

KEY WORDS

Gingival recession, aetiology, mucogingival, periodontal plastic surgery, aesthetic

LEARNING OBJECTIVES

- To understand why gingival recession develops and how dentistry can affect its progression
- To consider the management strategies for gingival recession and to understand what intervention is possible and why this may be indicated

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GINGIVAL RECESSION – CAUSES AND MANAGEMENT

ABSTRACT

Gingival recession of varying extent and severity is increasingly encountered in general dental practice. This paper outlines the aetiology of recession and discusses management strategies, both conservative and complex. It also highlights when to intervene and what outcomes may be expected.



Figure 1: A patient with a small amount of labial recession



Figure 2: Advanced generalised recession following successful management of a generalised periodontitis

Introduction

Gingival recession is defined as the location of the marginal tissues apical to the cemento-enamel junction¹. Whilst this might seem an obvious statement, recession does vary in how it presents, both in extent (the number of sites affected) and severity (amount of recession that has occurred). Accordingly, the significance to the patient may also be different. Figure 1 shows a patient with a small amount of labial recession associated with the upper right central incisor. This is of no health issue to the patient, but may present an undesirable aesthetic situation for someone with high expectation. Alternatively, Figure 2 shows advanced generalised recession following successful management of a generalised periodontitis. This has led to a significant aesthetic compromise for the patient, but is also associated with sensitivity, food impaction after eating, and speech changes as air escapes through the anterior teeth. These issues are all the result of what the clinician would consider successful treatment.

The development of gingival recession is not an inevitable consequence of age, but it is to a degree a reflection of some pathological change. As part of his seminal series on 'The Natural History

of Periodontal Disease in Man', Löe and co-workers looked at the prevalence of gingival recession in a highly dentally motivated population, compared to a cohort that did not have access to dental care². In both groups, recession started in early adult life and the prevalence increased with age, with 90% of the dentally motivated population showing signs of some recession by the age of 50. The distribution of the recession, however, differed. In the dentally motivated group, the recession affected predominantly buccal sites, with little interproximal recession being noted. In the untreated group, there was a greater tendency towards interproximal and circumferential recession. This does suggest that there may be different aetiological factors involved in the development of gingival recession.

Aetiology of gingival recession

We often talk of patients who have a thick gingival tissue biotype versus a thin gingival tissue biotype. This is the anatomical presentation of their genotype. Patients with a thin tissue biotype obviously have a more delicate type of gingiva that will be more susceptible to developing recession.

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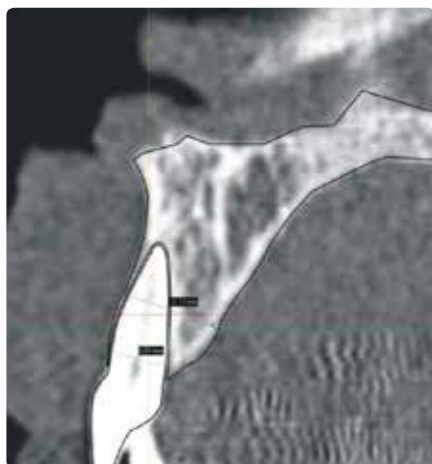


Figure 3: A CT cross section in a patient with clinically normal anatomy and no recession

When looking at a cross section of the dento-alveolar anatomy of an upper central incisor, it can be seen just how thin the labial alveolar bone is over an upper central incisor. Figure 3 shows a tracing over a CT cross section in a patient with clinically normal anatomy and no recession, showing just how thin the labial alveolar bone is.

The tissues may be further compromised by the presence of an alveolar dehiscence³, where there is a lack of alveolar bone over the root surface. The rest of the supporting structures can be expected to develop, and there will, at least initially, be an overlying mucosa and gingiva, with an inserting ligament into the root surface from the overlying connective tissue. The assumption is that such an anatomical situation is less resilient to the stresses and challenges of everyday function, and as a consequence, more prone to the development of gingival recession. Figure 4 shows alveolar dehiscences present over the root surfaces on raising a mucoperiosteal flap in a recession case.

The type of gingiva around the teeth is less important than the quantity. Historically, it was felt that a zone of attached



Figure 4: Alveolar dehiscences present over the root surfaces

keratinised tissue was needed to maintain gingival health after it was observed that areas with less than 2mm of keratinised tissues exhibited persistent signs of clinical inflammation⁴. This was later disproved by



Figure 5: Overzealous cleaning



Figure 6: Recession as a result of inflammation

a beagle dog study, which showed that whilst there may be more clinical signs of inflammation in sites without keratinised tissue, the underlying histologic inflammation was the same⁵. The current belief is that treating for the sole purpose of increasing the width of keratinised tissue cannot be justified. The decision to treat should be based on the status of the tissues and the ability or not to control inflammation.

Any trauma to the oral tissues can cause gingival recession, but a thin gingival tissue biotype is more likely to be prone to recession. A traumatic overbite in a severe Class II division 2 occlusion can cause recession on the lower labial or upper palatal tissues of the incisors, or both. The presence of a tongue or lip stud increases the likelihood of developing localised recession associated with the lower anterior teeth. The lingual recession associated with a tongue piercing is of particular concern as there are no proven techniques for correcting recession defects in this area.

Gingival recession and periodontal disease

In patients with a thin tissue biotype, overzealous cleaning can traumatise the gingiva enough to cause labial recession (See Figure 5). However, in these patients, insufficient cleaning will lead to localised inflammation that the tissue is too delicate to withstand and this may also result in gingival recession (See Figure 6).

The management of periodontal disease is commonly associated with the development of some gingival recession. The probing depth reduction that occurs following successful nonsurgical treatment of periodontal disease is a combination of gingival recession and attachment level gain, and often in equal measure⁶. Thin tissues, oedematous tissues and anterior teeth can be expected to respond with more recession after treatment. Obviously, resective periodontal surgery is going to create significant gingival recession



Figure 7: Non-surgical treatment leading to increased recession



Figure 8: Subgingival restorative margins associated with persistent gingival inflammation

in its attempt to 'pocket eliminate'. This recession tends to be circumferential, rather than the more localised labial recession that may be seen with toothbrush trauma. This is relevant because we still do not have predictable corrective surgical procedures to treat the "black triangle disease" of interproximal recession. Figure 7 shows a patient who was concerned about the aesthetic result of losing the papilla between her front teeth. Periodontal examination revealed localised periodontal bone loss that required treatment. A course of nonsurgical treatment reduced the pockets down to shallow probing depths but increased the amount of recession.

Gingival recession and restorative dentistry

The principle of the supracrestal tissue attachment (biologic width) is well-established⁷. There may be a temptation to place the margins of anterior restorations in a subgingival position to achieve an optimal aesthetic result. The further subgingival the margin, the harder it will be to clean, and the higher the risk that plaque retention will elicit an inflammatory response (See Figure 8). In a thin gingival tissue biotype, this is likely to result in recession apical to the restoration margin. Anything that increases plaque retention in this area may have this affect, such as poor marginal fit, poor crown emergence angles or rough restorative surfaces. Invasion of the supracrestal tissue attachment will lead to a re-



Figure 9: Thin tissue biotype recession

establishment of the correct anatomical relationship in a more apical position. In a thick tissue biotype, this will result in bone loss and the development of a periodontal pocket. In a thin tissue biotype recession is more likely to develop. (See Figure 9).

Gingival recession and orthodontics

Whilst orthodontics does not cause recession *per se*, it can influence the progression of recession. Orthodontic movement within the limits of the alveolar housing will retain bone on all aspects. Pushing a tooth beyond this bony limit will lead to the formation of an underlying alveolar dehiscence and the associated risk of progression. Figure 10 shows the recession in a patient who has had orthodontics to treat upper and lower crowding. Expanding the arches to create room for the teeth has resulted in a thin tissue biotype and subsequent gingival recession.



Figure 10: Recession in a patient who has had orthodontics to treat upper and lower crowding



Figure 11: Recession extended to the depth of the vestibule



Figure 12: An associated fraenal attachment

Theoretically, movement in a lingual direction could lead to a reduction in recession if the root surface is kept clean. What is more likely, however, is an improvement in the local tissue type to reduce the risk of recession progressing. If labial movement is planned in a patient with a thin tissue biotype, then supportive maintenance and control of the local factors is essential. If recession develops or cannot be maintained, then orthodontic movement should be stopped and gingival grafting may be considered.

It should also be remembered that fixed orthodontic treatment may be accompanied by the two main aetiological factors in the formation of recession, plaque retention due to the orthodontic hardware, or the risk of overcompensation and developing a more traumatic cleaning regime.

The management of gingival recession

By the nature of the local anatomy, most gingival recession is self-limiting. As the recession progresses up the root surface in the maxilla, or down in the mandible, the gingival tissues tend to become thicker and therefore more resilient. The decision to intervene is not a clear-cut one as there are no specific predictors of sites at risk of progressing. It is often reasonable to give preventive advice and considering monitoring for progress before deciding whether intervention is justified.

There are two key indications for active intervention, if the patient has aesthetic concerns, or for the prevention of continued recession. Whilst surgical procedures for root surface coverage have been advocated for the management of persistent sensitivity or shallow root caries, there are clearly less aggressive ways to manage these conditions.

Resolution of inflammation and oral hygiene instruction

Whether monitoring, active management or complex treatment is indicated, the first stage of treatment is to try to achieve periodontal health. This would include the removal of any local factors, such as calculus or restoration overhangs, followed by providing oral hygiene instruction to ensure and maintain an adequate level of plaque control. In patients with a thin tissue biotype who are prone to recession, the tooth brushing technique should be 'effective, yet atraumatic'. This may involve ensuring that the patient does not 'scrub' across the gingiva. A softer toothbrush or sensitive head may be required, but patients should be reviewed to make sure that the plaque is being adequately removed. The absence of marginal inflammation should indicate a consistently good level of dental cleaning.

Monitoring

As previously mentioned, gingival recession often progresses to a point where the soft tissues are able to

resist further progression. Knowing if this is the case is not straightforward. Certainly, the presence of persistent inflammation would be a risk factor for progression, but there are no good predictors for whether the recession has reached a stable position or is likely to progress. Often recession sites need to be monitored. The taking and recording of measurements, similar to measuring pocket depth, is an obvious way, allowing for comparison over a period long enough to allow measurable change. Measuring recession in this way is remarkably subjective, and an unreliable measurement over prolonged periods. Clinical photographs provide a better way to detect a true change.

Management for the prevention of continued recession

The decision to undertake surgical procedures to prevent continued gingival recession should be based on concern that the recession has resulted in an area that can no longer be maintained by the patient. This may be because the recession has extended to the depth of the vestibule, such as in Figure 11, where the patient is unable to clean properly. Figure 12 shows an associated fraenal attachment making cleaning difficult. The gingival tissues may just prove too uncomfortable or difficult for the patient to maintain adequately.

In situations such as this, the aim of treatment is to produce a robust, preferably keratinised, thicker tissue



Figures 13a-e: The stages of a free gingival graft in an orthodontic patient with significant localised recession



biotype that will allow the patient to clean the area thoroughly. Coverage of the recession may be secondary factor that is unimportant. Figure 13 outlines the stages involved in a free gingival graft in an orthodontic patient with significant localised recession. A free graft is one that has been removed from its blood supply and transferred to a remote site. A recipient site is prepared locally by means of a split thickness

sharp dissection (Figure 13b), then a matching sized piece of graft 1.5-2mm thick is harvested from the plate (Figure 13c). This is then secured in place and allowed to heal (Figure 13d). In the immediate post-operative period, the graft survives by 'plasmatic circulation', diffusion of the nutrients from the underlying recipient bed. Areas of graft over the root surface will not receive much in the way of nutrients and risk



Figures 14a-e: A tunnel procedure



becoming necrotic. For this reason, free gingival grafts are excellent for producing attached, keratinised tissue apical to the recession, and creating a thick, robust tissue type (Figure 13e); they are not good for achieving root surface coverage.

This is one of a number of techniques that can be used but it is out of the scope of this article to explain the decision-making process. Where the tissues are more robust, other techniques may provide the coverage needed to replace the tissue that has been lost and produce a better aesthetic result. Figure 14 shows a tunnel procedure, which undermines the adjacent tissue to allow it to be moved, being used in conjunction with a connective tissue graft.

Recession coverage for aesthetics

Patients may find gingival recession aesthetically unacceptable for a variety of reasons. Generalised labial recession can create unnaturally long looking teeth, or expose root surfaces that can be of different colour to the crown of the tooth. Recession can affect teeth to varying degrees causing asymmetry. Of course, the patient's lip line at rest

and smile line play a role in whether this is noticeable. The ability to cover recession depends on how much interproximal tissue loss has occurred. There are still no techniques that can predictably recreate lost interdental papillae, but our ability to cover labial recession is also dependent on their being good interproximal tissues.

When choosing a suitable technique for aesthetic recession coverage, the decision will be based on achieving a predictable high percentage of post-operative root surface coverage and a good tissue match for colour and consistency. For this reason, pedicle flaps are more likely to be the procedure of choice. Pedicle flaps are raised from the adjacent tissue and retain a blood supply to improve the healing. Figure 15 shows a coronally positioned flap being raised and coronally moved down the tooth to give an aesthetically satisfactory result. Coronally positioned flaps are often used in conjunction with a connective tissue graft sandwiched underneath to improve the tissue quality. Pedicle flap procedures can also be used to cover multiple recession defects in a single procedure, as shown in Figure 16.

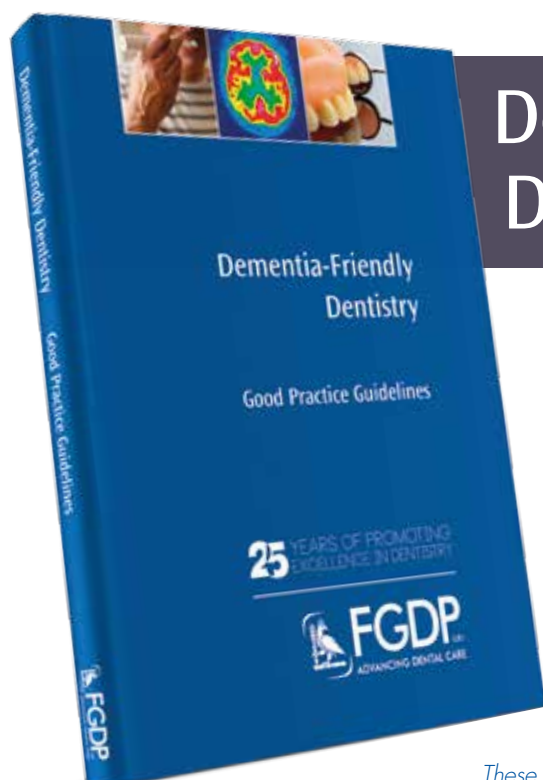


*Figures 15a-e:
A coronally
positioned flap*



Figures 16a-c: Pedicle flap procedures to cover multiple recession defects

Where recession has affected the interproximal tissue, the ability for grafting procedures to work is limited. In these cases, other restorative techniques may be used to try to give the patient an acceptable end result. Figure 17 shows a patient with some scope for soft tissue improvement to their labial recession, but this is limited due to the presence of interproximal loss. The patient was treated with a combination of a tunnel procedure with connective tissue graft to move the tissue down and cover as much of the recession as possible. Sensibly placed resin composite restorative material was then used to optically reduce the interproximal space and fill the abrasion cavities.



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Where the interproximal tissue loss is more extensive, periodontal surgery cannot improve it. If resin composite restorations can be placed to improve the aesthetic aspect, they must be done in a way that does not inhibit oral hygiene, as this is likely to exacerbate the gingival issue. In extreme cases, a gingival veneer can be provided, either in acrylic or silicone, to give the patient an aesthetically pleasing prosthetic solution (Figure 18).

Conclusion

Gingival recession is a common condition that can develop at various intraoral sites in people over time. Often it is of little consequence. There are

times, however, where gingival recession can progress to a point where tooth loss will occur or periodontal pocketing will start to progress apically or laterally. Timely intervention can often prevent this. Clinicians should be able to assess the presence of recession and whether the marginal inflammation can be controlled. Where there is uncertainty or concern, referral to a periodontics specialist, or a periodontics or restorative dentistry consultant may be appropriate.

There are a number of techniques that can surgically correct gingival recession where it is an aesthetic concern. None of these procedures can provide a guarantee of 100% coverage, but they can be considered predictable in most cases. The ability to cover will depend on the ability to move local tissue across the recession defect, and also be detrimentally affected by any interproximal tissue loss.



Figures 17: A combination of soft tissue grafting and composites to improve aesthetics



Figure 18: Acrylic gingival veneer to mask extensive recession

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