chance of recovery at 1-year post-surgery after treatment with PRF. A clinical study with bigger number of patients and long term follow up is required to confirm the findings of our analysis.

Funding and conflict of interest statement: This retrospective short communication received no funding. The author claims no conflict of interest.

Board review and informed consent statement: All patients granted their verbal and written informed consent.

References

- [1] G. Monaco, G. De Santis, M. R. A. Gatto, G. Corinaldesi, and C. Marchetti, "Coronectomy: A surgical option for impacted third molars in close proximity to the inferior alveolar nerve," *J. Am. Dent. Assoc.*, vol. 143, no. 4, pp. 363–369, Apr. 2012, doi: 10.14219/jada.archive.2012.0178.
- [2] T. O. Robinson, "Paresthesia: A postoperative complication following removal of the mandibular third molar," *Am. J. Orthod. Oral Surg.*, vol. 26, no. 3, pp. 278–284, Mar. 1940, doi: 10.1016/S0096-6347(40)90182-X.
- [3] A. B. Bataineh, "Sensory nerve impairment following mandibular third molar surgery," *J. Oral Maxillofac. Surg.*, vol. 59, no. 9, pp. 1012–1017, 2001, doi: 10.1053/JOMS.2001.25827.
- [4] E. Valmaseda-Castellón, L. Berini-Aytés, and C. Gay-Escoda, "Inferior alveolar nerve damage after lower third molar surgical extraction: a prospective study of 1117 surgical extractions.," *Oral Surg. Oral Med. Oral Pathol. Oral Radiol. Endod.*, vol. 92, no. 4, pp. 377–383, Oct. 2001, doi: 10.1067/MOE.2001.118284.
- [5] C. R. Brann, M. R. Brickley, and J. P. Shepherd, "Factors influencing nerve damage during lower third molar surgery," *Br. Dent. J.*, vol. 186, no. 10, pp. 514–516, May 1999, doi: 10.1038/SJ.BDJ.4800155.
- [6] D. Gülicher and K. L. Gerlach, "Sensory impairment of the lingual and inferior alveolar nerves following removal of impacted mandibular third molars," *Int. J. Oral Maxillofac. Surg.*, vol. 30, no. 4, pp. 306–312, 2001, doi: 10.1054/IJOM.2001.0057.
- [7] B. Naik, P. Karunakar, M. Jayadev, and V. Rahul Marshal, "Role of Platelet rich fibrin in wound healing: A critical review," *J. Conserv. Dent.*, vol. 16, no. 4, p. 284, Jul. 2013, doi: 10.4103/0972-0707.114344.
- [8] K. R. Kumar, K. Genmorgan, S. M. A. Rahman, M. A. Rajan, T. A. Kumar, and V. S. Prasad, "Role of plasma-rich fibrin in oral surgery," *J. Pharm. Bioallied Sci.*, vol. 8, no. Suppl 1, p. S36, Oct. 2016, doi: 10.4103/0975-7406.191963.
- [9] A. Saglanmak, C. Cinar, A. Gultekin, A. Saglanmak, C. Cinar, and A. Gultekin, "Platelet Rich Fibrin (PRF) Application in Oral Surgery," *Platelets*, Jun. 2020, doi: 10.5772/INTECHOPEN.92602.
- [10] E. Gheno *et al.*, "'Sticky Bone' Preparation Device: A Pilot Study on the Release of Cytokines and Growth Factors," *Materials (Basel)*, vol. 15, no. 4, p. 1474, Feb. 2022, doi: 10.3390/MA15041474/S1.
- [11] J. Sambhav, R. Rohit, M. Ranjana, and M. Shalabh, "Platelet Rich Fibrin (Prf) and B-Tricalcium Phosphate With Coronally Advanced Flap for the Management of Grade-II Furcation Defect," *Ethiop. J. Health Sci.*, vol. 24, no. 3, p. 269, Jul. 2014, doi: 10.4314/EJHS.V24I3.11.
- [12] A. Simonpieri, J. Choukroun, M. Del Corso, G. Sammartino, and D. M. D. Ehrenfest, "Simultaneous sinus-lift and implantation using microthreaded implants and leukocyte- and platelet-rich fibrin as sole grafting material: a six-year experience," *Implant Dent.*, vol. 20, no. 1, pp. 2–12, 2011, doi: 10.1097/ID.0B013E3181FAA8AF.
- [13] D. M. Dohan Ehrenfest, G. M. de Peppo, P. Doglioli, and G. Sammartino, "Slow release of growth factors and

thrombospondin-1 in Choukroun's platelet-rich fibrin (PRF): a gold standard to achieve for all surgical platelet concentrates technologies," *Growth Factors*, vol. 27, no. 1, pp. 63–69, 2009, doi: 10.1080/08977190802636713.

- [14] P. Anuroopa, P. Patil, R. Vinaya Kumar, and K. Kripal, "Role and Efficacy of L-PRFmatrix in the Regeneration of Periodontal Defect: A New Perspective," *J. Clin. Diagn. Res.*, vol. 8, no. 12, p. ZD03, Dec. 2014, doi: 10.7860/JCDR/2014/9240.5245.