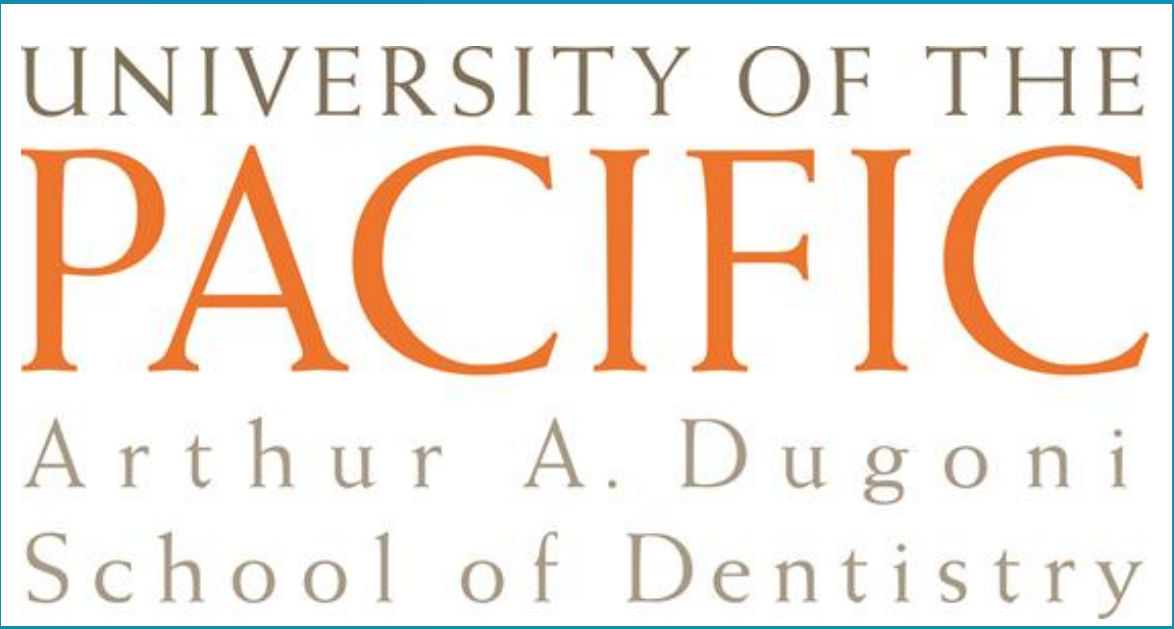


Platelet-rich fibrin vs. connective tissue graft: a literature review

Stephanie Tu, Dental Hygiene Class of 2020
University of the Pacific Arthur A. Dugoni School of Dentistry



Abstract

Gingival defects can be treated in multiple ways. The current gold standard is connective tissue graft (CTG) in order to treat Class I and II Miller defects (Chambrone, 2008). One of the newer procedures is the use of platelet-rich fibrin (PRF) therapy, which involves drawing the patient’s own blood and forming a membrane to heal gingival defects. This literature review looks at scholarly articles comparing the use of PRF to CTG in healing clinical attachment loss (CAL) over a period of 6 months and whether one is more effective than the other in gaining CAL.

Introduction

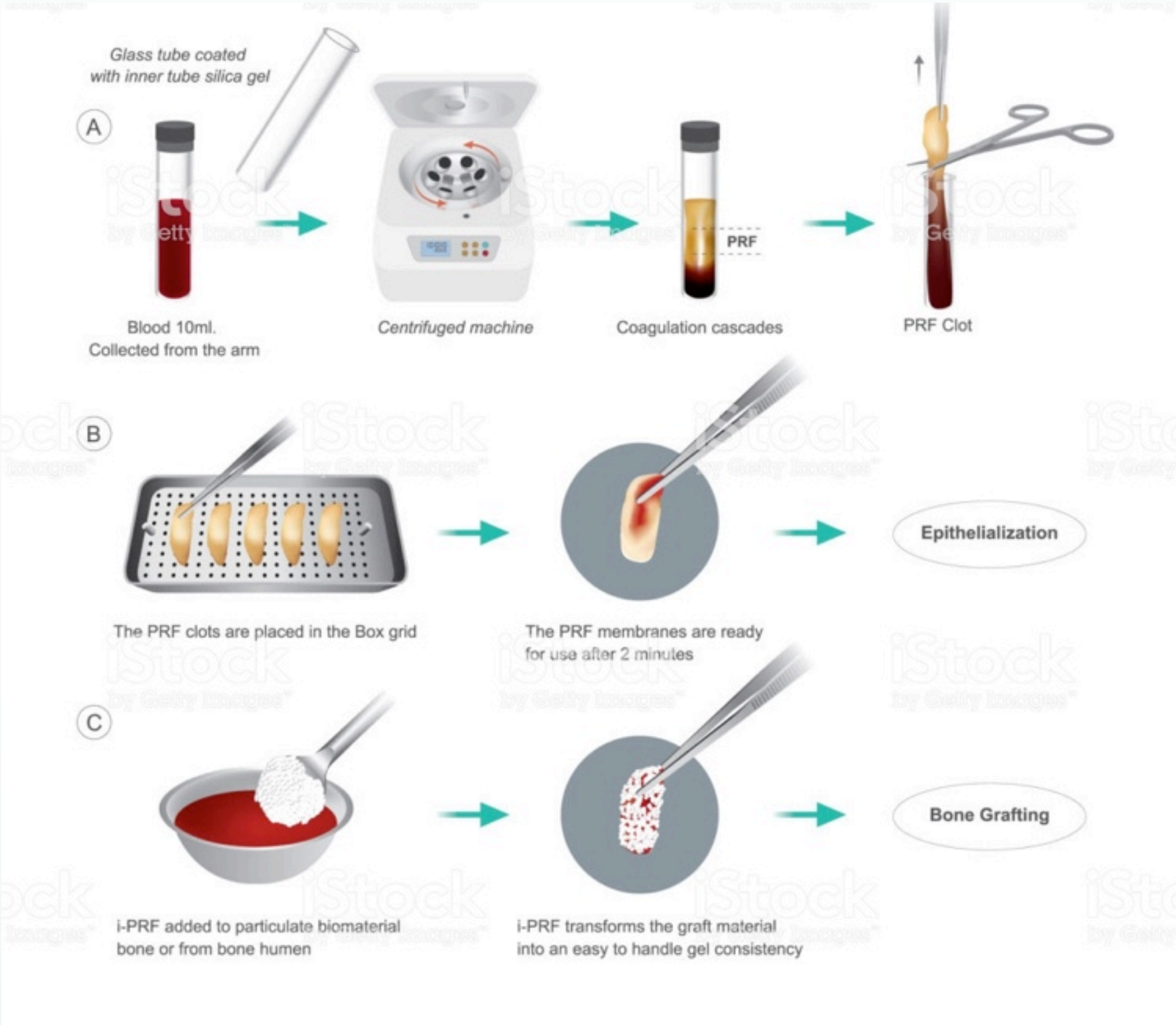
Periodontitis, the disease of the gums surrounding the teeth in the oral cavity, may lead to serious consequences if not treated appropriately. It has also been linked to a variety of systemic diseases as well, including Type II diabetes, osteoporosis, obesity, and many other conditions (Amar, 2006).

The American Academy of Periodontology classifies the severity of periodontitis through a variety of factors, one of which is clinical attachment loss (CAL). Maintaining CAL may reduce the risk of gum and bone recession, which are both possible indicators of periodontitis. When a patient has multiple gum defects or severe gum recession, one of the options for treatment is gum surgery. Some of the possible indications for gum surgery include dentinal hypersensitivity, esthetics, and preventing the progression of further recession. The risk of developing root caries also increases with root exposure.

One common surgery is the gum graft in which tissue is taken from a different source and grafted onto the area of recession. The current gold standard for gum surgery is connective tissue graft (CTG) surgery and the donor site is usually the hard palate. The difference between CTG compared to other types of tissue graft is that CTG takes specifically subepithelial tissue and leaves the epithelial tissue intact at the donor site (Chambrone, 2008). This accelerates the healing process due to leaving behind intact epithelium. CTG surgery is often used in conjunction with a coronally advanced flap (CAF), in which a pedicle flap is formed at the site of the recession and the connective tissue is placed between the periosteum and the overlying pedicle flap. This provides continued blood supply to the area.

One of the relatively newer innovations in gum surgeries is the use of platelet-rich fibrin (PRF) therapy in conjunction with pedicle flap surgery. This method has been shown to contain various growth factors, which help promote cell proliferation and tissue regeneration. It is meant to be replacing the connective tissue used in CTG in adjunct with CAF and does not replace the need for a surgical flap. One of the reasons for using PRF instead of CTG is the lack of a second donor site for tissue, which could potentially cause less discomfort for the patient. Both procedures are very similar, since both often require the need for a surgical flap, and the major difference is the chosen material underlying the tissue flap. PRF is becoming more widespread due to its promotion of accelerated healing.

The current generation of PRF involves extracting blood from the patient’s own body and collected in tubes without anticoagulants. The blood is centrifuged immediately after collection. A fibrin clot forms in the tube between the layer of red blood cells and plasma, and this yellow clot is separated from the clotted blood cells. The clot is compressed into a thin membrane that is a uniform thickness. The membrane is placed in the area of the mucogingival defect and a pedicle flap is used to hold the membrane in position to allow for maximum integration with the surrounding tissue.



https://media.istockphoto.com/vectors/fibrinrich-platelets-in-dentistry-vector-id1190310800

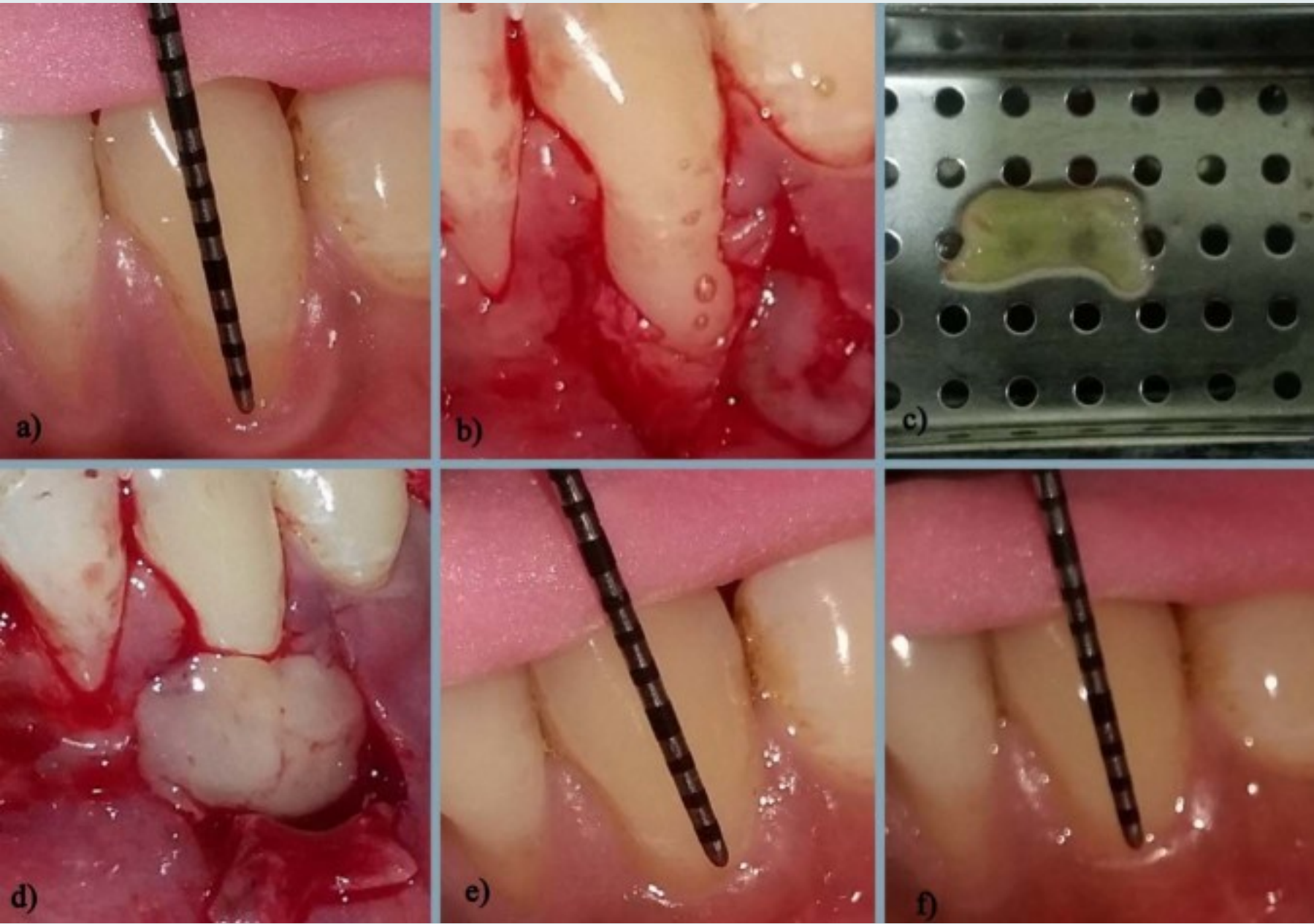
Methods

The study of the use of platelet-rich fibrin (PRF) therapy compared to connective tissue graft (CTG) surgery in terms of clinical attachment level after 6 months was done through a review of the literature.

Discussion

One comprehensive systematic review compared the use of PRF in various dental procedures and concluded that PRF compared to CTG had no statistically significant differences, although both increased periodontal values in general, including CAL (Miron, 2017). In multiple clinical trials, researchers compared PRF and CTG after 6 months by measuring multiple periodontal statistics, including CAL and most showed significant improvement in CAL but the difference between the two procedures was not statistically significant. One study came to the conclusion that more layers of PRF had an effect on CAL value (Culhaoglu, 2018).

A randomized clinical trial comparing PRF and CTG found similar results when comparing postoperative statistics regarding CAL. However, this study did conclude that PRF had decreased postoperative discomfort when compared to CTG (Oncu, 2017). Another clinical trial measured increases in HI for immediate postoperative values (Culhaoglu, 2018). A different clinical trial compared HI between PRF and CTG and found differences in favor of PRF after 1 week, but the interval diminishes after that period of time (Mufti, 2017).



Conclusion

According to the current research, there is no statistically significant evidence to suggest that PRF has a greater gain in CAL when compared to CTG over a period of 6 months. Some studies show that both PRF and CTG have statistically significant increases in CAL but comparing the data between the two procedures does not yield enough significant difference to definitively conclude that one procedure provides more improvement than the other. However, some studies have shown that PRF has superior immediate post-operative healing compared to CTG. PRF also contains numerous growth factors that promote accelerated healing as well, which means the risk of post-operative complications is decreased.

Because PRF is a relatively novel procedure when treating gingival defects, there is a lack of studies comparing its effectiveness to CTG. There are many clinical trials and single clinical case studies, as well as split-mouth randomized studies. It was difficult to find systematic reviews and meta-analyses comparing PRF to CTG together.

There was also a lot of conflicting research between the various articles. The formation of the PRF membrane is not currently a standardized process, and clinicians have varying protocol nuances. Some of the variations include centrifuge time, types of centrifuges, membrane thickness, membrane size, and amount of blood drawn. Therefore, the resulting information taken from literature reviews may not be as accurate than if the clinical procedure was standardized to eliminate the margin of error and increase external validity.

In order to have a more definitive answer about the comparison between PRF and CTG in terms of long term CAL changes, more research needs to be conducted. Based off of current research, it appears that PRF is a suitable alternative to CTG but there is not enough evidence backing PRF as a superior treatment option.

References

Akram, A., Khawaja, N., Rashid, H., & Vohra, F. (2016). Sub-epithelial connective tissue graft and enamel matrix derivative in the management of a localized gingival recession defect: A case report. *The Saudi Journal for Dental Research*, 7(2), 147-152. doi: <https://doi.org/10.1016/j.sjdr.2015.11.001>

Amar, S., & Kim, J. (2006). Periodontal disease and systemic conditions: a bidirectional relationship. *Odontology*, 94, 10-21. doi: [10.1007/s10266-006-0060-6](https://doi.org/10.1007/s10266-006-0060-6)

Chambrone, L., Chambrone, D., Pustiglioni, F. E., Chambrone, L. A., & Lima, L. A. (2008). Can subepithelial connective tissue grafts be considered the gold standard procedure in the treatment of Miller class I and II recession-type defects? *Journal of Dentistry*, 36(9), 659-671. doi: <https://doi.org/10.1016/j.jdent.2008.05.007>

Chandran, P. & Sivadas, A. (2013). Platelet-rich fibrin: Its role in periodontal regeneration. *King Saud University Journal of Dental Sciences*. doi: [10.1016/j.ksujds.2013.09.001](https://doi.org/10.1016/j.ksujds.2013.09.001)

Culhaoglu, R., Taner, L., & Guler, B. (2018). Evaluation of the effect of dose-dependent platelet-rich fibrin membrane on treatment of gingival recession: a randomized, controlled clinical trial. *Journal of Applied Oral Science*, 26. doi: <https://doi.org/10.1590/1678-7757-2017-0278>

Goel, A., Windsor, L. J., & Blanchard, S. (2018). Platelet-rich fibrin: Utilization in the treatment of periodontitis. *Periodontology and Dental Implantology*. doi: [10.5772/intechopen.78561](https://doi.org/10.5772/intechopen.78561)

Miron, R. J., Zucchelli, G., Pikos, M. A., Salama, M., Lee, S., Guillemette, V., ... Choukroun, J. (2017). Use of platelet-rich fibrin in regenerative dentistry: a systematic review. *Clinical Oral Investigations*, 21(6), 1913-1927. doi: [10.1007/s00784-017-2133-zs](https://doi.org/10.1007/s00784-017-2133-zs)

Mohan, S. P., Jaishangar, N., Devy, S., Narayanan, A., Cherian, D., & Madhavan, S. S. (2019). Platelet-rich plasma and platelet-rich fibrin in periodontal regeneration: A review. *Journal of Pharmacy & BioAllied Sciences*, 11(2), S126-S130. doi: [10.4103/JPBS.JPBS_41_19](https://doi.org/10.4103/JPBS.JPBS_41_19)

Moraschini, V., & Barboza, E. dos S. P. (2016). Use of platelet-rich fibrin membrane in the treatment of gingival recession: A systematic review and meta-analysis. *Journal of Periodontology*, 87(3), 281-290. doi: <https://doi.org/10.1902/jop.2015.150420>

Mufti, S., Dadawala, S. M., Patel, P., Shah, M., & Dave, D. H. (2017). Comparative evaluation of platelet-rich fibrin with connective tissue grafts in the treatment of miller's class I gingival recessions. *Contemporary Clinical Dentistry*, 8(4), 531-537. doi: [10.4103/ccd.ccd.325.17](https://doi.org/10.4103/ccd.ccd.325.17)

Oncu, E. (2017). The use of platelet-rich fibrin versus subepithelial connective tissue graft in treatment of multiple gingival recessions: A randomized clinical trial. *Official Journal of The International Journal of Periodontics & Restorative Dentistry*, 37(2), 265-271. doi: [10.11607/prd.2741](https://doi.org/10.11607/prd.2741)

Padma, R., Shilpa, A., Kumar, P. A., Nagasri, M., Kumar, C., & Sreedhar, A. (2013). A split mouth randomized controlled study to evaluate the adjunctive effect of platelet-rich fibrin to coronally advanced flap in Miller's class-I and II recession defects. *Journal of Indian Society of Periodontology*, 17(5), 631-636. doi: [10.4103/0972-124X.119281](https://doi.org/10.4103/0972-124X.119281)

Pazmiño, V. F. C., Rodas, M. A. R., Cáceres, C. D. B., Duarte, G. G. R., Azuaga, M. V. C., Paula, B. L. de, ... Silveira, E. M. V. (2017). Clinical comparison of the subepithelial connective tissue versus platelet-rich fibrin for the multiple gingival recession coverage on anterior teeth using the tunneling technique. *Case Reports in Dentistry*, 6. doi: <https://doi.org/10.1155/2017/4949710>

Uraz, A., Sezgin, Y., Yalim, M., Taner, I. L., & Cetiner, D. (2015). Comparative evaluation of platelet-rich fibrin membrane and connective tissue graft in the treatment of multiple adjacent recession defects: A clinical study. *Journal of Dental Sciences*, 10(1), 36-45. doi: <https://doi.org/10.1016/j.jds.2012.10.010>

Verma, U. P., Yadav, R. K., Dixit, M., & Gupta, A. (2017). Platelet-rich fibrin: A paradigm in periodontal therapy – A systematic review. *Journal of International Society of Preventive & Community Dentistry*, 7(5), 227-233. doi: [10.4103/jispcd.JISPCD_429_16](https://doi.org/10.4103/jispcd.JISPCD_429_16)

Contact: Stephanie Tu
Email: s_tu4@u.pacific.edu