

CURRENT CONCEPTS IN PERIODONTICS
NEWSLETTER 3-
Review of Dental Implants-Part I

Today's population has an ever-increasing "Dental IQ". Not only are patients realizing the potential with dental implants, but they are demanding them. Implants first hit the dental industry during the 1960's, but implants as we know them today (endosseous implants) are still somewhat in their infancy. This newsletter will attempt to review the differences in implant design as well as discuss the current beliefs on implant healing time and maintenance.

IMPLANT DESIGN

The choice of implants on the market can be quite daunting. While most all systems work well, selecting an implant and implant system is usually dictated by the individual case. Some of the options include: screw vs. cylinder, hollow vs. solid, 2 stage (submerged) vs. 1 stage (non-submerged), parallel wall vs. tapered/root form, external connection vs. internal connection, scalloped collars vs. flat collars, varying lengths and widths, and varying surface coatings and textures. Selection depends on amount of bone present, quality of bone present, location in the arch of implant placement, root proximity concerns, bony concavities, and a myriad of prosthetic concerns (suprastructure attachments, interocclusal spacing, type of restoration, etc.)

IMPLANT SURFACES

There were several other compositions of implants at one time, but Titanium implants have surfaced to the top. Initially these implants were a machined titanium, which had a smooth, shiny surface. As implants have evolved, the concept of a roughened surface implant pointed to a greater surface area on the implant, thus encouraging more bone integrating with the implant. Most all implant companies now have a proprietary method for "roughening" the implant surface. The first methods involved an additive style, such as spraying on a coating, i.e. hydroxyapatite or TPS, onto the implant itself. Unfortunately, these coatings often dissolved or broke off.

The next generation of "implant roughening" involved a subtractive method. Whether it be by exposing the implant surface to acid, sand blasting the implant, or promoting an oxide layer on the surface, the subtractive method saw an absence of failures due to loss of the coating, without sacrificing the increase in bone to implant contact.

Now, we are approaching another generation of implant surface design. While most companies are recognizing the benefits of the subtractive method, they are now raising the bar by adding an osteo-promotive element to the surface. Hydroxyapatite, fluoride, growth factor impregnated, and other additives are encouraging even greater bone to implant contact. And greater bone to implant contact hopefully will relate to an increase in bone preservation and even higher success rates.

HEALING TIME

The original protocol recommended a healing time prior to restoration of 6 months in the maxilla and 3 months in the mandible. Now, implant companies are promoting shorter and shorter healing times, with improvement in design. While advances in implant surfaces continue to increase bone to implant contact, bone still takes 6 weeks to reach the implant surface (Roberts, 1997). So, obviously implants do not require the same healing as we once thought, but 6 weeks seems to be the limit to the decrease in healing time.

How long must we wait to place an implant following tooth extraction? When replacing single rooted teeth, often times an implant can be placed simultaneously. However, in areas of poor bone, existing infection, or molar sites, often times we must allow for adequate time (4 months or greater) of healing. In addition, placing an implant into an area that has undergone ridge augmentation or sinus augmentation, the site typically requires a minimum of 6 months maturation prior to implant placement.

USES

The initial protocol some forty years ago called for two implants in the symphyseal region to support an overdenture. The bone quality, bone quantity, and underlying anatomical structures was such that implants could be placed in this area without complication. As we realized the success and osseointegration of implants, dentists began looking at uses other than for overdentures. Now, implants are used for single tooth replacements, fixed partial dentures, connecting to various types of removable prostheses, and lately in orthodontics. While not only do implants drastically improve the flexibility for restorative options, they have created restorative possibilities in patients that were previously subjected to conventional fixed and removable prosthodontics. Furthermore, we are recognizing many other benefits to implants, such as preserving alveolar and basal bone, offering treatment options previously discouraged in caries prone patients, and adding greater flexibility when additional teeth are lost.

MAINTENANCE

While today's implant success rates are in the high ninety percentiles, implants do and will fail. When teeth are lost to periodontal disease and/or parafunctional habits, these predisposing factors can still play a detrimental role in the success or failure of an implant, despite that the natural tooth was lost. We also know that once an implant has integrated, the implant is most likely to be lost during the first year in function. Knowing why the patient lost the tooth and knowing when and why implants typically fail can help to tailor the maintenance regimen for that patient.

During the first year following the restoration of an implant, frequent maintenance visits are recommended. This includes the instrumentation and plaque removal of the implant and all natural teeth at each visit (recommended to be every 3-4 months), evaluation of the patient's occlusion and prosthesis, a periapical radiograph of the implant (every 6 months), and routine home care instruction. Suffice it to say, the early diagnosis of an ailing implant may be the determining factor for survival or failure of the fixture.

The same pathogenic bacteria (except for the caries causing bacteria) that populate the sulcus around a natural tooth can and will populate the sulcus of an implant. Therefore, an implant is as prone to periodontal infection as a tooth. Many varying opinions exist on the in-office method of cleaning around an implant. Experts disagree on which is the best to use. Some of the options are: plastic, nylon, graphite, gold or stainless steel curettes, Teflon coated curette, stainless or Teflon coated ultrasonic tip, or a non-abrasive/tin-oxide on a rubber cup. Whichever the method, the goal is to remove all accretions on the implant surface, render it plaque free, and avoid damaging the implant surface.

It is of the author's opinion, that probing around the implant is not a good indicator of implant health. You see, while the epithelial component around an implant is similar to that around a natural tooth, the connective tissue attachment is quite different. Soft tissue will not strongly adhere to a metallic surface...period. While the soft tissue may form a cuff around the implant mimicking that of a tooth, it may be possible to probe to the crest of the bone. Because of this, and the bone loss often associated around the crestal aspect of implants (which is normal to the first implant thread or 2mm apical to the implant abutment connection), probing depths can be 5-6mm in health. This cuff of tissue is less vascularized and less adherent to an implant than natural teeth, thus, it is important to avoid vigorous subgingival curettage. This all having been said, studies have shown that typically around an implant there is a similar "biologic width" to that of a tooth with similar sulcus depth, connective tissue and epithelial thickness.

So should we not probe an implant? Probing can be helpful in diagnosing an ailing implant, especially when bleeding or suppuration is present. Probing is necessary because a radiograph will not show everything. While a deep probing depth may mean there is a bony problem, it may not mean anything. If probing around an implant, a plastic probe is recommended. When a metallic instrument touches the surface of an implant, this possibility exists to create an oxidation of the surface which can in turn lead to a "graying" of the tissue.

What should we expect to see around a healthy implant when probing? A periodontally healthy implant should have pockets less than 4mm, absence of bleeding or suppuration when probing, pink, stippled gingiva, and an adequate zone of keratinized tissue (may or may not be critical, but improves the ability to maintain adequate oral hygiene)

A future newsletter will address in greater detail, maintenance of the dental implant and treatment of an ailing implant.

SUMMARY

In summary, dental implants are becoming a mainstay in dentistry today. The flexibility they offer in treatment planning and the advances being made in design make the years to come extremely exciting for implant dentistry.

The next newsletter will address:

Please call our office if you would like any further information on these topics or have any questions.

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