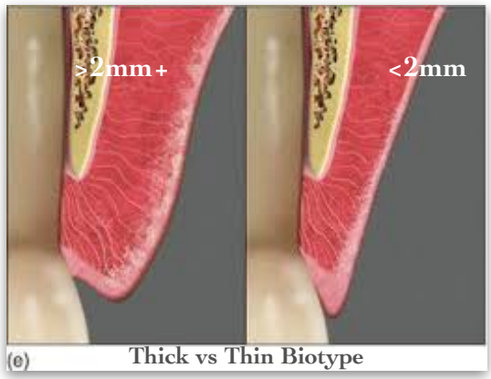
Gingival Biotype

Clinical observation of experienced practitioners has noted that people with thicker tissues tend to have more stable periodontal health and better surgical results over time than those with thinner tissues. Initially described in 1969 by Ochsenbein and Ross, the particular terms 'thick and thin biotype' were later introduced by Claffey and Shanley in 1986. The division line became a 2mm thickness of tissue: anything thinner did not do as well as tissues that were greater than 2mm. In fact, as early as 1996, a study in beagle dogs showed that at sites where tissues were thinned to 2mm or less there was more bone loss around the implants at 6 months compared to sites with tissues tissues thicker than 2mm.*



Thick vs Thin Biotype

Taken from Google Images

Whether it is circumferential bone loss for patients with periodontitis, lack of maintenance of root coverage for gingival grafting patients, lack of ridge augmentation in preparation for implants, or implant graying of tissues or thread exposure; patients with thinner tissues have a harder time responding well to any aspect of periodontal therapy.

Implant Crestal Bone Levels

Ever since the first tooth replacement with metal implants, we have been chasing ways to gain better and stronger bone integration to the implant, as well as better maintenance of crestal bone and soft tissues around implants.

Implants were first used in treating fully edentulous patients, so early goals were minimal in terms of esthetics or hygiene. Often 8 or more implants were placed at the time of surgery for an edentulous patient with the expectation that several would not integrate. If at least 6 implants were functional, then the restoration could be stable. Branemark's accidental discovery that titanium was achieving the best integration to bone was a critical finding in improving implant success.

As implant science became more predictable, implant replacement narrowed to single tooth treatment as opposed to full arch, and goals became more focused on developing implant tissues that would mimic those of a natural tooth. From internal hex and platform switching, to conical abutment design, screw retained restorations, one abutment one time, and one-piece implants, all are methods to help maintain the precious bone and therefore soft tissues around an implant. Exposed threads, for example, are not only unsightly, but difficult to clean around and certainly hinder the long term stability of the tissues around the implant.

As a periodontist, my passion is for developing ideal peri-implant soft tissues and achieving the most esthetic and hygienic outcomes possible. Some very interesting research has shown that the thickness of the soft tissues surrounding implants can have very important effects on maintaining the bone around those implants. This issue of ProbeTips will further explore this concept.

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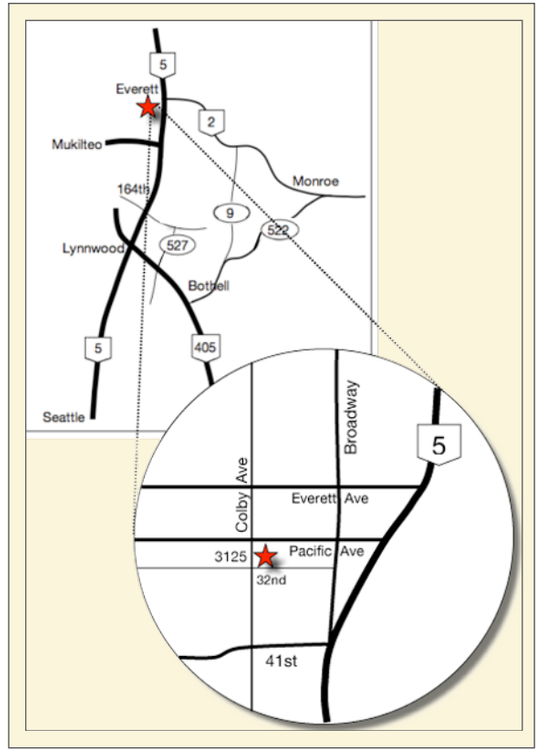
PERIODONTOLOGY IMPLANTOLOGY ORAL MEDICINE



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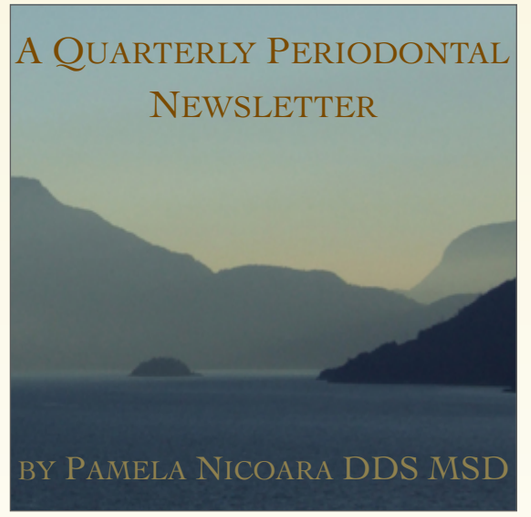
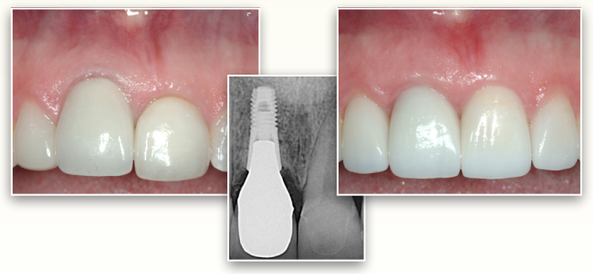
Probe Tips

A Quarterly Periodontal Newsletter



Thick Implant Tissues to Prevent Crestal Bone Loss



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Thick Implant Tissues to Prevent Crestal Bone Loss

The Research

There have been several studies out of one particular group led by Linkevicius that have looked at bone levels relative to tissue thickness around implants over time. They have evaluated multiple parameters to assess their effect on the crestal bone, but the tissue thickness seems to be the controlling factor, even more important than platform switching! Below are highlights from their most compelling paper.** Three groups were part of the study:

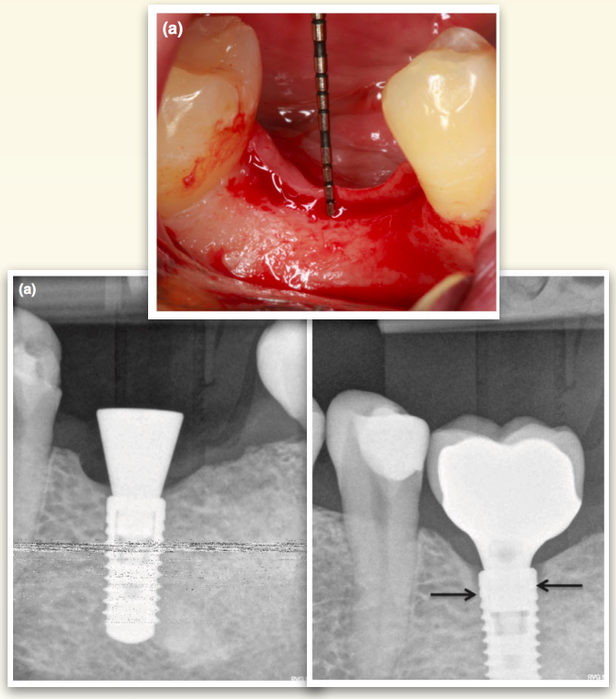
Group 1: Thin tissues (<2mm thick)
Group 2: Thin tissue thickened with Alloderm
Group 3: Thick tissues (>2mm thick)

Each group used Straumann bone level implants with the healing abutment placed at the time of surgery. Implants were restored with screw retained implants, so subgingival cement was not a factor. Implants were measured at the time of implant placement, at 2 months torque test, at crown placement, and at 1 year post treatment. I have provided only initial bone levels at the time of implant placement, and the 1 year follow up radiographs.

Screw Retained Final Restorations

Group 1 - Thin

These were sites with soft tissues less than 2mm in thickness as depicted in the photograph below of the flap measured by a periodontal probe.

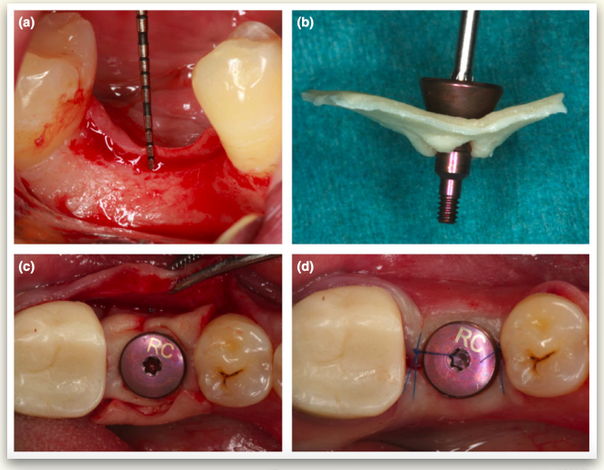


Initial 1 year post restoration

Results after 1 year: An average of 1.22mm of bone loss mesially, and 1.14mm distally. This was despite bone levels coronal to the implant platform at the time of implant placement. Bone loss was already occurring even prior to implant crown placement. This amount of bone loss was statistically significant compared to the other two groups. Clinically, 1mm loss can mean the difference between gray tissues over an abutment on full smile, or shadows from lack of tissue bulk.

Group 2 - Alloderm

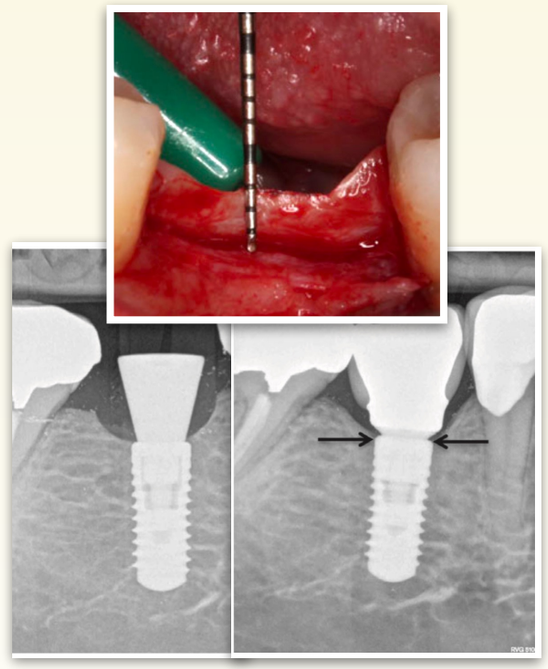
Group 2 included sites with less than 2mm of thickness that were augmented with Alloderm cadaver donor tissues, as show below. After 1 year, implants in group 2 had an average of 0.24mm of bone loss mesially, and 0.19mm distally which was similar to naturally thick tissues in group 3. This indicates that it is possible to 'change' biotype in certain situations.



Initial 1 year post restoration

Group 3 - Thick

Subjects in group 3 had tissues naturally greater than 2mm in thickness. At 1 year, implants in this group experienced 0.22mm of bone loss mesially, and 0.20mm distally.



Initial 1 year post restoration

Since most things generally do not physically get better with age or time, and the older we get, the harder it is to tolerate surgery or get ideal results, why not start with the best tissue dimensions possible?

References

COIR Akcali et al. 2016.
COIR Puisys et al. 2015.**
CIDRR. Linkevicius et al. 2015.
JCP. Burglundh et al. 1996.*