SameDay Dental Implants® & Teeth

A Surgical & Prostho Protocol

By Costa Nikolopoulos Oral & Maxillofacial Surgeon (S.A.) & Petros Yvenoglu Specialist Prosthodontist (U.S.A.)

The original Branemark protocol advocated the use of a two stage surgical approach where the turned (smooth) implants were buried for several months under the mucosa. With the advent of surface enhanced and tapered implants the protocol later evolved into a one stage approach.

Several clinicians then proceeded to immediately load these one stage implants with good success provided good primary stability (more than 45Ncm) was achieved at time of implant placement and provided micro-movements could be limited to 10μm. Ampel reports have been published on immediate loading of dental implants showing an initial unloaded period of 5 - 6 months is not necessary. From a patient's point of view the reduction of treatment time between implant placement & installation of a functional prosthesis leads to increased patient satisfaction & treatment acceptance and in gain time the patient implies an economical benefit especially for professionally and/or socially active patients.

High treatment acceptance and patient satisfaction are the most important advantages of immediate loading and immediate function.

Surgical Protocol

The surgical protocol of immediate loading of dental implants with same day teeth is based on:

1. Avoid Bone Grafts

This is in line with Prof. P.I. Branemark's philosophy of “Lesser Surgery to Treat More Patients” (Fig 1).

With increased costs and patient morbidity due to bone grafting, an increased patient resistance to implant treatment has been noted. An alternative method of treating implant patients who have suboptimal bone volume without bone grafting is made possible using:

1. Angled implants in a tilted manner placed into available bone anterior and posterior to the maxillary sinus (Fig 2).
2. Wider and appropriately shaped implants placed into immediate extraction socket morcellated to avoid socket or sinus grafting (Fig 5).

High Primary Stability

An important factor for immediate loading success is high primary implant stability (greater than 45Ncm) which can be achieved by using a surface enhanced tapered implant design to enhance lateral compression of bone.

By underprepping, high insertion torque and primary stability can be achieved even in cases of decreased bone density such as is often the case in maxillary alveolar bone and as well as in osteoporotic patients. Primary stability can easily be measured during implant placement with a torque wrench (Fig 4).

If 45Ncm insertion torque is not achieved, the implant should be removed and without further bone preparation a 1mm wider implant is placed.

This usually results in adequate primary stability of 45Ncm for immediate loading. If 45Ncm insertion torque is still not achieved then again the implant can be removed and replaced with an even wider diameter implant if the available bone width permits. This variable results in adequately high insertion torque and primary stability that is much greater than 45Ncm. If despite this, adequate primary stability is not achieved then immediate loading is not recommended.

Prostho Driven Implant Placement

By using a silicone key of the facial surfaces of the existing teeth (Fig 5) or a silicone key of a diagnostic wax up (Fig 6), it is possible to place the implant in the correct position and angle so that the screw access hole can exit in the correct place to allow for screw retention.

In order not to loose significant orientation, extractions are not performed all at once prior to implant placement but are rather performed one at a time followed by implant placement so that the silicone key can direct the implant surgeon (Fig 7).

It is very often necessary to use an implant with a build in angle of 12°, 24° or even 50° so that the case can be screw retained.

Screw retention is an absolute requirement for biological reasons (to avoid risk of inflammation due to excess cement) as well as the ease of handling of immediate loading in a surgical environment.

Bite registration is started prior to extraction of all the teeth in the mouth/arch case so as not to loose the centric relation and vertical dimension (Fig 8).

If a micro-peri-implant spigot is used, these are then performed, further implants are placed and the bite registration is completed with addition of bite registration material onto the remaining healing caps.

One Abutment One Time

After bone milling to remove any interfering bone, tubular implants are placed in six hours and the permanent ceramic/zirconia screw retained teeth are delivered to the patient within six hours.

Alternatively minimal flaps are raised where indicated. This flapless/punch technique/minimal flap approach results in minimal or no soft tissue change thereby allowing the restorative dentist/prosthodontist to proceed with the provision of acrylic teeth and as a result to start healing.

In healed sites where possible the “punch” technique is used (Fig 15).

Number of Implants

In edentulous cases 4 to 6 implants (figs 14 & 15) are placed per arch depending on:

1. Bone volume & quality
2. Implant length & diameter
3. Implant distribution (A-P spread)
4. Patient's age
5. Patient's finances (cost to benefit ratio)

Prosthodontic Protocol

The Prosthodontic protocol of SameDay Dental Implants & Teeth is focused and designed around the patient’s needs. It is fast, efficient and doesn’t compromise quality. The patients are never left without teeth for more than six hours. As a result treatment acceptance is high.

All implants with good primary stability (>45Ncm) are immediately loaded with screw-retained teeth. For single implant cases, the final all ceramic screw retained tooth is fabricated and delivered to the patient within six hours. For multi implants cases, temporary screw retained acrylic teeth are fabricated with.

One Abutment One Time

The remaining extractions are performed and/or covered with a “punch” technique is used.

Preoperative Preparation

In order to achieve this protocol, preoperative screening and detailed surgical and prosthodontic assessment is performed.

Placing implants

This is in line with Prof. Branemark's philosophy of “Lesser Surgery to Treat More Patients”. Fig 1. Dr. Costa and Dr. Petros in line with Prof. Branemark’s philosophy of “Lesser Surgery to Treat More Patients”.

Fig 2. Angled implants placed into available bone anterior and posterior to the maxillary sinus.

Fig 3. Immediate molar replacement implants.

Fig 4. 45Ncm Primary Stabilty measured during implant placement.

Fig 5. Silicone key of the facial surfaces of the existing teeth.

Fig 6. Silicone key of a diagnostic wax up.

Fig 7. The silicone key can direct the implant surgeon.

Fig 8. Bite registration is started prior to extraction of all the teeth in the mouth/arch case so as not to lose the centric relation and vertical dimension.

Fig 9. Good peri-implant tissues with “One Abutment One Time” approach.

Fig 10. Healing caps placed on abutments.

Fig 11. The single implant with a Zirconia screw retained crown.

Fig 12. Pulpation of the extraction socket walls with a peri-odontal probe.

Fig 13. All On-6.

Fig 14. All On-4.

Fig 15. All On-6.

Fig 16. Silicone key of a diagnostic wax up.

Science research shows less bone loss, better bone levels and peri-implant soft tissues when the transmucosal abutments are placed at time of surgery and never removed (Fig 9).

Healing caps are then placed on the multi-unit abutments (Fig 10). After abutment placement, at the same surgical appointments, the impression is taken at abutment level and provisional acrylic screw retained fixed teeth are placed in the same day as the implant surgery.

In single implant cases the healing abutment is placed directly at implant level. An implant impression is taken and six hours later a full ceramic/zirconia screw retained crown is connected and torqued to 45Ncm directly on to the implant without an intermediate/transmucosal abutment (Fig 11).

The multi-unit abutments is in placed or placed in the single implant case as the multiunit abutment has no anti-rotation feature.

Flapless/Minimal Flap Surgery

In extraction cases no macro-peri-implant flap is reflected. The integrity of the extraction socket walls is inspected and assessed with a 15mm or 20mm peri-implant probe placed into the extraction socket. An accurate impression of the extraction socket walls is performed with the probe (Fig 12) and this is complemented by good vision with magnifying loops and light illumination.

In healed sites where possible the “punch” technique is used (Fig 15).

Alternatively minimal flaps are raised where indicated. This flapless/punch technique/minimal flap approach results in minimal or no soft tissue change thereby allowing the restorative dentist/prosthodontist to proceed with the provisional acrylic screw retained teeth in the same day and permanent ceramic screw retained teeth in 1 week in the case of multiple implants.

In the case of the single implant the permanent full Zirconia screw retained tooth can be delivered in 6 hours on the same day.

Timing of Immediate Loading Dental implants either should be loaded the earliest possible (never exceed ten days after surgery) or alternatively two months after placement. This is because the so-called initial stability (mechanical stability) that an implant has, starts to drop gradually and the implant becomes more prone to failure if forces are applied. Fortunately, simultaneously a “secondary stability” (Osseointegration) starts to build up. The sum of the two “stabilities” which is demonstrated on the stability graph (Fig 16), gives us the “total stability”. As a golden rule implants ideally should never be disturbed during the “stability dip” period.

Preoperative Preparation

In order to achieve this protocol, preoperative screening and detailed surgical and prosthodontic assessment is performed.
Adaptation of the final prosthesis can be achieved by the technician grinding and shaping the available prosthetic space, form of the implant in use and according to the prosthetic platform of prefabricated zirconia cores of the implants and bite registration. Impression cured silicon impression tray technique is recommended (periapical x-rays can be used for the registration are taken from the teeth, are fabricated, which will be used during the surgery to guide the implant placement.

Impression During Surgery
An impression of the implants is taken during the surgery, either at implant level for single implants or at abutment level for multiple implants. It’s imperative to make sure that the impression copings are seated all the way onto the implants (periapical x-rays can be used for verification).

For fixed prostheses, the open tray technique is recommended with the use of very hard addition-cured silicon impression material.

At the end of each surgery, pre-operative impressions, impressions of the implants and bite registration are provided to the dental lab (Fig. 10). The dental technician mounts the implant models and starts the fabrication of the implant prosthesis.

Single Implant Reconstruction
For single implant cases the permanent, screw retained, all ceramic zirconia teeth are fabricated immediately with the use of prefabricated zirconia cores (Fig. 19). They are available in different sizes and shapes, according to the prosthetic platform of the implant in use and the available prosthetic space, between the adjacent teeth.

While the patient is waiting in the recovery room the dental technician grinds and shapes the zirconia core and eventually bakes the porcelain on to it. Four to six hours later the permanent tooth is placed into the mouth of the patient. The prosthetic screw is torqued down to 45Ncm. A periapical x-ray helps to verify the perfect fit (Fig. 5) on to the implant (Fig. 20). Occlusion is checked and verified with the help of 4:1, 5:1, “schimchott” articulating paper. The prosthetic access hole is obliterated with wax and perforated filling (telfon tape + opaque composite resin) to allow easy access for retrievability in the future but simultaneously excellent esthetics.

Two months later on maturation of the soft tissues and osseointegration, an additional x-ray is taken and if needed modifications are made to the prosthesis.

Multiple Implants Reconstruction
1) Temporary Teeth
For multiple implant cases (three unit bridges to full mouth reconstructions), the temporary screw retained teeth are fabricated by the in house dental lab within five to six hours and are ready in one-week’s time and are easily made to the acrylic teeth and are screwed onto the implant abutments. In some cases, depending on the lab’s capabilities, implants can be cleaned, dried and loaded during the “Stability Procedure”, in the dental lab within five to six hours and are ready in one-week’s time. As a result, the final prosthesis can be fabricated immediately the permanent teeth are screwed onto the implants.

The permanent teeth need to be ready in one-week’s time and should have perfect fit onto the implants. This is one of the most important prerequisites for optimal implant longevity.

The material of choice, used by our dental lab, for the past 20 years, is porcelain fused to metal. The fabrication of the metal ceramic prosthesis involves a series of techniques sensitive procedures, inevitably in each step, small “5 dimensional inaccuracies” are introduced into the final prosthesis. The sum of these inaccuracies is never zero. As a result, at the end of the fabrication procedure, the final prosthesis will never have a perfect fit onto the implants.

The use of the “Passive Abutment” (Fig. 25), which is a tita- nium machine-cut interfacial component/cylinder, offsets all the 3D inaccuracies, provided that the implant model is accurate. The passive abutment is cemented by the dental technician onto the fitting surface of the prosthesis, in the lab. The master implant model is used as a blueprint for the cementation. Based on our experience over the past 15 years of using passive abutments, the metal try in procedure is not necessary, thus speeding up the fabrication of the final prosthesis. Inevitably in each case, problems are introduced which means that in extensive cases the “mutually casts” are introduced into the prosthesis.

Silicone impressions are made to the prostheses. From the prosthodontic point of view, each patient’s smile, mouth and occlusion are evaluated with the help of photos and videos (dynamic picture). Impressions and bite registration are taken and the diagnostic models are mounted. If needed, the digital smile design of prefabricated zirconia cores is introduced which means that in extensive cases the “mutually casts” are introduced into the prosthesis.

2) Permanent Teeth Fabrication
The patient should be evaluated for esthetics, phonetics and occlusion. Midline, plane of occlusion and buccal corridors are established. The “S” and “P” sounds are checked. The occlusal scheme is adjusted. For extensive cases the “mutually protected occlusion” (Fig. 21) is established which means that in centric occlusion, all teeth are touching but the posterior teeth have slightly heavier contacts compared to the anterior and on lateral and protrusive excursive movements the anterior teeth are touching/guiding and there are no posterior “working” or “non-working” interferences (anterior guidance). X-rays are taken in order to verify the passive fit of the prosthesis.

Complications
The most challenging part of the prosthodontic complications are porcelains fractures/chipping. These are easily repaired by removing the tooth and relacing the porcelain.

Conclusion
By using tapered angled implants as well as wide immediate molar replacement implants in a prosthetically driven fashion it is possible in most cases to avoid bone grafts, achieve high primary stability and treat patients with implants and passively fitting, screw retained teeth all in the same day (Fig. 27).

This reduction in treatment time, immediate function and cost saving leads to high patient satisfaction and treatment acceptance by patients.