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A conversation with

Dr. Peter NORDLAND



Dr. Peter Nordland, D.M.D., maintains a full-time periodontal and implant surgery practice in La Jolla, Calif., focused on cosmetic regenerative periodontics. He is an associate professor at Loma Linda University and has multiple university teaching affiliations. He has popularized several periodontal plastic surgery techniques to esthetically restore lost gingiva. His lectures on periodontal plastic surgery demonstrate the new possibilities and techniques of cosmetic regeneration of soft tissue and bone around teeth and dental implants. He also teaches hands-on microsurgical techniques in periodontal plastic surgery and papilla regeneration.

Behind every general practitioner who excels in cosmetic and esthetic restorative dentistry, there usually stands a gifted periodontist who shares a similar passion for achieving symmetry and artistry. La Jolla, Calif.-based periodontist Dr. Peter Nordland is among a growing number of doctors within his specialty who have sharpened their focus on achieving optimal esthetics. Here clinical editor Dr. David Hornbrook, who has a close-working referral relationship with Dr. Nordland, explores specific ways GPs and periodontists can deliver better results for patients who are committed to appearance-enhancing treatment.

What is the role of the periodontist today in esthetic restorative treatment and how is this different from what we've traditionally seen?

Nordland: In the last 19 years, my practice focus and the focus in many areas of periodontics has been on cosmetic plastic surgical aspects of treatment. This seems like an oxymoron given the traditional perception that periodontists usually remove tissue and bone and make patients look uglier than when they initially walked in. Now the periodontist plays an important role in esthetics: to frame the picture for the restorative dentist, allowing the cosmetic restorative work to show its full potential. The periodontist can change bone and soft tissue contours so that the beautiful work the restorative dentist does can be the focal point of attention.

Is there any specialized training or post-graduate education that is needed in this type of periodontics? Is this something

that's being taught in today's periodontics programs?

Nordland: The curriculum at most universities has been modified significantly over the last 15 years, with a sharper focus on cosmetic procedures. Some post-doctoral residency programs emphasize this area and a lot of the students who are coming out of school today, with the training they've had, have this focus. Over the last 10 years we've seen the focus shift toward this direction at the American Academy of Periodontology.

Have you seen an increase in any specific cosmetic periodontal procedures referred by general practitioners?

Nordland: My practice is kind of unique. About 90 percent of my patient population comes to me for cosmetic procedures. And of those procedures, root coverage is probably the most common. We can predictably bring back missing gingiva to

give protection not only for cosmetics but for the stability of the case.

I've seen microsurgical procedures, which in many ways are still a subset of some of the other procedures, taken to a much higher level with magnification. Restoration of the lost interdental papilla is another area that has been very important to patients. Sometimes that involves a multidisciplinary approach to treatment. We've also been trying to maintain the soft and hard tissue when a tooth is extracted through soft tissue grafting techniques. In addition, if there has been a defect where the ridge form is disfigured we can correct the ridge form.

Implant reconstruction is another area of growth. Often I hear dentists say implants are great, but they can't be performed cosmetically in the anterior. This observation usually stems from a lack of knowledge about what's possible. Esthetic implants and reconstruction are great areas as well. Gingival sculpting or crown lengthening also can be a great help to the restorative dentist. Of course, bone regeneration is another area of focus for periodontics.

We also shouldn't overlook the fact that we no longer have to do many of the resective procedures that would disfigure patients experiencing "garden variety" periodontal disease. We now have beautiful ways to treat anterior bone loss without disfiguring these patients.

As a restorative dentist, I find it can be frustrating when we place veneers or crowns or a bridge and everything looks great except for that little open gingival embrasure that leaves the appearance of a black hole. Is there a way to rebuild the interdental papilla?

Nordland: Dealing with that little black triangle is probably the periodontist's greatest challenge. (See Figures 1-2 above.) It is important to determine the source of the problem. I actually teach an entire hands-on microsurgical course on papilla regeneration.

Sometimes the source of the problem may be root angulation, where there is a divergence of the roots. In

CLOSING EMBRASURES



FIGURE 1: Open gingival embrasures like this can be a periodontist's greatest challenge.



FIGURE 2: Papilla regeneration prior to veneer placement delivers an esthetic solution.

this case, I believe an orthodontist needs to participate in the patient's care, otherwise, we may end up with a less than ideal solution. We should consider orthodontics to facilitate better root alignment, to move roots closer together and examine what the restorative dentist can do to change tooth contour so that the embrasure space is closed.

Sometimes tooth shape is a problem. Tear-drop shaped lateral incisors make it difficult to bring about closure of the interdental papilla. These cases may become more evident after orthodontic treatment is accomplished.

If there is a surgical loss of the interdental papilla, for example if a patient has had periodontal surgery in the anterior and tissue has been removed or lost due to endodontic

flap surgery, then we can replace the tissue surgically. My experience has been that we need to use microsurgical techniques because of the limited space for access. With the aid of microsurgical instrumentation and a microscope, we can add tissue even in a tiny environment.

You also mentioned pontic site development. What are the keys to attaining excellent results in this area?

Nordland: The difficulty in the esthetic zone, especially in the maxillary anterior, is that the bone is very thin. And if a tooth needs to be sacrificed, we run the risk of ridge collapse. That's where we pay the highest price with tooth loss and bone recontouring following extraction. Because the bone is so thin, any kind of trauma—infection, an endodontic problem, root fracture or resorption to a non-restorable tooth—raises the bar in terms of our ability to have a cosmetic result.

In the past, teeth would be extracted without any particular attention paid to the soft tissue involved, where incisions would be made or we'd use burs to remove bone to provide better access to the root. We now realize that this is totally wrong and that any bone removal or soft tissue trauma will result in a net overall loss of the tissues we're trying to maintain.

The focus should be on ways to maintain the natural soft tissue profile and bone contours. If we don't, the restorative dentist will have great difficulty making a tooth that looks natural and will have to over-build the replacement tooth to make up the difference.

My perspective is that it is better to avoid bone loss when extraction is needed in the esthetic zone. When I extract a maxillary anterior tooth, first I want to do it as atraumatically as possible. If I need to section the root, I will take it out in small pieces, without touching the surrounding bone.

With the microscope, I will look down into the socket. The magnification allows me to see root fragments or granulation tissue that can be easily removed. I can see into the alveolus. That allows me to clean it out thoroughly. Once the tooth is removed atraumatically, we can add bone and use membranes to bring the missing bone back to its normal contour.

Soft tissue has a tendency to collapse around an extraction. It's like when you remove an implant healing abutment and it collapses inward before your eyes. Similarly, with an extraction, if the soft tissue isn't supported it also tends to collapse inward.

What we usually do is, the restorative dentist will take an impression and shade of the patient and slightly prepare the adjacent teeth. He'll then have the lab fabricate a replacement tooth that will bond to the lingual surface of the adjacent teeth. With the strong materials that are available, many times metals aren't used, giving us better esthetics.

The lab will then send the pontic to me. I'll go through the extraction process and then we'll add a flowable composite to the under side of the pontic. That way we can create the ovate pontic shape, which

DELIVERING AN ESTHETIC IMPLANT



FIGURE 3: A vertical root fracture of tooth No. 8 in a young female necessitates extraction. A surgical dissecting microscope is used to debride the socket of any root fragments and granulation tissue.



FIGURE 4: A freeze-dried demineralized bone allograft is placed into the extraction socket with a resorbable membrane.



FIGURE 5: A provisional restoration using the ovate pontic helps to maintain the soft tissue profile and keep the papillary tissue from collapsing.



FIGURE 6: Once bone healing is achieved with ideal soft tissue contours, then an osseointegrated implant can be placed in the ideal location for proper tooth emergence.



FIGURE 7: An all-white abutment is utilized to create a tooth-colored emergence with a porcelain crown.



FIGURE 8: The patient has form and function restored without ever having to feel toothless or self-conscious.

will then be submerged into the soft tissue about 1.5 to 2 mm to support the soft tissue. We'll support the interdental papilla so that it doesn't collapse. But even after going through these steps we sometimes still see soft tissue or bone collapse. In these instances, we'll go in secondarily and add.

This is especially true when there's been a severe amount of bone loss. For instance, if there has been an endodontic root fracture with previous endodontic surgery, many times a significant amount of facial bone

and apical bone is missing. In these types of cases I'll have to go back in later and add more tissue to augment the ridge. But generally, if we can take the tooth out delicately, add a bone graft at the time of extraction and address the soft tissue by giving it support, we can maintain the tissue in the esthetic zone so that the restorative dentist can deliver a normal-size replacement tooth.

This process also gives the patient time to think about replacement options. The patient may decide that a Maryland bridge is fine or may opt for an implant. The most important thing is that the patient leaves the office after an extraction feeling whole rather than leaving with a big hole in his or her mouth.

That brings up an important point regarding pontic site maintenance. For years, if I was going to place an anterior bridge, I would replace the missing tooth with a flipper, either a gingival partial or a removable partial. I figured they're easy to make and quick and inexpensive for the patient. But I learned that a flipper is not the answer because it doesn't maintain the site or the papilla. Can you address the use of a flipper vs. a fixed provisional prosthetic?

Nordland: The flipper tends to put pressure on the extraction site, so we end up getting some pressure-related bone atrophy. Also, this doesn't address the soft tissue because without support the interdental papilla and facial contour tend to collapse inward. The flipper may seem like a quick solution, but I think the techniques that we've developed and have described leads to a much superior result, and from the restorative dentist's perspective, these techniques don't require much chair time.

In terms of maintenance, the patient can clean the ovate pontic easily. Because it has a dome top, floss can get around that rounded top and clean plaque off effectively. Anyone who has sectioned a bridge that has a ridge lap pontic has always seen irritation underneath the ridge lap shape because of the concavity. Patients just can't clean that, and as bacteria accumulates it irritates the tissue.

Frequently my patients want longer teeth, and I can't always do this by adding to the incisal edge. We need to take tissue away, whether it be soft tissue or bony alveolus. There has been some controversy with crown lengthening about how long to wait before performing the restorative work to be able to achieve pre-

dictability after the periodontist removes bone. What's your view?

Nordland: The patient that has a typical gummy smile many times is very self-conscious and feels that they have short, squatty teeth. It's important to look at the position of the cemento-enamel junction (CEJ) relative to the soft tissue position. If the soft tissue extends over the CEJ, then moving the soft tissue apically can result in a much more beautiful smile by showing the full contour of the tooth's enamel profile.

Understanding where the bone is in relation to the soft tissue will let you know what will be needed to accomplish that goal. Sometimes the bone is far enough away that using a scalpel or a laser or a diamond to perform dermabrasion or a gingivectomy can work as long as the bone is not within biologic width distance.

Because we have what's known as biologic width, the body is able to restore soft tissue when we approach the bone. It's sort of like if you skinned your knuckles down to the bone. Your body would want to bring back that natural covering so the bone is not exposed.

In the mouth, biologic width is the soft tissue distance covering the bone and creating the sulcus. If the soft tissue level the restorative dentist would ultimately like to have is going to bring the new gingiva level within 3 mm of the bone, then we'll also need to remove bone.

Many times we find that patients with a gummy smile have previously had orthodontic treatment. For these patients, the final step in orthodontic treatment really should be a consideration for crown lengthening. If the patient presents with a thick alveolus in a bucco-lingual dimension, that type of thick gingiva is resistant to recession. In addition, the thick type of alveolus many times has a thick bony housing. If this is the case, we need to recontour the bone not only in an apical direction but also in a bucco-lingual dimension.

It's also essential that the restorative dentist and the periodontist communicate well. One doctor's ideal tissue height may be different than the other doctor's ideal and the patient can get stuck in the middle.

We've developed many different communication techniques. It could be a measurement from the incisal edge to the desired soft tissue above it or an overlay type of a guide (a Hollywood stent). Regardless, it's essential that you have some kind of definitive communication.

Let's say I send the patient to your office, you perform crown lengthening by laying a flap, recontouring the bone and re-laying the flap. How long should I tell the patient it's going to be before I can prepare the crowns or the veneers or do the bonding?

Nordland: I think offering any pat answer would be inappropriate because the way that the surgeon addresses the soft tissue and bone can vary. For example, if we look at soft tissue healing, at six weeks time the connective tissue and epithelium will be well healed. If we're looking at bone recontouring

Lasers have provided an exciting realm in cosmetic dentistry by being able to help obtain symmetry in tissue. What role do you see lasers playing in periodontics?

Nordland: The periodontics specialty has taken a strong stance against lasers because laser manufacturers many times have recommended the equipment for procedures such as pocket depth reduction without first having solid, refereed, double-blind studies performed. I know my peers in the American Academy of Periodontology have been reluctant to promote the use of lasers for this reason.

In the past, teeth would be extracted without any particular attention paid to the soft tissue involved ... We now realize that this is totally wrong.

along with the soft tissue reshaping, we have to add time to the equation, and this is where communication comes in.

Let's say there is a reduction of soft tissue without addressing biologic width. As the soft tissue heals six weeks later, there will be additional healing in the bone contour as it heals from the trauma of the soft tissue surgery. During this time there will be a tendency for the tissue to move back down in an incisal direction. This can happen over months, so the tendency for relapse can be seen over time if the bone has not been addressed and bone healing is not considered.

It's important to know what the status of the gummy smile was pre-operatively and what technique was used surgically to change it. If we're positioning soft tissue with bone removal and we've established ideal contour and ideal bone position, then many times just a few months can be adequate for the restorative dentist to proceed with the restoration. But if there has been a lack of dealing with the contours of bone and there has been a biologic width invasion, there can be a strong tendency for relapse to occur. For these reasons and time requirements, it's especially important that the restorative dentist place well-fitting and cosmetic provisional restorations.

However, I've had a diode laser in my office for about five years now and I find it very helpful. I can remove small increments of tissue with excellent control. In the past, as an alternative, I've used rotary diamonds with poor control. I've used an electro-surgical unit with a needle tip that also had less than ideal control.

I hate to condemn a modality because it's being promoted for pocket reduction and other areas that need to be scrutinized. However, I think lasers have a role and give practitioners potential they don't have with other instruments. In fact, I promote the use of lasers. I think that periodontists who don't have experience using a laser should get that experience.

Personally, I have seen great results in using lasers to reduce periodontal pocket depths and for treating bony defects. Clinically, in your practice, what do you believe are the advantages or disadvantages in using the laser for pocket reduction? Based on your reading of the scientific literature, where do you believe the controversy exists?

Nordland: The controversy comes from the concept that the laser can be used across the board for treating periodontal pockets. If the pocket is supra bony, soft tissue removal can be very predictable with the laser. On the other hand, if the pocket is an infra-bony

pocket, where we have angular bone loss, treating those types of lesions with a laser is not well documented.

It's one thing to get in and remove the sulcular tissue; it's another question to remove calculus from the root of the tooth. The laser may be effective in calculus removal, but that's the area where it hasn't been well documented in double blind studies. Thus, the effectiveness of the laser in an infra-bony region is the biggest question.

The potential for us to have apparent radiographic healing is something that we all get nervous about because we know we can take an X-ray of an infra-bony lesion and just change the angulation subtly and be able to have apparent bony healing without actual healing occurring. I believe the biggest area of controversy is the actual clinical effect of the laser in an infra-bony lesion and what type of healing is occurring. We need histologic slides showing the healing of infra-bony lesions at different time points. Without that, it's hard for any periodontist to promote its use. That's where I think the rub is, and I think skepticism can be helpful because it can help to encourage a thorough review and understanding of what's happening in that infra-bony lesion.

As a restorative dentist, I've seen many nightmares where tissue heights are asymmetrical from one tooth to another in the anterior region, particularly in the maxillary where single implants were placed. What advances in implants are allowing us to place more esthetic anterior implants?

Nordland: I believe there are a couple of areas. The first issue is site development, and the techniques we've discussed help create an ideal site. I think it is the tendency of any surgeon who wants to please the patient to rush the process and put that implant in no matter what it takes, even if there is less than ideal bone contour. That is wrong because if you proceed at that point, you'll end up with a compromise.

Maintaining ideal bone and soft tissue contours are important because if we have a deficiency in either area

that means the replacement tooth has to be bigger. The communication between the restorative dentist and the surgeon also is extremely important because if the surgeon creates an emergence of the implant contour that's not where the restorative dentist can properly deal with it, there are going to be issues.

The abutments available today also have made a big difference in esthetic implant restorations. Some of the strong porcelain abutments allow for good function in the anterior and beautiful emergence. (See Figures 3-8 on page 44.) In the past we had only metal abutments and even if we had ideal implant placement, delicate transparent tissue allowed the metal to show through. That, of course, would create a dark halo on the gingival margin, which would be unacceptable.

What are your thoughts about immediate implant placement in extraction sites?

Nordland: Immediate implant placement can work when we have the ideal environment, meaning we have ideal bone height and ideal tissue height. In the maxillary anterior we know that the bone is very thin, and rarely do the ideal conditions exist. If there is significant bone loss, then there also will be bone loss around the immediate implant placement. Basically, we're crossing our fingers and hoping that we're going to

have adequate bone healing around the implant. If we don't, we'll either end up with a pocket or a deficiency that will create a problem either in the maintenance of the implant or a cosmetic defect.

If the bone is thick in the anterior, the risk is very low that we'd have a cosmetic or maintenance problem. However, the maxillary anterior rarely has a thick alveolus. So my own bias is to not proceed with immediate implant placement in the maxillary anterior, especially when there has been bone loss either from root fracture, endodontic failure or resorption. The reason for this is we end up starting off with a net loss of bone and run the risk that we're going to have incomplete bone fill once the implant is placed. I think this adds a significant element of risk that usually I am not willing to take. □

RIDGE AUGMENTATION



FIGURE 9: A patient presents with a missing lateral.



FIGURE 10: Ridge augmentation helps deliver an esthetic resin-bonded bridge.