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Tooth Extrusion For Implant Site Development: What Your Team Needs To Know

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You've likely been at a Spear workshop or seminar and seen one of the resident faculty members show an incredible implant (https://www.speareducation.com/spear-review/category/implants) case where the papilla and facial tissue looked awful at the beginning of treatment planning and gorgeous by the completion of treatment. It's funny how we tend to see so many patients with that same poor bony and gingival architecture in our own practices, yet so few of the cases could be showed on the big screen at completion. Why is that?

Orthodontic extrusion is a valuable alternative option to periodontal regenerative therapies when you want to increase the quantity and quality of the hard and soft tissue before implant placement. Salama and co-workers pointed out that, "A hopeless tooth is not a useless tooth." (1) Since most of the time when an anterior tooth requires extraction, we're not dealing with ideal supporting tissue, it's one of our best tools in putting the pink stuff back where we want it.

We can establish new bone in the crestal aspect of the alveolar bone by using controlled tooth movement via orthodontics. It is currently our only non-surgical option for the creation of new bone. As Tarnow and Chu point out, it is a misnomer that papilla can be regenerated using extrusive methods. Rather, "it is more accurately described as the reformation of the papilla in a new location." (2)

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One of the barriers I've repeatedly run into in executing these cases successfully has been communication and willingness of my multidisciplinary team. Because I'm not currently doing ortho extrusion myself, it requires communication with my orthodontist. As adult treatment becomes an increasingly popular area of orthodontics, our specialists are met with increasing demands and expectations. If our support team hasn't been tasked with ortho cases for the sole purpose of restorative set-ups in the past, they can be inundating to approach for the first time. In addition, orthodontic extrusion isn't as predictable as we'd sometimes like it to be.

So if the restorative dentists are asking the specialists to complete treatment that they aren't as comfortable with or accustomed to, how can the team increase predictability and case satisfaction with these more complex situations?

Setting expectations in extrusion cases

Setting expectations is paramount with any case, but especially in extrusion cases. Letting a patient know in both the restorative dentist's office as well as the orthodontist's that we are putting forth an extra effort to take an unideal situation and *improve* it is key. If a patient knows you can guarantee it will look mediocre at best without ortho intervention, or there is the opportunity to *attempt* to improve the situation with extrusion, however unpredictable, they are much more likely to approach the ortho treatment in a way that adds comfort to the orthodontist's position.

In addition to setting the stage appropriately, there are a few basic principles with orthodontic extrusion that can guide your success. I recently had the pleasure of hearing Frank speak about some of these principles, and I'll reiterate my takeaways here:

1. If you only extrude a single tooth, you will not get improvement of the papilla location. When only one tooth undergoes extrusion, your improvement potential is limited to facial bone, so you won't gain anything interproximally.

2. You will typically see 0.5 mm to 1 mm per month during extrusion. Follow the process with three months of retention when your goal is to move the bone and gingival tissue coronally.
3. When you have bone loss across all anterior teeth and one tooth is being removed for an implant, extrude multiple teeth to improve the interproximal relationship, and then crown lengthen the facials.
4. You *can* extrude a tooth next to an implant to improve the papilla!
5. Rectangular wire holds the torque during extrusion. Negative torque brackets help withstand the[2] forward rotation of proclined teeth during extrusion.
6. Extrusion is not successful in the presence of inflammation. This is one of the most common reasons for unpredictable response to orthodontic extrusion.

Tarnow and Chu have described three tissue types that help aid in anticipating the outcomes of extrusion. Prior to extrusion, you will need to probe the sulcus, sound to bone under local anesthetic and determine the relationship of the mucogingival junction to the crest of the bone in order to determine the type of tissue your patient presents with.

3 types of tissue for anticipating outcomes of extrusion

Type 1 tissue is the situation where the mucogingival junction is attached to the underlying bone and the attached gingiva is connected to both bone and the root of the tooth. In this scenario, extrusion won't cause the mucogingival junction to migrate with the tooth in the coronal direction, so extrusion results in increases in both the width of the soft tissue as well as the attached gingiva (2).

Type 2 tissue exists when a dehiscence or fenestration is present, resulting in a mucogingival junction and attached gingiva connected to the root surface alone, and not the bone. In this scenario, you will see an increase in the width of the soft tissue, but not in the attached gingiva, because the mucogingival junction is attached directly to the root and therefore moves coronally with the tooth (2).

Finally, Type 3 tissue exists when there has been a significant insult to the periodontium and a periodontal pocket exists. In this scenario, because there is no root attachment of the mucogingival junction or attached gingiva, the width of both the attached gingiva as well as the overall soft tissue will remain unchanged (2). The only way you can see changes in the tissue with a periodontal pocket are when you extrude the tooth beyond the pocket. Depending on the depth of the pocketing and the length of the root, this may or may not be possible. A typical central incisor is 24 mm long, with a 13 mm root.

Anterior teeth don't have the same axial inclination as posterior teeth; their inclination is dependent upon the premaxilla. A proclined anterior tooth will undergo a forward rotation during extrusion that may result in perforation through the facial bony housing. Extrusion of proclined anterior teeth is therefore much less predictable and has a decreased success rate. Vertically upright teeth are the best to extrude when your goal is facial bone growth.

As we treatment plan our anterior implant cases, orthodontic extrusion via a multidisciplinary approach aids in achieving the optimum esthetics each of us is after. Knowing what you're up against before initiating extrusion helps with the ease, success, and satisfaction of these complex cases. Next time you're found treatment planning a patient in this category, sound to bone, check the sulcus, evaluate the mucogingival junction as it relates to crestal bone and determine the inclination of the tooth.

References

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