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PART I

GENERAL INFORMATION
1. Introduction

Loss of teeth results in gradual bone resorption of the alveolar ridge. Poorly fitting prostheses and iatrogenic factors may also contribute to further changes in relation between the mandible and the maxilla. A considerably individual pattern of atrophy may lead to clinical situations where using conventional prosthetics is not enough to meet patient’s needs and expectations.

In those, as well as in many other clinical situations, the use of dental implants has become a scientifically accepted treatment concept to replace missing elements of the dental arc. The range of possible implant applications, however, is wider than only teeth replacement, giving the clinician a chance to plan full rehabilitation of the mouth.

The use of implants in combination with different barrier membranes has undoubtedly changed dentistry in the past few years. Improved surgical technique accompanied by recent developments in the implant surface treatment gives the clinician nowadays an extremely predictable tool in dental surgery and prosthetics. Well-prepared treatment plan can provide long lasting positive results and provide a patient with functional and esthetical prosthesis for decades.

This manual is written for dentists with interest in implant dentistry wishing to begin working with Dyna Implant System. It gives basic information concerning surgical and prosthetic procedures accompanied by practical tips. Containing laboratory procedures it can be of use to the dental technicians or dental laboratories cooperating with implantologists. Last but not least it may be a source of useful information for those dentist and dental students who want to increase their knowledge in the field of dental implantology.

We realize, however, that some of the questions may be left unanswered after reading our manual. In this respect and in the view of extremely fast changes in dental implantology we recommend regular lectures or read available national and international scientific publications appearing in dental magazines and books. To acquire, on the other hand, indispensable practical skills we strongly advise following one of the courses, led by experienced specialists keen to share with you their knowledge, organized by Dyna Dental Engineering.

In case of any questions you can always visit our website http://www.dynadental.com/ or contact us directly under the telephone number +31 164 258208 Fax +31 164 258390.
1.1 Dyna Dental Engineering

Dyna Dental Engineering, located in Bergen op Zoom, The Netherlands, is active in the field of the development of innovative products and systems for the dentistry. Since 1983, we have succeeded in developing high quality products that contribute to the simplification of dental treatment. Sales of these products take place through an extensive, worldwide distribution network. In support of sales and usage, Dyna provides product-oriented postgraduate education.

1.2 History of Dyna Dental Engineering.

1978 - 1983 Research and Development of Dyna System; the magnetic attachment.

1984 Foundation of Dyna Dental Engineering B.V., a trade company

1984 - 1987 The Dyna System was introduced worldwide by a fast growing network of exclusive distributors. Next to the in-house developed Dyna System several other products such as Mirage are represented by Dyna and its network. The success of the magnetic attachment forced Dyna to re-asses its business philosophy; from that moment Dyna became a real engineering company that sells products under the trade name Dyna. At the same time research for a unique implant design was set up

1991 Introduction of the memory abutment, an adjustable abutment for those situations where the implants could not be place parallel. The unique characteristics of the Memory abutment was made available to all the implantologists through designing various abutments for other implant systems.

1993 The success of the Dyna Implant Design, until then only available in 3 mm diameter, led to the introduction of the 4 mm implant. At that moment the 3 mm implant is being supplied in 6 different lengths while the 4 mm implant was available in 4 different lengths

1994 - 1996 The existing product line it was improved continuously by research in our company and through experience of our users. At that moment the Dyna Implant Design had a large range of prosthetic possibilities such as the magnetic attachment and the ball anchor for over dentures, the memory and fixed abutment for crown and bridge work and finally the Bar System for Dolder bar and full arch constructions

2002 Introduction of the Octalock system
2. Long Term Success

2.1 Materials

Dental implantology is a comparatively young treatment concept, based on fundamental experimental studies carried out by the Swedish group of scientists in the ‘60. These studies triggered a chain of further researches aiming at finding suitable implant material that would meet all demands required to replace natural teeth in the mouth environment, which in effect led to introducing into the market different materials believed to be able to exchange or replace lost teeth.

Consequently, speaking about successful implant material we have to mention two terms:

- biocompatibility and
- osteointegration

The first can be defined as the compatibility of a living organism with any material for which the interaction between the living tissue is so minimal that the material is not detrimentally affected by the tissue nor the tissue by the material, and going further it can be divided into:

bio-inactivity and bio-activity

The second can be defined as a direct apposition of the bone to the surface of the implant without intervening with connective tissue.

Metals such as stainless steel, Cr-Co-Mo alloys, noble metal alloys, polymethylmethacrylate, and other polymers are only to certain degree tolerated by bone. They do not “really” integrate (layer of connective tissue between) and therefore can not be considered as good implant materials.

Titanium, tantalum and aluminium oxide are described as being bio-inert and the model of bone apposition, that occurs in living organism, can be seen as direct.

Recently developed surface conditioning for titanium implants is also described as being osseoinductive and the connection with the bone as physico-chemical.

The group of the materials like bio-glass, bio-ceramics, Ca-phosphates, apatite is the only bio-active group of materials, which means that the connection between the bone and the implant is chemical and the bone growth originates also at the implant surface. The osseoinductivity of these materials is very interesting for the implantology. However, pure materials show inadequate mechanical properties. Therefore they are used as coatings for other bio-inert materials.

Eventually, taking into consideration physico-mechanical and biological properties of the successful implant material (which must meet high standards being subjected to high mechanical loads and contact with the living tissue), it is Titanium that become the material of choice for dental implants.
Because of its characteristics it can be used in the mouth, but still it can not be considered to be ideal. Therefore, the majority of the implants on the dental market, although made of Titanium (or its alloy), have modified surface enabling them to have better fixation within the bone. The surface conditioning can be divided into two main groups:

- **Covering the implant with a layer of material**
- **Mechanical, chemical or physical modification of the implant surface.**

In the first group you can find implants covered, usually in the process of **Plasma Spraying**, with Titanium or hydroxylapatite, whereas the second group contains implants with surfaces that can be polished, electro-polished, sand blasted, acid or alkali treated, heat treated or combination of more of these factors.

2.2 Anatomy

Stomatognathic system defined by the Nomenclature Committee Academy of Denture Prosthesis as combination of all the structures involved in speech and in the reception, mastication, and deglutition of food is not a static system during all our lives. The anatomic parts that form the system are the maxilla, the mandible, the activating muscles of the mandible and the temporomandibular joint. Collective relation of all elements of the system decides of the equilibrium that exists between them and any change in this system occurs in new equilibrium.

Loss of teeth results in gradual resorption of alveolar ridge. The degree of it seems to be related to a combination of physiological (e.g. osteoporosis, hyperfunction of parathyroid glands) and local factors (e.g. denture pressure). In severe cases resorption of the mandibular body and basal maxillary bone may occur. Consequences of this are reduction of the denture bearing area, loss of retention and stability and problems with functioning of prospective dentures. The mandible resorption is four times higher than that of the maxilla. Moreover, the bearing area for lower denture is generally lesser, which may be a heavy burden for some patients considering denture retention. To help individuals with severe resorption some pre-prosthetic procedures (e.g. deepening of the floor of the mouth, ridge augmentation, vestibuloplasty) may be needed.

Oral implants provide reliable treatment in the above mentioned situations. Moreover they can be used in full range of clinical situations replacing one or more teeth or serving as an anchorage for overdentures. However, proper placement of implants demands, from a clinician accurate knowledge of the anatomy and morphology. Constant changes in stomatognathic system especially in relation between the mandible and the maxilla may influence choosing potential place for implantation. Anatomical structures (e.g. sinus maxillaries, mandibular canal, nasal floor) may also present obstacles in the most favourable positioning of implants. One should also notice differences in the bone quality of the mandible and the maxilla, structure of the alveolar walls, teeth axes, innervation and blood supply of particular structures. All those factors are crucial for planning and rehabilitation of the mouth.

For more detailed description we recommend referring to adequate anatomy texts.
2.3 Patient

Dentists who plan to restore their patients with dental implants should always take into consideration all factors that influence the final result. Therefore, it is important to see the patient as a whole. Understanding patient’s needs and expectations is the start point for the successful treatment. On the other hand, patient have to be fully aware of what he can expect. A careful planning including available examination methods, followed by adequate surgical technique and precise prosthetics can provide long term success. However, this can be only achieved with the complete cooperation between dentist, patient and technical laboratory. Patient – dentist relation though important is not sufficient to guarantee long lasting results. Technical aspects should also be taken into consideration and in this respect good communication between dentist and dental technicians must be established. Eventually, technician have to be fully informed about patient’s demands concerning desired shape, colour etc. of the future prosthesis.

*Only when those elements are fulfilled can we expect predictable, long term success!*
3. Material Properties

3.1 Titanium

The use of dental implants has increased dramatically in recent years, and is expected to grow in the future. The high degree of success achieved with dental implants is attributed to improved materials, designs and surgical techniques. There have been attempts to replace missing teeth since the time of the early Egyptian and South American cultures. Materials used in that purpose included natural teeth from man, animal teeth, ivory, wood, plastic, carbon, and metals such as aluminium, steel, cobalt-chromium.

Nowadays, titanium and its alloys became prominent as dental and orthopaedic materials because of titanium's excellent biocompatibility, corrosion resistance, and desirable physical and mechanical properties.

The era of titanium had really started in the 1940s when noting some problems with S-Mo stainless steel and Vitallium, preferred at this time as orthopaedic implants, many workers and surgeons begun looking for even better materials that would join both physiological inertion and good mechanical characteristics. The first recorded discovery of the element we know as titanium is attributed to Wilhelm Gregor, a clergyman and amateur mineralogist who in 1791 in Cornwall investigated black magnetic sand he named menachanite. It took, nevertheless, 150 years to make titanium commercially available. The industrial process that we, with small changes, use today to extract titanium from its rutile was developed in 1930s by dr. Wilhelm Kroll. Attractive mechanical properties and excellent corrosion resistance made titanium one of the most important industrial metals.

Indeed it is used today widely throughout the world in a multitude of applications including aerospace and defence industry as well as medicine and dentistry. However, the history of implementing titanium into surgery is not straightforward and though it has become the material of choice for dental and orthopaedic implants there are still controversies over precise composition design and suitability of use.

Titanium is a very light metal having a density of 4.505 g/cm³ at 25 ºC. The melting point is about 1665 ºC though it may vary depending on impurities. The coefficient of thermal expansion is 8.35 x 10⁻⁶/ ºC at 15 ºC and the electrical resistivity 42.0 x 10⁻⁶/g. It has a hexagonal closed packed crystal structure referred to as alpha phase that undergoes an allotropic modification at 883 ºC to a body centred cubic crystal structure known as beta phase. The manipulation of these crystallographic variations through alloying and thermomechanical processing results in a wide range of alloys and properties.

Commercially pure titanium, available in four different grades, is based on the incorporation of small amounts of oxygen, nitrogen, hydrogen, iron, and carbon during purification process. The microstructure consists of equiaxed alpha grains.
To attain higher strength, in commercially pure titanium, alloying elements are added. For medical purposes alloy design criteria are not only based on changing the mechanical properties but on biocompatibility of the resulting alloy. Allying elements dictates the microstructure and determines properties. Pure titanium, though, used in dental implantology is not strong enough to be used in demanding circumstances. Therefore, different types of titanium alloys have been developed and introduced into the market. Having better mechanical characteristics and the same biocompatibility they give a wider range of applications also for dental implantology. Crystallographic variations help to categorize these alloys. Based on the phase that can be produced by alloying titanium alloys can be grouped as alpha, alpha-beta, and beta alloys. Particular elements stabilize particular phase and so, for instance, aluminium, tin and zirconium act as alpha phase stabilizers whereas vanadium, molybdenum, niobium, chromium, iron and manganese as beta phase stabilizers. The wide range of mechanical properties is based on the transformation characteristics of the beta phase. The transformation is sluggish and can be controlled to produce the desired properties. The structure depends on the composition of the alloy and thermo-mechanical treatment and there are different methods to achieve desirable properties. The most popular alloy is Ti-6Al-4V microstructurally which consists of equiaxed alpha grains with only a small amount of residual beta in the matrix. The mechanical properties of titanium and its alloys surpass the requirements for an implant material (strength level greater than bone, comparable elastic modulus). The most commonly used and important titanium alloy is Ti-6Al-4V, as of its favourable proportion and predictable producibility.

<table>
<thead>
<tr>
<th>Selected physical and mechanical properties of titanium and its alloys.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemical composition, %max</strong></td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>ASTM Grade I</td>
</tr>
<tr>
<td>ASTM Grade II</td>
</tr>
<tr>
<td>ASTM Grade III</td>
</tr>
<tr>
<td>ASTM Grade V</td>
</tr>
<tr>
<td><strong>Alpha/beta</strong></td>
</tr>
<tr>
<td>Ti-6Al-4V</td>
</tr>
<tr>
<td>Ti-6Al-7Nb</td>
</tr>
<tr>
<td><strong>Beta</strong></td>
</tr>
<tr>
<td>Ti-13Nb-13Zr</td>
</tr>
<tr>
<td><strong>Dyna Ti grade 5 ELI</strong></td>
</tr>
</tbody>
</table>

With the combination of biocompatibility, high strength, corrosion and wear resistance, attractive weight to strength ratio Titanium and its alloys have become extremely popular materials of choice for dental implants. The application of titanium to fixed and removable prostheses is still in the development phase. Concerns regarding technology of machining, casting, welding, and veneering have been reported in the literature. At present titanium is a useful and interesting material. It will probably continue to dominate the dental implant market as one of the most biocompatible metals.
3.2 Hydroxyapatite

It has been well documented that living bone may show direct or almost direct apposition on the surface of titanium implants. Due to this phenomenon implants may function well in the mouth environment replacing natural elements of dentition. However, this type of connection between the bone and the implant gives only a mechanical retention. Those kinds of implants are called bioinert in contrast to implants that connect with the bone chemically and consequently called bioactive.

Sintered hydroxyapatite (HA) or Ca$_{10}$(PO$_4$)$_6$(OH)$_2$ is biologically very compatible material to replace bony tissues. Numerous studies have proved its excellent bonding properties with the bone. Unfortunately, due to its poor biomechanical characteristics it can only be used where it is not subjected to high mechanical loads. Therefore, it has been suggested that HA coated metallic devices might be useful for sites where heavy loads can be expected. Such a “hybrid” implant would join both the properties of titanium and HA giving a clinician attractive mechanical characteristics and bioactivity in one.

The use of bioceramics dates back to 19th century when in 1894 the use of plaster of Paris (calcium phosphate) to fill bone defects was reported. This first synthetic bone filling material had the perceived advantage of being mouldable, setting in place and would resorb releasing calcium. In practice it was weak and resorbed too quickly and eventually fell into disuse. Further researches focused on biomaterials led the bioceramics into the new era. Inert ceramics like aluminium-oxide have been tried unsuccessfully as load-bearing implants and are no longer in use now. Glass ceramics are silicon-dioxide glasses containing calcium-phosphate ions and being very similar to glass. They have osteogenic properties but are not used because of their brittleness. The biggest and the most investigated group is Calcium Phosphate Ceramics. Two major representatives are:

- **Hydroxyapatite (HA)**
- **Tricalcium Phosphate (TCP)**

HA is in its composition equivalent to the hard mineral matrix of bone. It shows both the features of osteoconductivity and osteointegration and it allows the bone to bridge gaps up to 1mm without forming intervening fibrous tissue layer. HA is available in two main forms: porous blocks and granulate, and can be produced or synthetically or by sintering xenograft type materials like bovine bone or coral. It is also available as amorphous (soluble) and crystalline (insoluble) material. Dense HA is strong in compression but brittle when subjected to fatigues shear and tensile forces so it is not indicated as a pure material for dental implants but it can be successfully used as a covering for titanium cores. Several methods exist to coat a metallic surface with a thin (less then 50microns) coating of metallic or ceramic origin, but two of them are most popular:

*Electrolytically* – by suspending colloidal particles of coating material in non conducting liquid, whereafter an immersion of oppositely charged substrate will result in a transport of particles toward the surface covering it loosely. To get a dense surface an appropriate heat treatment is needed.
Plasma spraying – HA powder is suspended in a carrier gas stream which is fed into the plasma flame. The plasma flame is achieved by burning the flammable gas or mixture of gases (in presence of oxygen) when passing through electric arc. This results in ionised gas of high temperature up to 30000°C, and a high speed approaching the speed of sound (due to large thermal expansion). In this way suspended particles of HA reach the surface of titanium with great speed and elevated temperature allowing to create a firm chemical bond between coating and substrate.

One of the most important factors influencing the quality of HA coating is the HA powder. Dyna implants have the covering made of powder produced to assure the consistency of the highest quality coating. Some of the Dyna HA features are shown in the table below.

<table>
<thead>
<tr>
<th>Chemical properties</th>
<th>Trace element analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coating</td>
<td>min 97%</td>
</tr>
<tr>
<td>Crystallinity</td>
<td>min 62%</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Ca/P ratio</td>
<td>1.67 - 1.76</td>
</tr>
<tr>
<td>typical</td>
<td>1.682±0.005</td>
</tr>
</tbody>
</table>

| Solubility |  |
|-----------|  |
| Gomori's tris-HCl | Sorensen's Glycine-3 |
| (37°C, pH 7.3, 7 days) | (37°C, pH 3.0, 4h) |
| Ca (ppm) | ±100 |
| P (ppm) | ±40 |

| Physical properties |  |
|---------------------|  |
| Coating thickness | 15 μm (Eddy method) |
| Surface roughness | 6.0–1.0 μm |
| Density | 95% (2.98kg/dm3) |

| Mechanical properties |  |
|-----------------------|  |
| Tensile strength | >50.8MPa |
| Shear strength | >22.0MPa |
| Fatigue strength | no failure after 10 Mcycles (Wholer method) |
| Abrasion resistance | after 1000cycles at 250g load < 0.2g (ASTM C 501) |
3.3 Shape memory alloy.

Nitinol (an acronym for Ni, Ti Naval Ordance Laboratory) is an intriguing metal with very interesting and specific biomechanical properties. But it is its possibility to be programmed to change shapes or dimensions in response to an increase or decrease of temperature that has aroused considerable interest.

This shape memory phenomenon is a consequence of particular reaction when cooled through a range of temperatures. At high temperature (cubic phase) it consists of equiatomic intermetallic compound NiTi where the atoms are highly symmetrically arranged resulting in a very stable metal form. At low temperature (martensite phase) it has however completely different features allowing for plastic deformation. Consequently as of the process’ reversibility, the phase transformation brings along shape modification of a nitinol object. The temperature and extent of this modification can be by means of specific alloying, within certain limits, changed. In this way it is possible to adjust temperature range to particular clinical body applications.

Nitinol is an alloy of Nickel and Titanium and therefore has also interesting corrosion properties. Nitinol corrosion resistance pattern resembles that of pure Titanium or its aluminium-vanadium alloys, which means that exposed to e.g. saline solution a thin oxide layer forms around the material. Due to the same fact its biocompatibility is close to that of titanium and relevant studies proved its sufficient compatibility with living tissues.

Those and some other mechanical properties make nitinol one of the most innovative concepts. Numerous clinical applications (in dentistry, maxillo-facial surgery, orthopaedic) have been proposed and performed since the introduction of this metal.
4. Dyna Concept

4.1.1 Dyna Implant

Dyna Implant System is the complete implant system made totally in Holland able to solve wide range of implant-related clinical indications. It has been developed in close cooperation with the Open University of Amsterdam and the University Leiden and it was the first system with HA coated implants commercially available on the world market. Years of clinical experience supported by numerous studies carried out on different universities have proved that proposed by Dyna Dental Engineering concept of simplified implantation technique leads to excellent and predictable results.

The system combines flexibility, simplicity and reliability with cost effectiveness and high quality of all used materials. It meets both demands of surgeons and patients and allows to look forward to undisturbed functioning and long term success.

4.1.2 Fixture

The implant is HA coated full titanium cylinder with reversed screw designed to give secure mechanical fixation and load distribution. It is two a stage, push-in type implant. HA covering promotes the process of bone ingrowth not only from the bone side but from the fixture surface as well. The implant is available in four diameters (including Ø3mm), and different lengths allowing for using the system in situations, where the amount of available bone is limited. Every implant is totally covered (without polished collar) with a thin layer of hydroxylapatite, which creates anchoring surface favouring direct bone apposition. Every implant is supplied together with the covering screw in sterile double peel-pouch type packaging.
4.1.3 Abutment

The abutment is an all-in-one element without separate fixation screw. This solution simplifies the procedure and necessary instrumentation. There are several types of abutments for all types of prosthetic constructions available.

4.1.4 Instruments

Instruments manufactured by Dyna Dental BV are designed to be simple and universal. Only a limited number of instruments are sufficient to perform surgery phase and complete prosthetic part. Selection of drills corresponding with the diameters and lengths of implants enables precise preparation of the implant bed in a time-saving and possibly atraumatic manner. All instruments, however, should be regularly checked by the user to see that they are working properly.

4.1.5 Dyna philosophy

Dyna Dental BV is present on the dental market since 1984. During this time a special philosophy was formulated. It can be seen as a principle for the use of Dyna System. Besides the well accepted rule of using the biggest implant that can be placed in all situations it is important to determine, before implantation, the type of the prosthetic construction you wish to construct.

Indeed, there are numerous possibilities but, in fact, the real choice you have to make is the choice between the removable, and not removable prosthesis.
A removable prosthesis can be taken out of the patient’s mouth in a simple manner by the patient himself or by the dentist.

By using the Dyna System it is possible to construct a full range of overdentures. The following anchoring possibilities are available:

- the magnet
- the bar
- the ball

A not removable prosthesis is a construction that can’t be removed by the patient and the dentist needs special prosthetic instrumentation. In general cemented or screwed retained crowns and bridges are the most popular.

Example abutments for this type of constructions are:

- bar abutment
- memory abutment
- fixed crown abutment

Every construction should be scrupulously analysed and a full individual treatment plan prepared. For removable prostheses we recommend using implants

- with diameter smaller then Ø4.0;

whereas for non removable prostheses implants

- bigger or equal Ø3.6 [only in exceptional situations is it allowed to use Ø3.0 implants but with the length not shorter than 13mm]

For almost all prosthetic constructions Ø3.6 implant is the most universal one; Ø3.0 6mm-long implant is available only for maxillo-facial purposes.

4.1.6 Important features of the system

Dyna Implant System has following advantages:

- Individual choice of implants
- Wide range of indications
- Standardized instrumentation
- Standardized implant design
- Simple surgical and prosthetic procedure
- Time saving
4.2.1 DYNA OCTALOCK

Dyna Dental Engineering has always been on the spearhead of the innovative solutions for dental implantology. We strive constantly to improve our products in order to supply clinicians, practising dentists and dental technicians with up-to-date solutions.

During the years we have developed a unique implant philosophy, based on the clinical experience of the users. The guarantee of the highest possible standards of quality and production process is complying with ISO 9001 and authorisation to issue all of our products with CE symbol.

In response to still growing demands of dentists worldwide we decided to broaden our product line with the revolutionary Dyna Octalock System, aimed at improving fixed prosthodontics.

Years of experience gave us the confidence to design a connection system between the implant and the implant abutment, that would provide the dentist with a reliable tool for crown and bridge works. Our philosophy to keep all the procedures simple made us choose for the already existing outside design of the implant itself, and completely changed, new range of prosthetic abutments. Due to such combination it was possible to join a very simple surgery with an easy and reliable prosthetic part. A variety of prosthetic treatment options can be undertaken using the Octalock implants as anchorage component. The octagonal connection besides superior anti-rotation increases the strength of the implant wall and gives more freedom during prosthetic construction. Last but not least improved aesthetics was an issue during the development of the Octalock connection.

The system combines flexibility, simplicity and reliability with cost effectiveness and high quality of all used materials. It meets both demands of the surgeons and patients and allows to look forward to undisturbed functioning and long term success.

4.2.2 Fixture

The Dyna implant has been extensively documented and clinically used since 1986. Complication-reducing simplicity of surgical and prosthetic procedures, has confirmed easy and predictable treatment option. The HA-coated, two stage implant based on the push-in principle requires a minimum of instrumentation and presents no special difficulty in application technique. The combination of a cylinder shape with rounded
threads provides excellent biomechanical properties. A high strength of the implants is guaranteed for all diameters by the use of grade 5 titanium.

The HA coating is firmly connected to the titanium implant body so the risk of mechanical fracture is neglectable. Excellent bone bonding properties of the HA (especially in poor bone quality) are assured by using the best quality HA powder and controlled process of plasma spraying. The uniform layer of HA has a fixed crystalline ratio and therefore optimal bio-chemical properties.

Based on the biological width principle besides coated up to the neck implants they are available with a machined polished collar.

The implant is available in three diameters 3.6mm, 4.0 and 5.0mm, and different lengths (from 8 to 15). It is intended to cover the majority of clinical situations, but most of all to be reliable and user-friendly in fixed prosthodontics.

Every implant is supplied together with the covering screw in sterile, double peel-pouch type packaging.

The new attribute of the Octalock system is completely changed inside connection with the abutment. In comparison with the old system it has the following new features:

- a conical fixation screw
- a conical abutment connection
- an internal octagon

The Octalock connection between the implant and abutment has been developed to broaden the existing Dyna Implant System. Based on the experiences of the researches and clinicians, it is aimed at improving, and at the same time facilitating, fixed prosthodontics. As an outcome of the interdisciplinary cooperation it joins the best biomechanical features. The use of only two implant diameters and all-fit abutments gives an interesting combination of simplicity and reliability.
4.2.3 Instruments

Instruments manufactured by Dyna Dental BV are designed to be simple and universal. Only a limited number of instruments are sufficient to perform surgery phase and complete prosthetic part. Selection of drills corresponding with the diameters and lengths of implants enables precise preparation of the implant bed in a time-saving and possibly atraumatic manner. All instruments, however, should be regularly checked by the user to see that they are working properly.

4.2.4 Abutment

For cemented as well as screwed fixed prostheses on Dyna Octalock implants, several innovative abutment systems are available. These are developed according to the latest standards. Optimalised aesthetics can be obtained with a range of abutments that can be individualised in the lab. Octalock connection between Dyna implant and its abutment represents a design which stands for real antirotation. The risk of loosening the abutment is virtually prevented thanks to special features of this connection, thereby insuring mechanical strength and long-term stability. The collection of lengths combined with universal abutment design allow for individual solutions and treatment variation, being user-friendly at the same time. The new abutment line of the Octalock System consist of the abutment itself and the fixation screw.
The same abutments may be used for diameters 3.6, 4.0 and 5.0mm implants, and there is only one fixation screw that can be used for both diameters and all abutments heights. Such solution in combination with the Octalock connection has the following advantages:

- stable and secure connection
- simplified prosthetic procedure
- precise impression
- significantly shorter and easier treatment time
- creating a very simple system
- reduction of stock
- reduction of costs

In comparison to our old all-in-one abutment, the new line of products allows for working on the same abutment in the lab and in the mouth of the patient. Exact and easy transfer of the implant position to the model eliminates the need to use abutment analogues and increases the transfer precision. The conical connection and conical head of the fixation screw protects both the screw and the abutments from overloading and makes the force distribution more uniform.

New abutments have been developed baring in mind conventional fixed prosthodontics for teeth. They are more solid and have chamfer finish allowing for excellent production of ceramic crowns. The chamfer line is also more exposed (in comparison with the old system) in order to allow for taking conventional impressions over the abutment*. Abutments can also be individualized by the technician to get the best aesthetic results.

*Dyna Dental recommends open tray technique
5. Product Catalogue

The following catalogue contains, apart from elements overview, basic information about products made by Dyna Dental Engineering. It is intended to give the user a clear overview of our products, extra general technical data, as well as practical tips concerning clinical and technical procedures. It is, however, not the full product description and it may serve only as a guide through our products.

Dyna Implant System

Because of the fact that all Dyna implants are produced in four different diameters there exist four different lines of implants (Ø3.0, Ø3.6, Ø4.0, Ø5.0mm) and corresponding with them prosthetic elements. To facilitate the dentist and the technician recognition of a particular line all elements are colour coded.

The following colours have been chosen for particular implant diameters:

Ø 3.0 White (no colour, colour of titanium)
Ø 3.6 Magenta
Ø 4.0 Blue
Ø 5.0 Yellow

The colour is achieved in the process of titanium oxidation and therefore has the same properties as titanium in relation to biocompatibility and tissue response.

All products are coloured in such places that they do not influence the final aesthetic result, but at the same time offer easy recognition of diameter during all phases of surgery and prosthetic construction.
Planning aids

X-ray tracing
To facilitate implant choice in a particular clinical situation the X-ray tracing can be used. Thin transparent plastic foil with all fixtures contours in 1:1 and 1:3 (for OPG!) scale put over the X-ray photo allows to determine implant type and right position.

Please notice:
Because of the fact that X-ray photos are rarely exact it is important to remember that this method is not entirely precise. In more demanding situations we recommend using CT scans.

Implants

Dyna implants are two-stage, endosseous, push-in dental fixtures. They are sterilized in the process of gamma irradiation and supplied in sterile double peel-pouch packaging.

The current concept of Dyna is based on the full, reverse Edison-screw implants covered fully (without polished collar) with hydroxylapatite. The essential features of this design are:

- fast osteointegration
- good physiological loadability
- direct bone apposition
- simple and time-saving implantation technique
- favourable load distribution.
- good results in bad quality bone

Coating titanium implants with HA, besides excellent biocompatibility, favours direct bone growth to the implant surface. In contrast to the other non-HA implants the process of the bone apposition occurs not only from the bone side but from the implant surface as well.

The implants are already provided with a titanium cover screw (height 0.4mm) and suspended on a plastic, colour-coded holder, facilitating manipulation during the surgery.

The implants are available in diameters 3.0; 3.6; 4.0; 5.0 and lengths 6 (only for maxillo-facial purposes) 8,10,13,15mm and 17mm (for Ø3, Ø3.6).
### Planning aids

<table>
<thead>
<tr>
<th>Implant X-ray tracing</th>
<th>5472</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implants HA Coated Ø3.0</strong></td>
<td></td>
</tr>
<tr>
<td>6 mm Implant HA Coated Ø3mm</td>
<td>5406</td>
</tr>
<tr>
<td>8 mm Implant HA Coated Ø3mm</td>
<td>5408</td>
</tr>
<tr>
<td>10 mm Implant HA Coated Ø3mm</td>
<td>5410</td>
</tr>
<tr>
<td>13 mm Implant HA Coated Ø3mm</td>
<td>5413</td>
</tr>
<tr>
<td>15 mm Implant HA Coated Ø3mm</td>
<td>5415</td>
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<tr>
<td>17 mm Implant HA Coated Ø3mm</td>
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<tr>
<td><em>closing screws included</em></td>
<td></td>
</tr>
<tr>
<td><strong>Implants HA Coated Ø3.6</strong></td>
<td></td>
</tr>
<tr>
<td>8 mm Implant HA Coated Ø3.6mm</td>
<td>5308</td>
</tr>
<tr>
<td>10 mm Implant HA Coated Ø3.6mm</td>
<td>5310</td>
</tr>
<tr>
<td>13 mm Implant HA Coated Ø3.6mm</td>
<td>5313</td>
</tr>
<tr>
<td>15 mm Implant HA Coated Ø3.6mm</td>
<td>5315</td>
</tr>
<tr>
<td>17 mm Implant HA Coated Ø3.6mm</td>
<td>5317</td>
</tr>
<tr>
<td><em>closing screws included</em></td>
<td></td>
</tr>
<tr>
<td><strong>Implants HA Coated Ø4.0</strong></td>
<td></td>
</tr>
<tr>
<td>8 mm Implant HA Coated Ø4mm</td>
<td>5508</td>
</tr>
<tr>
<td>10 mm Implant HA Coated Ø4mm</td>
<td>5510</td>
</tr>
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<td>13 mm Implant HA Coated Ø4mm</td>
<td>5513</td>
</tr>
<tr>
<td>15 mm Implant HA Coated Ø4mm</td>
<td>5515</td>
</tr>
<tr>
<td><em>closing screws included</em></td>
<td></td>
</tr>
<tr>
<td><strong>Implants HA Coated Ø5.0</strong></td>
<td></td>
</tr>
<tr>
<td>8 mm Implant HA Coated Ø5mm</td>
<td>5008</td>
</tr>
<tr>
<td>10 mm Implant HA Coated Ø5mm</td>
<td>5010</td>
</tr>
<tr>
<td>13 mm Implant HA Coated Ø5mm</td>
<td>5013</td>
</tr>
<tr>
<td>15 mm Implant HA Coated Ø5mm</td>
<td>5015</td>
</tr>
<tr>
<td><em>closing screws included</em></td>
<td></td>
</tr>
</tbody>
</table>

### Closing screws

| Closing screw Ø 3mmm                   | 5400 |
| Closing screw Ø 3,6mm                 | 5300 |
| Closing screw Ø 4mm                   | 5500 |
| Closing screw Ø 5mm                   | 5000 |
**Drills**

Together with the system a special set of drills is supplied. All drills supplied by Dyna Dental Engineering, produced for Dyna Implant System, are made of surgical stainless steel and apart from the pilot drill internally irrigated.

Depending on the quality of the bone they can be used for maximum of 20 implant-preparations. All drills have markings corresponding with the several implant lengths. They are, however, positioned slightly higher than the real implant length in order to prepare a bone bed ready to accommodate an implant together with the covering screw (0.4mm). In this way the implant shoulder does not protrude over the bone ridge and there is some space for possible initial bone resorption.

---

**Please notice:**
Always prepare the implant site so that the desired length marking is covered slightly under the bone ridge.

---

Dyna drills are intended to be used with the surgical contra angle with internal cooling system, and a special surgical unit.

---

**Pilot drills**

are used to make the initial drilling. With these drills the depth of the drilling and insert angulation are defined. (see also 6.3 and 7)
In situations where conditions do not allow for further drilling the initial holes can be left empty and the new more favourable place for the implant found.

---

**Spade drills**

are intended to be used for final bone bed preparation. Five different types of internally cooled drills allow preparation to the desired diameter.

**Please Notice:**

It is obligatory to follow the sequence of widening of the preparation (see chapter 7).
All drills have special markings corresponding with the implants’ lengths and facilitating orientation in the depth of drilling.

---

**Special drills**

are to be used to prepare a place for initial drilling, remove sharp bone edges or slightly change the primary insert angulation. Lindemann fraise may additionally be used instead of a pilot drill.
Pilot drills

Pilot Drill \(\phi 2\) Short (Externally Irrigated)  5369
Pilot Drill \(\phi 2\) Long (Externally Irrigated)  5362

Spade drills

Spade Drill \(\Phi 3,0\)  5463
Spade Drill \(\Phi 3,0\) short  5468
Spade Drill \(\Phi 3.6\)  5363
Spade Drill \(\Phi 3.6\) short  5368
Spade Drill \(\Phi 4,0\)  5563
Spade Drill \(\Phi 4.7\)  5062
Spade Drill \(\Phi 5,0\)  5063

Special drills

Crestotome Drill (Internally Irrigated)  5565
Bone Cutter \(\Phi 4.0\) (Internally Irrigated)  5465
Lindemann Fraise \(\Phi 2.3\) (Internally Irrigated)  5562
Surgical instruments

All surgical instruments are made of surgical stainless steel or titanium ELI 5 (TiAlV). In order to obtain parallel preparations, the parallel/depth instrument can be placed in the implant socket, thus visualizing the direction of the preparation. The instrument is colour coded and serves also for measuring depth and diameter of the preparation.

To pull out implants that have been accidentally placed too deep Dyna implant puller should be used. In order to remove the problematic implant the covering screw must be unscrewed and replaced by proper implant puller (corresponding diameter; colour coding!). With the implant puller, turning clock wise, it is possible to carefully remove the implant without touching or contaminating it.

For screwing or unscrewing elements during the surgery surgical screwdrivers should be used. A hole in the screwdriver’s handle serve as an extra protection against aspiration (after fixing it on e.g. dental floss)

Auxiliaries

Locking drill extender
The locking drill extender is a drill holder used to extend the length of drills in demanding situations.

Cleaning wire
To clean the internal cooling system of spade drills use a cleaning wire.

To organize in an easy way all Dyna surgical instruments and drills use sterilizable cassette for surgical instruments and drills.

Please note:
This product is manufactured from coloured anodised aluminium. The colour of the product may be damaged by the use of some chemicals. Remember:
- do not use dish washer
- do not use ultrasonic bath
- be careful when using disinfecting liquids
- do not use chemicals too alkaline or too acid; pH between 4 and 8 is safe
- for sterilizing follow the following process: autoclave (134°), chemclave (132 °) or dry heat (180°). For cycles and time please refer to the manufacturer’s instructions.
### Dyna Parallel/Depth Instrument

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyna Parallel/Depth Instr. Ø 2 mm</td>
<td>5285</td>
</tr>
<tr>
<td>Dyna Parallel/Depth Instr. Ø 3 mm</td>
<td>5485</td>
</tr>
<tr>
<td>Dyna Parallel/Depth Instr. Ø 3,6 mm</td>
<td>5385</td>
</tr>
<tr>
<td>Dyna Parallel/Depth Instr. Ø 4 mm</td>
<td>5585</td>
</tr>
<tr>
<td>Dyna Parallel/Depth Instr. Ø 5 mm</td>
<td>5085</td>
</tr>
</tbody>
</table>

### Dyna Pull out instrument

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyna Pull out Ø 3 mm</td>
<td>5482</td>
</tr>
<tr>
<td>Dyna Pull out Ø 3,6 mm</td>
<td>5382</td>
</tr>
<tr>
<td>Dyna Pull out Ø 4 and 5 mm</td>
<td>5582</td>
</tr>
<tr>
<td>Dyna Single slot driver Lab</td>
<td>5481</td>
</tr>
<tr>
<td>Dyna Hex driver</td>
<td>5581</td>
</tr>
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</table>

### Auxiliaries

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locking Drill Extender</td>
<td>5060</td>
</tr>
<tr>
<td>Cleaning wire</td>
<td>5474</td>
</tr>
<tr>
<td>Cassette for surgical instruments and drills (Alu)</td>
<td>900002</td>
</tr>
</tbody>
</table>
Drivers

In order to screw final prosthetic abutments to 30 or 35Ncm* or unscrew them Dyna torque wrench prosthetic screwdrivers should be used.

S - Drivers were designed to facilitate handling of Dyna products. This line of screwdrivers, besides better mechanical properties, has additionally a special connection for the Straumann® Torque Wrench. In this way both Dyna and Straumann® instruments may be used interchangeably. The new connection part facilitates grip of the instrument as well.

**Dyna Hex Driver T.W.-S** serves for screwing and unscrewing all elements with hex opening. It can be used with Dyna or Straumann Torque Wrench*.

**Dyna Single Slot Driver T.W.-S** serves for screwing and unscrewing all elements with slot opening. It can be used with Dyna or Straumann Torque Wrench*.

**Castellated driver TW-S** serves for screwing and unscrewing “castellated” abutments. It can be used with either Dyna or Straumann® Torque Wrench*.

**Notched driver** serves for screwing fixed GN and memory GN abutments and adjusting the angulation of the memory abutments.

Torque Wrenches

**Torque wrench** is a special instrument intended to screw all final abutments with 30 or 35Ncm* torque. This torque prevents abutments, subjected to physiological bite forces, from unscrewing. (see also instructions for use delivered with the Dyna Torque Wrench)

* Apply **35 Ncm** indication for all abutments placed directly on implant level
* Apply **30 Ncm** indication for all abutments placed on extension level

Other Instruments

**Grip Device**
To make the grip of T.W. instruments easier a special holder can be applied.

*ITI Straumann is a registered name of the ITI Straumann(CH)
Drivers

- Dyna Single slot driver T.W.-S  5081S
- Dyna Hex driver T.W.-S  5181S
- Castellated Driver T.W.- S  5383S

Torque Wrenches

- Dyna Torque Wrench  5083

Other Instruments

- Dyna Grip Device T.W.  5381
- Notched Driver  5183
Healing Abutments

**Healing abutments** are a special type of titanium screws used in the second stage surgery to heal and form the gingiva. They have height markings on 2mm, 4mm and 6mm (the top) allowing for gingiva height determination after the healing period. Depending on the type of prosthetic construction different healings should be used for overdentures and crown and bridge works. Shape difference was designed not only because of hygienic requirements but because of the fact that for crowns and bridges special aesthetic aspects should be taken into consideration (emergency profile).

The height of healing abutments is 6 mm (without the screw).

Extension Posts

These abutments are used to extend bar or ball abutments above their standard lengths. They should be screwed with single slot screwdriver.
Healing Abutments (Ti)

For overdentures:
Healing Abutment 6 mm Ø 3.0mm  5614
Healing Abutment 6 mm Ø 4.0mm  5615
Healing Abutment 6 mm Ø 3.6mm  5616

For fixed constructions:
Healing Abutment 6 mm Ø 3.0   5814
Healing GG Abutment 6 mm Ø 3.6  5816GG
Healing GG Abutment 6 mm Ø 4.0  5815GG
Healing GG Abutment 6 mm Ø 5.0  5817GG
Healing GG Narrow 6mm Ø 3.6   5816GN
Healing GG Narrow 6mm Ø 4.0   5815GN
Healing GG Narrow 6mm Ø 5.0   5817GN

Extension Posts (Ti)

Extension Post 4mm Ø 3.0mm  5604
Extension Post 5mm Ø 3.0mm  5605
Extension Post 5mm Ø 3.6mm  56829
Extension Post 1.5mm Ø 4.0mm  56822*
Extension Post 2.5mm Ø 4.0mm  56823*
Extension Post 3.5mm Ø 4.0mm  56824*
Extension Post 4.5mm Ø 4.0mm  56825*
Extension Post 5.5mm Ø 4.0mm  56826*

*Only Ø3 abutments fit on Ø4mm extension abutments.
Dyna magnetic attachment consist of:

- magnet
- ferromagnetic part (medical abutment, prefabricated Dyna Direct keeper, Dyna alloy for casted keepers)

Magnetic abutments are specially designed abutments for use with Dyna magnets. They are produced from PdCoPt alloy. They should be screwed with using Dyna TW-S screwdriver and torque wrench. Dyna Dental produces also magnetic abutments for other systems.

Magnets

Dyna magnets are permanent rare earth magnets supplied in two attraction forces (Normal Strength, Extra Strong) and two heights (1.5mm/NSS/ and 2.5mm/NS, ES/). To prevent any corrosion they are encapsulated with 316L stainless steal. For full magnet description please see the Dyna Magnet Manual.

Magnet Bond

To fix the magnets into the dentures use Dyna Magnet Bond, a specially designed resin material. Its features enable to achieve chemical connection between the magnets and a denture acrylic. Therefore, no discoloration appears around the magnets. Dyna Magnet bond may be used additionally in all situation when perfect bonding of acrylic to metal is necessary.
### Magnetic abutments (Pd/Co/Pt)

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 3mm</td>
<td>Magnetic Abutment 3mm</td>
<td>5443</td>
</tr>
<tr>
<td></td>
<td>Magnetic Abutment 4mm</td>
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<td>Magnetic Abutment 5mm</td>
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<tr>
<td></td>
<td>Magnetic Abutment 6mm</td>
<td>5446</td>
</tr>
<tr>
<td>Ø 3,6mm</td>
<td>Magnetic Abutment 3mm</td>
<td>5343</td>
</tr>
<tr>
<td></td>
<td>Magnetic Abutment 4mm</td>
<td>5344</td>
</tr>
<tr>
<td></td>
<td>Magnetic Abutment 5mm</td>
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</tr>
<tr>
<td></td>
<td>Magnetic Abutment 6mm</td>
<td>5346</td>
</tr>
<tr>
<td>Ø 4mm</td>
<td>Magnetic Abutment 3mm</td>
<td>5543</td>
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<tr>
<td></td>
<td>Magnetic Abutment 4mm</td>
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<td></td>
<td>Magnetic Abutment 5mm</td>
<td>5545</td>
</tr>
<tr>
<td></td>
<td>Magnetic Abutment 6mm</td>
<td>5546</td>
</tr>
</tbody>
</table>

### Magnetic abutments for other systems

- Medical abutment external hex (Branemark type implants-standard platform) h 3mm : 6113
- Medical abutment external hex (Branemark type implants-standard platform) h 5 mm : 6115
- Medical Bonefit : 6640

### Magnets

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnet 300g h.2.5mm (NS)</td>
<td>1101</td>
</tr>
<tr>
<td>Magnet 300g h.1.5 mm (NSS)</td>
<td>1102</td>
</tr>
<tr>
<td>Magnet 500g h.2.5mm (ES)</td>
<td>1106</td>
</tr>
</tbody>
</table>

### Magnet Bond

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyna Magnet Bond cassette (pink)</td>
<td>21001</td>
</tr>
<tr>
<td>Dyna Magnet Bond bonding</td>
<td>21101</td>
</tr>
<tr>
<td>Dyna Magnet Bond monomer</td>
<td>21201</td>
</tr>
<tr>
<td>Dyna Magnet Bond polymer (pink)</td>
<td>21301</td>
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<tr>
<td>Dyna Magnet Bond cassette (white)</td>
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<tr>
<td>Dyna Magnet Bond bonding</td>
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</tr>
<tr>
<td>Dyna Magnet Bond monomer</td>
<td>21201</td>
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<tr>
<td>Dyna Magnet Bond polymer (white)</td>
<td>21302</td>
</tr>
</tbody>
</table>
Ball attachment consist of:

- Ball abutment (Ti)
- Matrix (Au/Pd/Pt)
- PVC ring
- Impression transfer
- Tin foil ring
- Lab analogue

To screw the abutment use a hex screwdriver TW-S and torque wrench.

Please notice
The ball abutment is supplied together with impression transfer. Other elements must be ordered separately!

Ball abutment instruments.

To activate or deactivate (increase or decrease the grip force) ball attachment two separate instruments are required:
- **activator**
- **deactivator**.

During the activation lamellae of the matrix are symmetrically bent closer increasing the retention whereas during deactivation it is pushed aside.

Please notice:
When activating make sure that there is no PVC ring around lamellae of the matrix
### Ball abutments (Ti)

<table>
<thead>
<tr>
<th>Ball Abutment</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>2mm Ø3.0</td>
<td>5762</td>
</tr>
<tr>
<td>3mm Ø3.0</td>
<td>5763</td>
</tr>
<tr>
<td>4mm Ø3.0</td>
<td>5764</td>
</tr>
<tr>
<td>5mm Ø3.0</td>
<td>5765</td>
</tr>
<tr>
<td>6mm Ø3.0</td>
<td></td>
</tr>
<tr>
<td>2mm Ø3.6</td>
<td>5792</td>
</tr>
<tr>
<td>3mm Ø3.6</td>
<td>5793</td>
</tr>
<tr>
<td>4mm Ø3.6</td>
<td>5794</td>
</tr>
<tr>
<td>5mm Ø3.6</td>
<td>5795</td>
</tr>
<tr>
<td>6mm Ø3.6</td>
<td>5796</td>
</tr>
</tbody>
</table>

Ball Abutment 6mm Ø3.0 consist of 5760+5605

Ball Abutment 2mm Ø4.0 (5780 + 56822) 5782
Ball Abutment 3mm Ø4.0 (5780 + 56823) 5783
Ball Abutment 4mm Ø4.0 (5780 + 56824) 5784
Ball Abutment 5mm Ø4.0 (5780 + 56825) 5785
Ball Abutment 6mm Ø4.0 (5780 + 56826) 5786

### Ball abutment instruments.

- DYNA Ball Activator 5768
- DYNA Ball Deactivator 5769
Dyna ball inserting instrument

Dyna ball space retainers (PVC rings) are specially designed for retaining space around the matrix during waxing and finishing of a denture. They are supplied together with the matrix (placed around the lamellae). It is recommended to leave them in place in ready prosthesis. In some situations, however, they have to be removed (e.g. activation, rebasing). To put them easily back without destroying the matrix one should use the Dyna Ball Inserting instrument.

It consist of two parts. To place the PVC ring around the matrix follow the next procedure

- separate the handle and the core
- put two PVC rings on the core (they can be inserted only from one side)
- put the handle back on the core
- place the instrument inside the matrix
- gently push on the handle sliding the ring around lamellae.

Impression copings.

Impression coping is a special element used during impression taking. It was designed for open tray technique. It transfers exactly the implant position into the model.

Please notice:
These impression copings are meant to be used when producing bar overdentures. In certain clinical situations they can be also used for other constructions.
Dyna ball inserting instrument

Dyna ball inserting instrument  5770

DYNA Ball Matrix ring (PVC)  5772 (10 pcs)

Impression copings (Ti)

Impression coping for Ø3.0  56810
Impression coping for Ø3.6  56840
Impression coping for Ø4.0  56830
Bar attachment consist of:

- Bar abutment (consist of two parts the titanium sleeve and the dentist screw)
- Lab screw
- Lab analogue
- Castable plastic ring

The Dyna bar abutment allows the dentist to decide on the type of the bar in a particular case. Cemented bar guarantees totally stress free construction that can be still retrievable. In this way there are no destructive lateral forces transferred onto the implants. Dyna Dental does not supply any pre-fab bar itself giving the operator free choice.

Please notice:
Bar Abutment is supplied together with the castable plastic ring and screw. Other elements have to be ordered separately!
Bar abutments (Ti)

Bar Attachment 1 mm Ø3.0/Ø3.6mm 57801

Bar Abutment 2 mm Ø 3.0mm  57802
Bar Abutment 3 mm Ø 3.0mm  57803
Bar Abutment 4 mm Ø 3.0mm  57804
Bar Abutment 5 mm Ø 3.0mm  57805
Bar Abutment 6 mm Ø 3.0mm  57806
Bar Abutment 7 mm Ø 3.0mm  57807

Note: Bar abutments 6mm and 7mm consist of two parts: extension abutment 57801 and 5605.

Bar Abutment 2 mm Ø 3.6mm  57862
Bar Abutment 3 mm Ø 3.6mm  57863
Bar Abutment 4 mm Ø 3.6mm  57864
Bar Abutment 5 mm Ø 3.6mm  57865
Bar Abutment 6 mm Ø 3.6mm  57866
Bar Abutment 7 mm Ø 3.6mm  57867

Note: Bar abutments 6mm and 7mm consist of two parts: extension abutment 57801 and 56829.

Bar Abutment 2 mm Ø 4.0mm  57822
Bar Abutment 3 mm Ø 4.0mm  57823
Bar Abutment 4 mm Ø 4.0mm  57824
Bar Abutment 5 mm Ø 4.0mm  57825
Bar Abutment 6 mm Ø 4.0mm  57826

Note: All bar abutments Ø4mm consist of two parts: extension abutment (56822/3/4/5/6 and 57820).
The Universal (cast to) Abutment.

This versatile abutment expands the prosthetic possibilities and may be used in almost all clinical situations. Custom fabrication from the top of the implant is a great advantage in those cases where optimal emergence profile and crown design is necessary. Prosthetic correction of the implant divergence or unfavourable angulation improvement is easy to realize. Both screw-type and cemented constructions can be produced with help of this universal abutment.

After taking the impression it is the technician who waxes up the desired abutment first, and than produces planned prosthetic construction. The castable sleeve can be easily prepared and adjusted to every desirable shape. Low metal collar allows for achieving perfect aesthetics (for diameter 4mm only a fully castable plastic sleeve is available) and achieve optimal contouring of soft tissue, for an even more natural looking restoration. The abutment is available for Dyna implants diameter 3, 3.6 and 4 mm.

**Material:** POM and Gold Alloy (61.5%Au, 20,1%Pt, 17.5%Pd, 0,5%Ag),
- melting interval 1340°C -1470°C,
- thermal expansion coefficient (25-500°C) 13.0µm/m.K,
- recommended solders – Orion 1120°C white

**General indication:**
1. For soldering with Elephant I 850°C, II 800°C, III 750°C or Pallas II 830°C or III 750°C
2. To cast against with precious alloys
3. To cast against both precious or non-precious alloys
4. To cast against with non-precious alloys

POM needs to be burned out during 20 minutes with a minimum temperature of 260 and maximum of 300 °C. Heating cycle of the oven is recommended on a maximum of 30 °C per minute. If burning out is done faster than recommended there is a risk of burning POM causing porous casting.

**Variations:** The universal abutment is for the Dyna Implant system (not Octalock) available in one form
- metal basis without octagon and plastic sleeve (soldering)

The universal abutment can be used for single or multiple unit (splint) crown and bridge restorations or bar supported overdenture restorations. Highly aesthetic custom restoration attached directly to the implant may be realized with this type of abutment.

---

**Abutment Screw**

Each abutment has its own abutment screw. Conical design guarantees optimal anti-loosening properties.

**Material:** Titanium grade 5.

**Laboratory Screw**

Each abutment has its own laboratory screw.

**Material:** brass
### Dyna Universal Abutment (POM)

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal (cast to) Abutment d. 3.0 + abutment screw</td>
<td>31UA30S</td>
</tr>
<tr>
<td>Universal (cast to) Abutment d. 3.6 ST + abutment screw</td>
<td>31UA36S</td>
</tr>
<tr>
<td>Universal (cast to) Abutment d. 3.6 BB + abutment screw</td>
<td>31UA36BS</td>
</tr>
<tr>
<td>Universal (castable) Plastic Abutment d. 4.0 + abutment screw</td>
<td>31UP40S</td>
</tr>
</tbody>
</table>

*ST= Single Tooth  
BB= Bars and Bridges*

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyna laboratory screw universal d. 3.0</td>
<td>31LS0</td>
</tr>
<tr>
<td>Dyna laboratory screw universal d. 3.6</td>
<td>31LS1</td>
</tr>
<tr>
<td>Dyna laboratory screw universal d. 4.0</td>
<td>31LS2</td>
</tr>
</tbody>
</table>

### Abutment Screw

**Abutment screw**
Abutments for fixed constructions.

These abutments are intended to be used for cemented crowns and bridge constructions. They have been designed according to gingiva guiding idea. The outer transmucosal part of the Dyna Fixed Abutment is highly polished whereas the crown part is roughened. The abutments can be shaped to realise highly aesthetical prostheses.

**GG abutments** have diameter 6mm for Ø3.6, and Ø4.0 mm implants and 7mm for Ø5mm implants. GN abutments have Ø5mm for Ø3.6 and Ø4.0mm implants and 5.5mm for Ø5mm implants. All abutments for Ø3.0 implants have one diameter 5.0mm. These variations allows easier interdental placement and avoiding unfavourable emergency profile and together with the possibility of adjusting to the gingiva height achieve a pleasing effect.

The GG shape has following advantages:
- possibility to hide crown margin under gingiva
- no pressure on papillae
- possibility to produce highly aesthetical prostheses

![Abutment with castellated part](image1) ![Abutment without castellated part](image2)

GG and GN abutments should be screwed in to the implants, using the torque wrench (32Ncm)

Dyna fixed abutment (0°)

These abutments may be used when implant positioning is parallel or almost parallel. Different trans-gingival heights and types, GG and GN, allow to achieve excellent aesthetic effects. GG abutments with bigger diameter are provided to replace more “massive” teeth, whereas GN, with smaller diameter, may replace lower incisors or premolars.

The total height and transgingival height are presented in the form of two digits e.g. 2/5. The first means transgingival (polished) height whereas the second total height.
### Fixed abutments (Ti)

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed 0° Abutment 2/8 Ø3.0</td>
<td>5842</td>
</tr>
<tr>
<td>Fixed 0° Abutment 3/9 Ø3.0</td>
<td>5843</td>
</tr>
<tr>
<td>Fixed 0° Abutment 4/10 Ø3.0</td>
<td>5844</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 2/8 Ø3.6</td>
<td>5862GG</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 3/9 Ø3.6</td>
<td>5863GG</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 4/10 Ø3.6</td>
<td>5864GG</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 2/8 Ø4.0</td>
<td>5852GG</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 3/9 Ø4.0</td>
<td>5853GG</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 4/10 Ø4.0</td>
<td>5854GG</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 2/8 Ø5.0</td>
<td>5872GG</td>
</tr>
<tr>
<td>Fixed 0° GG Abutment 3/9 Ø5.0</td>
<td>5873GG</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 1/7 Ø3.6</td>
<td>5861GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 2/8 Ø3.6</td>
<td>5862GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 3/9 Ø3.6</td>
<td>5863GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 4/10 Ø3.6</td>
<td>5864GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 1/7 Ø4.0</td>
<td>5851GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 2/8 Ø4.0</td>
<td>5852GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 3/9 Ø4.0</td>
<td>5853GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 4/10 Ø4.0</td>
<td>5854GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 1/7 Ø5</td>
<td>5871GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 2/8 Ø5</td>
<td>5872GN</td>
</tr>
<tr>
<td>Fixed 0° GN Abutment 3/9 Ø5</td>
<td>5873GN</td>
</tr>
</tbody>
</table>
Dyna memory abutment

This abutment can be used in situations where the positioning of the implants is not favourable (angulation more than 6°). The outer transmucosal portion (cup) of the memory abutment is made from highly polished titanium. This portion of the abutment is the only part which, in clinical application, will contact the body tissue.

The abutment head (patrix) that is contained within the transmucosal cup is made from nitinol (shape memory alloy: see chapter 3.3)

A special shape-memory metal used in this abutment allows the abutment head to be bent from 0° to 15° after spraying it with a special Dyna cooling spray. GG shape of the transgingival part allows for constructing highly aesthetical prostheses.

GG abutments have diameter 6mm for Ø 3,6, Ø 4,0 mm implants and Ø 7mm for Ø 5mm implants. GN abutments have Ø 5mm for Ø 3,6 and Ø 4,0mm implants and Ø 5,5mm for Ø 5mm implants. All abutments for Ø 3.0 implants have one diameter 5.0mm

By using these variations unfavourable emergency profile can be avoided. The possibility of adjusting to the gingiva height allows to achieve pleasing effect.

The GG shape has the following advantages:
- possibility to hide crown margin under gingiva
- no pressure on papillae
- possibility to produce highly aesthetical prostheses

Cooling aids

Memory abutments can be cooled down in the mouth of the patient with help of the Memory Cooling Aid. The aid resembles in its shape saliva ejector tip. To use it properly the long end should be connected to the ejector whereas the wider opening of the ball part should be positioned around the memory patrix. Please make sure that the patrix is placed totally inside the ball. If it is not the case you can easily adjust it by cutting it to shape. Subsequently connect the cooling spray with the smaller hole and cool the abutment for around 3-5 seconds. Wait a moment and with the Dyna Position Instrument change the angulation.
Memory abutments (Ti/TiNi)

<table>
<thead>
<tr>
<th>Trans-gingival part / Total height</th>
<th>Trans-gingival part / Total height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory Abutment Ø 3.0 3/9</td>
<td>5800</td>
</tr>
<tr>
<td>Memory Abutment Ø 3.0 2/8</td>
<td>5802</td>
</tr>
<tr>
<td>Memory GG Abutment Ø 3.6 2/8</td>
<td>5807GG</td>
</tr>
<tr>
<td>Memory GG Abutment Ø 3.6 3/9</td>
<td>5808GG</td>
</tr>
<tr>
<td>Memory GG Abutment Ø 4.0 2/8</td>
<td>5832GG</td>
</tr>
<tr>
<td>Memory GG Abutment Ø 4.0 3/9</td>
<td>5833GG</td>
</tr>
<tr>
<td>Memory GG Abutment Ø 5.0 2/8</td>
<td>5837GG</td>
</tr>
<tr>
<td>Memory GG Abutment Ø 5.0 3/9</td>
<td>5838GG</td>
</tr>
<tr>
<td>Memory GG Abutment Ø 3.6 2/8</td>
<td>5807GG</td>
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<tr>
<td>Memory GG Abutment Ø 3.6 3/9</td>
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</tr>
<tr>
<td>Memory GN Abutment Ø 3.6 2/8</td>
<td>5807GN</td>
</tr>
<tr>
<td>Memory GN Abutment Ø 3.6 3/9</td>
<td>5808GN</td>
</tr>
<tr>
<td>Memory GN Abutment Ø 4.0 2/8</td>
<td>5832GN</td>
</tr>
<tr>
<td>Memory GN Abutment Ø 4.0 3/9</td>
<td>5833GN</td>
</tr>
</tbody>
</table>

Memory abutments for other systems:
Dyna Dental Engineering produces memory abutments only for a few other implant systems. Should you request any particular abutment please contact Dyna Dental directly for further information.

Cooling aids

In order to cool down the memory abutments, and change theirs angulation use the Dyna Memory cooling spray.

Dyna Memory Coolspray: 5850
Dyna cooling aid: 5890

Please notice:
When using the Dyna Coolspray in the mouth take proper care to protect the gingiva from too low temperature. See also below.
Laboratory elements (fixed)

The laboratory analogue is intended to be used by the technician as an abutment analogue in the working model. This model can only be poured in after previous positioning of the analogue in the impression. See also 8.5 and 8.11.

GG/GN Laboratory Analogues “fixed”

<table>
<thead>
<tr>
<th>Laboratory analogue Ø 3 (Ti)</th>
<th>58234L</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG Laboratory analogue Ø 3.6</td>
<td>586234GGL</td>
</tr>
<tr>
<td>GN Laboratory analogue Ø 3.6 for 1mm</td>
<td>5861GNL</td>
</tr>
<tr>
<td>GN Laboratory analogue Ø 3.6 for 2-4mm</td>
<td>586234GNL</td>
</tr>
<tr>
<td>GG Laboratory analogue Ø 4</td>
<td>585234GGL</td>
</tr>
<tr>
<td>GN Laboratory analogue Ø 4 for 1mm</td>
<td>5851GNL</td>
</tr>
<tr>
<td>GN Laboratory analogue Ø 4 for 2-4mm</td>
<td>585234GNL</td>
</tr>
<tr>
<td>GG Laboratory analogue Ø 5</td>
<td>58723GGL</td>
</tr>
<tr>
<td>GN Laboratory analogue Ø 5 for 1mm</td>
<td>5871GNL</td>
</tr>
<tr>
<td>GN Laboratory analogue Ø 5 for 2-4mm</td>
<td>58723GNL</td>
</tr>
</tbody>
</table>

GG/GN Laboratory Analogues “memory”

<table>
<thead>
<tr>
<th>Laboratory analogue Ø 3 (Ti)</th>
<th>58023L</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG Laboratory analogue Ø 3.6</td>
<td>58078GNL</td>
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<tr>
<td>GN Laboratory analogue Ø 3.6</td>
<td>58078GGL</td>
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<td>GG Laboratory analogue Ø 4</td>
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<td>GN Laboratory analogue Ø 4</td>
<td>58323GGL</td>
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<tr>
<td>GG Laboratory analogue Ø 5</td>
<td>58378GNL</td>
</tr>
<tr>
<td>GN Laboratory analogue Ø 5</td>
<td>58378GNL</td>
</tr>
</tbody>
</table>

Laboratory parts – implant analogue

| Labo Implant Analogue Ø3.0 (Ti) | 7810 |
| Labo Implant Analogue Ø4.0 (Ti) | 7811 |
| Labo Implant Analogue Ø3.6 (Ti) | 57812 |
| Labo Implant Analogue Ø5.0 (Ti) | 57813 |
### Laboratory parts (bar)

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Lab. Screw Ø3.0 1/2 (Ti)</td>
<td>57830-L1/2</td>
</tr>
<tr>
<td>Bar Lab. Screw Ø3.0 3mm (Ti)</td>
<td>57830-L3</td>
</tr>
<tr>
<td>Bar Lab. Screw Ø3.0 4/5 (Ti)</td>
<td>57830-L4/5</td>
</tr>
<tr>
<td>Bar Lab. Screw Ø3.6 2/3 (Ti)</td>
<td>57832-L2/3</td>
</tr>
<tr>
<td>Bar Lab. Screw Ø3.6 4/5 (Ti)</td>
<td>57832-L4/5</td>
</tr>
<tr>
<td>Bar Lab. Screw for Ø4.0 1/2 (Ti)</td>
<td>57830-D4</td>
</tr>
<tr>
<td>Bar Lab. Screw short for Ø3.0 (Ti)</td>
<td>57831-D3</td>
</tr>
<tr>
<td>Bar Lab. Screw short for Ø3.6 (Ti)</td>
<td>57831-D3.6</td>
</tr>
<tr>
<td>Bar Lab. Screw short for Ø4.0 (Ti)</td>
<td>57831-D4</td>
</tr>
<tr>
<td>Bar Fixation Screw Ø3.0 (Ti)</td>
<td>57830-L4/5</td>
</tr>
<tr>
<td>Bar Fixation Screw Ø3.6 (Ti)</td>
<td>57832-L4/5</td>
</tr>
<tr>
<td>Bar Fixation Screw Ø4.0 (Ti)</td>
<td>57833</td>
</tr>
<tr>
<td>Castable Sleeve For Bar Abutment</td>
<td>5720</td>
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</table>

### Dentist part

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Dentist Screw Ø3.0/Ø4.0 1mm (Ti)</td>
<td>56802-L1</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.0 2mm (Ti)</td>
<td>56802-L2</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.0 3mm (Ti)</td>
<td>56802-L3</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.0 4mm (Ti)</td>
<td>56802-L4</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.0 5mm (Ti)</td>
<td>56802-L5</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.6 2mm (Ti)</td>
<td>56806-L2</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.6 3mm (Ti)</td>
<td>56806-L3</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.6 4mm (Ti)</td>
<td>56806-L4</td>
</tr>
<tr>
<td>Bar Dentist Screw Ø3.6 5mm (Ti)</td>
<td>56806-L5</td>
</tr>
<tr>
<td>Bar Dentist Screw for Ø4.0 1mm (Ti)</td>
<td>56802-L1</td>
</tr>
</tbody>
</table>

### Laboratory parts (ball)

<table>
<thead>
<tr>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>DYNA Ball Matrix</td>
<td>5761</td>
</tr>
<tr>
<td>DYNA Ball Matrix Gold</td>
<td>5761G</td>
</tr>
<tr>
<td>DYNA Ball Impression spacer</td>
<td>5766-4 (4 pcs)</td>
</tr>
<tr>
<td>DYNA Laboratory Patrix</td>
<td>5767</td>
</tr>
<tr>
<td>DYNA Ball Space retainer (tin)</td>
<td>5771</td>
</tr>
</tbody>
</table>
Because of the fact that Dyna Octalock implants are produced only in three different diameters (3.6mm, 4.0mm and 5.0mm) and all abutments can be fitted on both implant types, there is no need for special colour coding. Therefore, none of the Octalock products is specially coloured.

**Implants**

Two-stage, endosseous, push-in dental fixtures. Sterilized in the process of gamma irradiation and supplied in sterile double peel-pouch packaging.

The concept of Octalock implants is based on the full, reverse Edison screw implants covered, either fully or with 1mm machined polished collar, with hydroxylapatite. The essential features of this design are:

- fast osteointegration
- good physiological loadability
- direct bone apposition
- simple and time-saving implantation technique
- favourable load distribution.
- good results in bad quality bone

Coating titanium implants with HA, besides excellent biocompatibility, favours direct bone growth to the implant surface. In contrast to the other non-HA implants the process of the bone apposition occurs not only from the bone side but from the implant surface as well.

**The implants are already provided with a titanium cover screw** and suspended on a plastic, colour-coded holder, facilitating manipulation during the surgery.

The implants are available in diameters 3.6, 4.0 and 5.0 and lengths 8, 10, 11.5, 13 and 15mm.
### Dyna Octalock® Ø3.6 Cylindrical Implant, HA Coated

**Cover Screw OCTA** (no colour) 83600

<table>
<thead>
<tr>
<th>Implant OCTA</th>
<th>Length (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCTA</td>
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<tr>
<td>OCTA</td>
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<tr>
<td>OCTA</td>
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<tr>
<td>OCTA</td>
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</tr>
<tr>
<td>OCTA</td>
<td>15</td>
<td>83615</td>
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</tbody>
</table>

### Dyna Octalock® Ø4.0 Cylindrical Implant, HA Coated

**Cover Screw OCTA** (no colour) 84000

<table>
<thead>
<tr>
<th>Implant OCTA</th>
<th>Length (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCTA</td>
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<td>84010</td>
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<td>84013</td>
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<tr>
<td>OCTA</td>
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<td>84015</td>
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### Dyna Octalock® Ø5.0 Cylindrical Implant, HA Coated

**Cover Screw OCTA** (no colour) 84000

<table>
<thead>
<tr>
<th>Implant OCTA</th>
<th>Length (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCTA</td>
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<td>85013</td>
</tr>
<tr>
<td>OCTA</td>
<td>15</td>
<td>85015</td>
</tr>
</tbody>
</table>

### Dyna Octalock® Ø3.6 Cylindrical Implant MC, HA Coated

**Cover Screw OCTA** (no colour) 83600

<table>
<thead>
<tr>
<th>Implant OCTA</th>
<th>Length (mm)</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCTA</td>
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<td>OCTA</td>
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<td>83613 MC</td>
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<tr>
<td>OCTA</td>
<td>15</td>
<td>83615 MC</td>
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</table>
Dyna Octalock® Ø4.0 Cylindrical Implant MC, HA Coated

<table>
<thead>
<tr>
<th>Component</th>
<th>Diameter</th>
<th>Code</th>
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<tbody>
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<td>Cover Screw OCTA</td>
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<td>84000</td>
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<tr>
<td>Implant OCTA 8 mm</td>
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<td>84008 MC</td>
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<tr>
<td>Implant OCTA 10 mm</td>
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<td>84010 MC</td>
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<tr>
<td>Implant OCTA 11,5 mm</td>
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<td>84011 MC</td>
</tr>
<tr>
<td>Implant OCTA 13 mm</td>
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<td>84013 MC</td>
</tr>
<tr>
<td>Implant OCTA 15 mm</td>
<td></td>
<td>84015 MC</td>
</tr>
</tbody>
</table>
### Straight abutment

Ideal for all those situations where the implants are placed parallel or almost parallel. The unique simplicity of this abutment makes all the connected procedures easy and fast. The possibility of the abutment trimming gives a chance to get always the best aesthetic result.

Both the single tooth reconstructions and bridges can be realized with this abutment. The straight abutment can only be used with cemented crowns and bridges.

**Material:** Titanium grade 5.

**Variations:** Straight Abutment is available in different transgingival lengths L2=2mm*, L3=3mm*, L4=4mm*. All abutments have the octagon. It is indicated for single and multiple unit cemented restorations where no angulation correction is necessary.

*depends on the implant diameter see product catalogue

### Memory abutment

The memory abutment employs the idea of using the memory metal to change the angulation of the abutment’s head. Cooling it with a special Dyna Coolspray enables easy adjustment of the head to the particular clinical situation. For more information please see Dyna Implant Manual.

**Material:** Titanium, Nitinol

**Variations:** Memory Abutment is available in two transgingival lengths L2=2mm*, L3=3mm*.

*depends on the implant diameter see product catalogue

### Temporary Abutment

The temporary Abutment is intended to be used after second stage surgery to provide the patient with a temporary restoration. The titanium sleeve offers a textured surface for better connection with the covering material, when constructing provisional restorations on Dyna Octalock implants.

**Materials:** Titanium grade 1

**Variations:** Temporary Abutment is available in one form to be trimmed individually either by dentist or by technician.
Dyna Octalock® Straight Abutment (Ti)

Straight Abutment OCTA L2 (Ø3.6-2.0mm, Ø4.0-1.5mm)  81ST2
Straight Abutment OCTA L3 (Ø3.6-3.0mm, Ø4.0-2.5mm)  81ST3
Straight Abutment OCTA L4 (Ø3.6-4.0mm, Ø4.0-3.5mm)  81ST4

Dyna Octalock® Memory Abutment (Ti+NiTiNol)

Memory Abutment OCTA L2 (Ø3.6-2.0mm, Ø4.0-1.5mm)  82MY2
Memory Abutment OCTA L3 (Ø3.6-3.0mm, Ø4.0-2.5mm)  82MY3
Memory Analogue  82MA0

Dyna Octalock® Temporary Abutment (Ti)

Temporary Abutment OCTA (without octagon)  81TA0
Temporary Abutment OCTA (with octagon)  81TA1
The Universal (cast to) Abutment.

This versatile abutment expands the prosthetic possibilities and may be used in almost all clinical situations. Custom fabrication from the top of the implant is a great advantage in those cases where optimal emergence profile and crown design is necessary. Prosthetic correction of the implant divergence or unfavourable angulation improvement is easy to realize. Both screw-type and cemented constructions can be produced with help of this universal abutment.

After taking the impression it is the technician who waxes up the desired abutment first, and than produces planned prosthetic construction. The castable sleeve can be easily prepared and adjusted to every desirable shape. Low metal collar allows for achieving perfect aesthetics (it is also possible to choose fully castable plastic sleeve) and achieve optimal contouring of soft tissue, for an even more natural looking restoration.

The abutment is available for single tooth reconstructions and cemented bridges with octagon, and for screwed bridges without.

Material: POM and Gold Alloy (61.5%Au, 20.1%Pt, 17.5%Pd, 0.5%Ag), melting interval 1340°C - 1470°C, thermal expansion coefficient (25-500°C) 13.0µm/m.K, recommended solders – Orion 1120°C white general indication:
5. For soldering with Elephant I 850°C, II 800°C, III 750°C or Pallas II 830°C or III 750°C
6. To cast against with precious alloys
7. To cast against both precious or non-precious alloys
8. To cast against with non-precious alloys

POM needs to be burned out during 20 minutes with a minimum temperature of 260 and maximum of 300 °C. Heatingcylcus of the oven is recommended on a maximum of 30 °C per minute. If burning out is done faster than recommended there is a risk of burning POM causing porous casting.

Variations: The universal abutment is available in three forms
A. metal basis with octagon and plastic sleeve (soldering)
B. metal basis without octagon and plastic sleeve (soldering)
C. plastic abutment (to be casted totally by the technician)

The universal abutment can be used for single or multiple unit (splint) crown and bridge restorations or bar supported overdenture restorations. Highly aesthetic custom restoration attached directly to the implant may be realized with this type of abutment.

Fixation Screw

Universal fixation screw fits on all abutments types. Conical design guarantees optimal anti-loosening properties.

Material: Titanium grade 5.

Variations: Short fixation screw is available only in one form.
Dyna Octalock® Universal Abutment (POM)

- Universal (cast to) Abutment (without octagon) + sleeve 81UA0
- Universal (cast to) Abutment (with octagon) + sleeve 81UA1
- Universal (castable) Plastic Abutment 81UP1
- Universal (castable) Sleeve OCTA 81US0

Fixation Screw

- Fixation screw OCTA
Ceramic\Titanium Abutment (trimmable)

The aesthetic abutment was developed in order to meet high aesthetic demands posed by patients nowadays. The use of ceramic abutment besides excellent aesthetics creates optimal biocompatibility, which is mandatory for a long-term success. Ideal mechanical and biological properties of the Zirconium Oxide guarantee predictable and stable results. Conical design of the abutment allows for individual trimming and therefore, the best adaptation to the individual mouth conditions.

*Example of the ceramic abutment after preparation.

The abutment can be trimmed to the desired form by the dental technician. The use of ceramic material gives the prosthodontist a chance to adapt the colour of the restoration to the natural situation.

The ceramic abutment is supplied in the trimmable form (see. catalogue) so that both straight and angulated abutments can be easily realised. Such solution gives more versatility and saves the need to have different abutment lines.

**Material:** Zirconium Oxide  
**Variations:** Ceramic Abutment is available only in one form. The total height of the abutment together with octa is 13mm, whereas the upper diameter is 8mm. It is indicated for single and multiple unit, cemented restorations where the high level of aesthetics is required.

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Dyna Octalock® Titanium Abutment (Ti)

In order to increase the mechanical strength of the abutment in challenging though demanding clinical situation, besides the ceramic abutment, Dyna Dental produces the **titanium trimmable abutment**. It has the same form as the ceramic abutment and is ideal for situations where strong and resistant prosthetic constructions are indicated.

**Material:** Titanium grade 1  
**Variations:** The titanium Abutment is available only in one form. The total height of the abutment together with octa is 14mm, whereas the upper diameter 11.5mm. It is indicated for single and multiple unit, cemented restorations.
Dyna Octalock® Ceramic Abutment

Ceramic Abutment (trimmable) 81CP0

Dyna Octalock® Titanium Abutment (Ti)

Titanium Abutment OCTA (trimmable) 81TP2
Impression abutment and implant analogue

The impression abutment is used when transferring the position of the implant in the mouth to the model. It has the same octa features as other abutments and provide exact replication of the octagon position to the working model. It is intended to be used with open-tray impression technique. For more information about impression taking please see Dyna Implant Manual.

Materials: Titanium
Variations: The Impression Abutment is available in one form. It can be individually adjusted if the interocclusal space is too small. It is intended to be used for single and multiple-unit restorations and bar retained overdenture restorations.

Dyna Octalock® Healing Abutment (Ti)

Healing abutments are used in the second stage surgery to heal and form the gingiva. They have special height markings helpful in reading the gingiva height after the healing period. Depending on the type of prosthetic construction different healings should be used for overdentures and crown and bridge works.

Different height of the healing abutments allows better tissue management especially for fixed constructions.

Materials: Titanium
Variations: The Healing Abutment is available in two basic forms:
• for overdentures
• for fixed constructions
Abutments for fixed constructions are additionally available in high, medium and low version.
Impression Coping OCTA (overdentures) 82IC2
*sold with fixation screw 82IC2

Impression Coping OCTA (fixed constructions) 81IC2
*sold with fixation screw 82IC2

Impression Screw 81IS2
Implant Analogue 81IA0

Healing Abutment OCTA (fixed) L2 81HE2
Healing Abutment OCTA (fixed) L4 81HE4
Healing Abutment OCTA (fixed) L6 81HE6

Healing Abutment OCTA (overdenture) L6 82HE6
1.4.7 Abutments for overdentures.

The abutments for overdenture have only been adjusted to fit the new Octalock connection. They are almost the same as for the old system. Therefore, please refer to Dyna Implant Manual for further clinical details.

**Materials:** bar abutment and ball abutment – titanium, magnet abutment EFM alloy

**Variations:** all overdentures are available in different heights

- **bar** - L2=2mm, L3=3mm, L4=4mm, L5=5mm, L6=6mm
- **ball** - L2=2mm, L3=3mm, L4=4mm, L5=5mm, L6=6mm
- **magnet** - L3=3mm, L4=4mm, L5=5mm

*depends on the implant diameter see product catalogue

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**Explanation of the used codes.**

- **AS** abutment screw
- **CP** ceramic abutment
- **HE** healing abutment
- **IA** implant analogue
- **IC** impression coping
- **IS** impression screw
- **MY** memory abutment
- **ST** straight abutment
- **TA** temporary abutment
- **TP** titanium abutment
- **UA** universal abutment
- **UP** universal plastic abutment
- **US** universal sleeve
- **BE** bar extension

- **BL** bar abutment
- **BS** bar screw
- **MG** magnet abutment

- **81** fixed constructions
- **82** overdentures

The last number in the abutments code means either the abutment length(2-6), or the presence of the octagon (0-1), exceptionally it means that the product is only in one design (0)

- **830** implants 3.6mm
- **840** implants 4,0mm

The last two numbers in the implant code represents the length of the implant.
6. Clinic

6.1 Indications

Dyna Implant System can be used in the following clinical situations:

- Retention of overdentures in the maxilla or the mandible.
- Restoring shortened maxillary or mandibular arch with fixed constructions (with possible connection with natural elements).
- Restoring edentulous patients with fixed constructions.
- Restoring edentulous patients with fixed-detachable prostheses.
- Retention of maxillo-facial prostheses.

Octalock System was developed primarily for enhancing construction of the crown and bridge works. Therefore, it is additionally indicated for:

- Restoring single missing teeth.

6.2 Contraindications

The Dyna System is a multipurpose implant system allowing for easy construction of different prostheses. Simplicity of use, however, can be often seen as a universal solution to all kinds of prosthetic problems. Such an approach may lead to failures. These, are not connected with the system.*
When using any implant system following contraindications should be taken into consideration:

1 local
- local infections
- inadequate quality or quantity of bone in place of implantation
- inadequate hygiene
- unfavourable bite relation
- mucosa infections
- jaw defects
- macroglossia

2 systemic
- systemic diseases of bone, endocrine system, homeopoetic system
- rheumatic disease
- cardiac disease
- nephritises or nephroses
- cirrhosis hepatis
- psychic diseases
- defective immune response
- allergic diseases

3 age related limitations
- children
- juvenile patients with not finished growth of maxillo-facial bones
- elderly patients with:
  - insufficient bone quantity or quality
  - unfavourable morphological conditions
  - difficult bite relation
  - trauma of the mandible or the maxilla
  - lack of motivation

4 other
- pregnancy
- planned radiotherapy
- drugs and tobacco abuse
- inability to perform adequate surgery operation
- diseases treated with large doses of steroids
- limited mouth opening
- lack of motivation to perform adequate hygiene

Most of the contradictions listed above are now viewed more as conditional and temporary rather than absolute.
The following contraindications for the Dyna Implant System should be taken into consideration:

- placing the Dyna implant directly after extraction
- using Ø3.0mm implants for fixed constructions subjected to heavy or moderate loads;
- constructing cantilevers
- joining implants with natural elements.

In most cases, it is the severity of the condition and the patient’s residual ability to tolerate treatment that determine whether or not implant therapy is contraindicated. In addition, there are a number of systemic medical conditions that can cause complications during the postoperative healing stage, and may contribute to implant failure. These factors must also be assessed by the implant surgeon.

*Dyna Dental Engineering disclaims any reliability for failures subject to contraindications that have not been aforementioned but which are described in the world literature. Therefore, we recommend careful study of adequate available research material.*

6.3 Planning

Planning is one of the most important factors in successful rehabilitation of edentulous or partially edentulous patients with dental implants. Full success depends on a balanced judgment of patient’s expectations on the one hand, and surgical and prosthetic possibilities on the other.

This manual provides a framework of concepts and ideas to facilitate the evaluation of prospective implant patients. The information presented should also help to promote successful planning and co-ordination of treatment for the implant restored patients.
Principles of patient selection

Preliminary evaluation
The evaluation of a patient as a suitable candidate for implants should follow the same basic format as the standard patient evaluation, although some areas require additional emphasis and attention. In particular, the patient’s medical history may reveal a number of conditions that could complicate or even contra-indicate implant therapy.

The following aspects are relevant when examining a patient as a prospective recipient of dental implants:

1 initial consultation
Prior to any medical examination, or local conditions evaluating, patient should clearly formulate:
- his problems with existing prosthesis or dentition (aesthetic, lack of stability, lack of retention etc)
- wishes and expectations in respect to the future restoration.

Dentist on his side should explain:
- existing treatment possibilities
- benefits and risk of implants

2 medical examination
- general health situation (current and past)
Patient should be physically and mentally healthy. Patients age is less important though it should not be underestimated. Implantation in an early age is *per se* not a real contraindication. Contrary, young patients have a bigger chance for successful osteointegration. However, because of the fact that the bone growth with those patients is still an active process, and the connection between the implant and the bone has ancylicotic type, the chances are, that the potential operator will be confronted with *unfavourable* prosthetic situations after biological maturation of such patients. Namely implanted fixture and surrounding it bone (which could not grow) will be somewhat “deeper” than the rest of the dentition (e.g. adversely influencing the emergency profile of the restoration).

On the other hand elderly patients having matured bones may present contrary process – bone resorption, making it difficult to find favourable position for implants. Additionally, all factors that may interfere with good implant healing and functioning (see contraindications) should be noted.

**Contraindications presented above are generalized and valid for every surgery.** It does not mean, however, that for instance patients who smoke can not have implants. They do, but the risk of implant failure is much higher. Similar is valid for the rest. Therefore, it is very important to discuss the problems with the patient before the operation and explain to him everything in detail.
• specialist care
  In cases where the patient is under the specialist care it is strongly recommended to consult him, even if the cause of this care seems to have no direct connection with implant treatment.

• medical and social history

3 local conditions evaluation
• effective oral hygiene and motivation to perform such
• local diseases (bruxism, periodontal problems, allergy etc)
• quality and thickness of mucosa
• intermaxillary relations
• bone quantity and quality

4 general aspects
• patient’s habits: smoking, diet, drugs abuse etc
• finding local and systemic contraindications
• evaluation of potential implant sites

5 psychic status
  Even if a patient is found to be a suitable candidate for implant therapy, he or she must be apprised of two additional factors before being considered for treatment:

  • Patients receiving implant therapy for a mandibular bar over-denture may potentially experience approximately four to six months of discomfort and diminished function before any benefits become apparent. They are frequently required to go without their removable prosthesis for significant periods of time following initial surgery.

  • Implant failures can occur at any time, despite everyone’s best efforts. Current success rates in the anterior mandible are very high. However, even here, implant fixtures can and do fail.

If the patient cannot come to terms with the possibility of failure, or four to six months of potential discomfort and inconvenience, then he or she is not a suitable candidate for implant therapy.
Pre-operative planning

Before selecting the most suitable type of implant restoration, the practitioner should review and be guided by the patient’s previous dental history. It is also vital to evaluate the patient’s chief complaint, as it may have an equal bearing on treatment outcome.

I surgical criteria

Proper length and diameter selection of implants is crucial for their uneventful placement and functioning. The definitive site should be carefully chosen bearing in mind optimal support of prosthetic construction and load distribution. As a general rule implants should be surrounded at least by 1mm of the bone from each side. However, in order to prevent bone resorption between implants or implants and natural elements following minimal distances should be kept:

- implant – implant  - 3mm
- implant – tooth  - 2mm

The violation of the sinus maxillaris, canalis mandibularis or the mandible itself, should be avoided (2mm of bone are advisable between those structures and implants!).

The design of final prosthetics should be considered prior to implant surgery. CT scans, radiographs, study casts, wax-ups an overall clinical evaluation should be utilized to determine the optimal position and angulation of all implants at the time of placement. Drilling guides (or surgical stents), particularly in case of fixed constructions, are strongly recommended. Total case planning including eventual prosthetic-restorative modalities is essential for proper use of Dyna Implant Design.

To help choosing the proper implant size and implantation site the following planning steps are important:

Intraoral inspection

Intraoral inspection and palpation of mucosa is the first step to give general information about anatomical situation, available bone, muscles and fraenula attachments. In many cases it can correct our first impression that bony conditions are favourable.

Jaws relation should be noticed.

Looking at the edentulous mandible over time, it loses height and width of bone. As this occurs, the width of attached gingiva narrows considerably, the tongue increases in size and activity, and the buccinator and mylohyoid muscles become more active. In addition, the genial tubercles become more prominent and in the severely resorbed mandible, they can often be superior to the height of the ridge crest.

With successive denture treatments, it is common for the vertical dimension of occlusion to decrease as bone resorbs. This promotes an increased tendency toward a skeletal Class III relationship.

Posteriorly, poor ridge height inadequate attached gingiva, and compromised ridge shape cause increased horizontal movement of the prosthesis. This increases the lateral forces that are brought to bear on the anterior implants, and may affect overdentures retained on implants in the anterior part.

It is also important to notice the dentition. For example: a full natural arch in some situations can be contraindicated for placing fixed construction in the opposing jaw whereas, full denture seems to have no influence on this type of prosthetic construction. Given the fact that occlusal forces in the molar region
are in the range of 150 to 250 psi, and knowing that parafunctions increase these occlusal forces to as high as 900 psi it is clear why it is so important to assess the situation properly, though in the edentulous patient, the average occlusal force drops to just 50 psi.

Natural dentition opposing implants is always a situation of special consideration. In those cases the load forces transferred onto the implants will be greater and a small fault in prosthetics (allowing for perfect planning and following surgery) may lead to serious consequences including implant failure. Maximum occlusal forces in such situations may increase as much as 300 per cent compared with pre-treatment values.

**X-ray examination**

X-ray photos help to get more adequate information about anatomical situation and the position of important structures. Different radiographic techniques are available. The most accurate is Computer Tomogram scanning (CT). This technique gives exact information about position of the sinus maxillaris, canalis mandibularis, vertical horizontal and transversal dimensions of available bone. An orthopantomogram (OPG) is a very popular and frequently used technique. However, it is not as precise as CT scans and it can only supply information about vertical and horizontal dimensions of the bone. To avoid faults in measurements (connected with size deformation usually in scale 1:1,20; 1:1,25) OPG can be taken with special templates that patient wears in the mouth during taking the X-ray. By placing round, metal markers over potential implant sites in those templates we can calculate (knowing their dimensions) the real height of the bone. Another way of choosing the implant size is placing a special X-ray tracing over the OPG. It is a fast method but not fully accurate. Therefore, to make the procedure safer Dyna Dental Engineering produces it in scale 1:1,3.

**Models analysing**

By analysing study models of the patient one can determine intermaxillary relations as well as bone configuration. The same models can be used to visualize bone in so called bone mapping technique. This technique allows to transfer the thickness of the mucosa to be transfer onto the model and in this way gain information about the transversal shape of the bone. Different methods of measuring the thickness of the gingiva are available. The simplest is to use a thin needle or endodontic instrument with endo-stopper to punch gingiva in the place of potential implantation on different levels and then transfer measurements to the anatomical model. More advanced is using an ultrasonic instruments which measures the thickness automatically.

**Diagnostic set-up in wax.**

To provide information about favourable angulation and positioning of implants diagnostic set-ups can be used. The angle between the long axis of the implant and the direction of bite load should be as low as possible and not bigger than 15°. Furthermore set-ups can be used to produce a drilling guide. After consultation with your technician concerning the type of desired prosthesis,
location and number of implants, insert angulation an acrylic or metal stent can be produced (type of it depends on personal preferences of the operator). This stent serves as a drilling guide and is used intra-operatively. This solution seems to be especially useful for less experienced operators who may find preparing parallel implant beds problematic. It has also another advantage. Relations between neighbouring implants as well as between implants and natural elements are decided before the operation and chosen so that the best esthetical effect can be achieved.

2 prosthetic criteria
The type and design of prosthetic construction should be determined before implantation. X-rays, models, wax set-ups may be useful to determine implant position and angulation. It is also possible to use earlier prepared drilling guides. Total case planning including surgical and prosthetic planning is indispensable for proper use of Dyna Implant Design.

- It is recommended for overdentures in the mandible, 2 to 4 implants to be placed between foramina mentalae .. In the maxilla 4 to 6 should be placed remembering about position of the sinus maxillaris. Eventual sinus lifting may be considered. For fixed bridges in edentulous patients minimum of 6 implants, and preferably 8, must be used. The diameter of the used implants for fixed (single crowns, bridges also with memory), and bar constructions should be at least 3,6mm, and the length at least 10mm.

- In relation to the diameter of used abutments the sufficient distance between neighbouring implants should be kept in order to achieve satisfactory aesthetics. Implants placed too close to one another or neighbouring teeth may be a serious problem during prosthetic reconstruction. Using drilling guides during surgery and choosing proper implant diameter prevents such problems.

- In relation to prosthetic design rules of biomechanics should be taken into consideration. In order to minimize excessive compressive/transverse forces coming on the final restoration, to reduce off-axis loads, reduce occlusal tables by one third. Create shallow incline planes to change the direction of unfavourable forces. Avoid creating cantilevers as they multiply the forces due to moment arm. Group function occlusal scheme is recommended and the centric occlusion contacts should be light. Night guards for bruxers, clenchers or heavy biters is strongly recommended.

To determine the ideal diameter and place for implants use the study models. Implants should be chosen so that the minimal distance between an implant and a tooth (A, C) should be at least 2mm, whereas between two neighbouring implants(B) 3mm. Bucco-lingual, and mesio-distal position must be chosen in relation to the shape and position of natural teeth.
Necessary minimal distance between implants (diameter centre) in relation to the abutment used.

<table>
<thead>
<tr>
<th>IMPLANT DIAMETER</th>
<th>ABUTMENT / DIAMETER</th>
<th>MINIMUM DISTANCE BETWEEN IMPLANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,6mm - 4mm</td>
<td>GG - 6mm</td>
<td>7mm</td>
</tr>
<tr>
<td>3,6mm - 4mm</td>
<td>GN - 5mm</td>
<td>6mm</td>
</tr>
<tr>
<td>5mm</td>
<td>GG - 7mm</td>
<td>8mm</td>
</tr>
<tr>
<td>5mm</td>
<td>GN - 5,5mm</td>
<td>6,5mm</td>
</tr>
</tbody>
</table>

In all cases, if the possible treatment options will not satisfy the patient’s most important concern, the practitioner must clearly explain what the likely outcome of treatment will be, as well as the potential risks, and the patient must agree that the compromise is acceptable.
6.4 The Cawood and Howell classification.

The importance of preparing the accurate treatment plan for successful implant restoration is unquestionable. The aim of the modern implantology is to prevent, or delay bone mass loss in edentulous and partially edentulous ridges and restore the function of the stomatognathic apparatus. Resorption of the alveolar ridge after tooth extraction is a continuing process and manifests itself by anatomic changes that occur in a vertical as well as a horizontal plane.

It is very important to the practitioner to realise what changes the edentulous ridge may undergo. Different classification has been proposed to divide edentulous jaws but the most popular at the moment seems to be the classification of Cawood and Howell. It gives the operator a chance to visualise different forms of the ridge and set indications for e.g. the type, number or length of the implants. It may be used to provide guidelines for the use of implants in the prevention of bone loss, and function restoration in the edentulous jaws.

However, our idea of using this classification was to make the cooperation between the surgeon and the prosthetist easier by setting clear indications for particular prosthetic solutions in connection with the form of the ridge. When referring the patient to the surgeon it can become an extremely useful tool in establishing mutual cooperation.

Cawood and Howell classified edentulous jaws according to a three-dimensional analysis of the anatomy. Three different cross sections were used:

- in the symphysis region,
- through the mental foramen
- in the molar region.

They found the following dependences:
- the alveolar ridge resorbs in the anterior and premolar regions horizontally as well as in vertically
- the resorption process was almost entirely confined to the alveolar ridge of the mandible and that
- the basal part, which is the part caudal to the mental spina, does not significantly change after extraction.
Cawood and Howell proposed the following resorption stages:
Class I. Dentate ridge.
Class II. Ridge directly after extraction.
Class III. Broad and rounded ridge with adequate height and width.
Class IV. Knife-edge ridge with sufficient height but insufficient width.
Class V. Flat ridge with insufficient height and width.
Class VI. Depressed ridge with a cup-shaped surface.

Additionally two classes are added:

Class VII, the labial part at the site of the symphysis has been resorbed in a vertical direction to a height of 10 mm,
Class VIII, a further reduction of the height to a value of 5 mm.
7. Surgery

The complete implantation technique with Dyna implants consists of two surgical phases and following prosthetic procedure. All elements should be performed as atraumatic as possible with use of the proper Dyna instruments. This manual contains only the description of simple surgical procedures used for placing implants in the mandible for overdentures. For more advanced procedures (use of membranes, sinus lifting, tissue management) we recommend participating in special training courses and reading available literature.

Anyone wishing to perform implantations should have proper surgical training and experience in the field of dentoalveolar surgery. It is highly recommended for inexperienced dentists, at the beginning, to work under supervision of other qualified operators. It is also important to remember about requirements for equipment that have to be fulfilled to place implants in aseptic conditions. The surgery theatre should be thoroughly disinfected. Patient, unit and instruments should be covered with sterile sheets. Operator and his assister should wear sterile cloth and gloves.

7.1 Sterilization

Only the implants are supplied sterile. Expiry date is clearly marked on every package and should always be checked before implantation. The Dyna instrument cassette is supplied non sterile and therefore should be sterilized, in the appropriate manner, before use.

Please notice:
All parts must be removed from their packaging before sterilization. Implants are supplied in a double peel pouch packaging which means that the implant itself (in a plastic bottle) is covered by three protective layers of packaging.
Do not sterilize or re-sterilize implants.
7.2 Instrumentation

A suitably equipped operation room is prerequisite for complete success of any implant treatment. It is important to have such an instrumentation that allows for secure handling of all possible situations. The choice is rather personal and depends on individual preferences as well as techniques performed. Herewith we give an example of basic surgery instrumentation:

*Dental mirror, Dental probe, Cotton pliers, Fine tissue pliers, with teeth and flat, Scalpel, Bone file, Curette, Needle holder, Dissection scissors, Suture scissors, Lip retractor, Bone ronguer, Suture material, Straight handpiece and contra-angle for surgical unit.*

7.3 Premedication

Premedication is necessary only in particular situations. Patients belonging to the “risk group”, or patients with planned extended operation procedures may be premedicated in an adequate manner – following all general rules. Premedication with atropine has proved to be useful for diminishing saliva production and can be used as standard. Anxious patients seem to be indicated for sedative medication.

7.4 Anaesthesia

There are several possible way of anaesthetising the patient before implantation.

- Nerve block
- Local anaesthesia
- General anaesthesia

The choice depends on the particular situation and dentist’s preferences. However, in most of the cases local infiltration anaesthesia seems to be most recommendable. Addition of constructive agent reduces bleeding in place of implantation. Moreover, patients can feel some pain when approaching the mandibular canal which gives the dentist a chance to avoid unwanted complications (perforation !)
7.5 First surgical phase.

When carrying out late implantation (after disinfection and giving the anaesthesia) the bone is exposed by making an incision along the alveolar ridge.

The mucosal flaps and periosteum are then reflected.

Now, the shape of the bone can be properly judged, eventual sharp ridges removed (using a crestotom drill or preferably bone ronguer), and the definitive location of implantation marked with rose drill (using additionally e.g. drilling guide).

The minimum buccal-lingual thickness of osseous tissue, required to successfully place an implant, is 5.0 mm. The anterior ridge crest of the mandible often resorbs to a peak superiorly, leaving inappropriate ridge morphology for implant placement. In order to achieve demanded 5.0 mm "flat" base, either the anterior ridge crest peak must be removed (which effectively lowers the level at which the implants are placed), or a bone graft must be considered. Prior to selecting implant sites, the osseous tissues should be evaluated with appropriate radiographic studies such as panoramic x-rays, tomograms, or CAT scans.

When using particular implants the minimal transversal thickness of the bone after removing inappropriate structures should be as follows:

<table>
<thead>
<tr>
<th>Implant diameter</th>
<th>Transversal thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 mm</td>
<td>&gt;5.0 mm</td>
</tr>
<tr>
<td>3.6 mm</td>
<td>&gt;5.5 mm</td>
</tr>
<tr>
<td>4.0 mm</td>
<td>&gt;6.0 mm</td>
</tr>
<tr>
<td>5.0 mm</td>
<td>&gt;7.0 mm</td>
</tr>
</tbody>
</table>

With the pilot drill the first drilling is made. Using the drilling guide is here recommendable. The depth of the preparation should be determined before operation (see 6.3) but it is possible and advisable to change it if the existing situation allows for, or demands using a longer or shorter implant. Thereafter, the Lindemann frees can be used to make the preparation wider and if required slightly change the angulation.
Enlarging of the site depends on the diameter of the implant to be used. The following sequence of drilling should be applied for different final preparations:

<table>
<thead>
<tr>
<th>Final preparation</th>
<th>Max. Rounds per min.</th>
<th>Drills sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø 3.0 mm</td>
<td>2000 rpm/min</td>
<td>pilot → (lindemann) → Ø3.0</td>
</tr>
<tr>
<td>Ø 3.6 mm</td>
<td>All spade drills</td>
<td>pilot → (lindemann) → Ø3.0 → Ø3.6</td>
</tr>
<tr>
<td>Ø 4.0 mm</td>
<td>800 rpm/min</td>
<td>pilot → (lindemann) → Ø3.0 → Ø3.6 → Ø4.0</td>
</tr>
<tr>
<td>Ø 5.0 mm</td>
<td></td>
<td>pilot → (lindemann) → Ø3.0 → Ø3.6 → Ø4.0 → Ø4.7 → Ø5.0</td>
</tr>
</tbody>
</table>

The grooves on drills allow to prepare the site to the exact depth corresponding with the implants’ length (markings must be fully covered beneath the bone). All preparations should be done under excessive cooling (preventing possible thermal trauma) with sterile saline solution that additionally may be cooled before operation. All preparations should be done in a pump-up-and-down movement with moderate pressure force. To avoid perforations or further prosthetic problems it is important to control continuously the direction and the depth of drilling. To do so we advise using parallel/depth instruments and drilling guides. The dental assistant can also be of use as she or he see the drill from a different angle.

Once the site has been widened to the desired diameter it is ready to receive implants. The Dyna parallel and depth instruments are used to control the preparation. If the instrument fits without any problems one can be sure that the implant will fit as well (see also product catalogue). To begin with, however, the site should be carefully cleaned (saline solution) with any debris and the entrance of the preparation controlled and adjusted if necessary.

The implant is removed from the sterile packaging and introduced into the receptor site making certain not to contaminate it. (It may only have contact with the bone and the blood of the patient.)

The implant should be seated by:

-first inserting it into the site, then bending the inserting handle off, and
-finally pushing it to “the end” with an instrument (e.g. elevator) or the handle itself touching only the covering screw.

A properly seated implant should be placed slightly (together with the covering screw) under the bone level. Implants should not be forced to fit into the site.

If any obstacle exists (when pushing the implant) the handle should be bent off, covering screw unscrewed, implant using the implant puller removed and the site once more controlled and adjusted (widening and cleaning). The implant should be secured in a sterile place and after the site adjustment reinserted. Next, the puller is unscrewed and the covering screw screwed back.

The flap is sutured into place.

Please notice:
1 Never overforce the implant into the site—it may lead to destroying the coating and further failures. With softer type of bone (Maxilla) it is, however, possible to knock, but very gently, the implants into the prepared site, that can be even slightly narrower than the real implant diameter*.

2 Always stick to the fixed pattern of drilling:
   - sequence of drills,
   - intermittent drilling technique,
   - avoidance of excessive force during preparation,
   - use of sharp drills (maximal 20 times per drill depending on bone quality)
   - excessive cooling with chilled saline
   - adequate rational speed

   *see the Dyna training courses

3 Never touch the implant by hand. Avoid contaminating the implant with substances other than the blood and bone of the patient. If it happens or if the implant has been in any other way damaged never place it. (see guarantee)

4 Never and in no way sterilize or re-sterilize the implant yourself neither with or without the packaging. An implant taken out only of its outer pouch can be stored, but not more than one month, in a clean and sterile place.

5 Always try to prevent perforating or destroying vital anatomical structures.

6 Always try to place the implants in the most favourable position (possibly parallel to one another and axial to bite forces). When placing more than two implants for fixed constructions try not to position them in one straight line, and if this is not possible try to use different diameters. For the overdentures try placing the implants following the curvature of the alveolar ridge. Remember about the minimal distance from one another biological width, type of prosthetic construction. The depth of placing should include consideration of biological height and possible initial bone resorption – which influences the papilla formation and the final aesthetic result.

7 Try to suture the flap so the healing occurs per primam intentione. Preferably use non resorbable sutures (000 or thinner)

9 Always tight the covering screw with the hex screwdriver before suturing the flap!
7.6 After care.

After every operation each patient should be told to follow certain rules. Consequently the patient should:

- cool the operation area with extraoral dry ice compress for several hours (overcooling should be avoided)
- use a “soft” diet
- in some cases it is preferable that the denture is not worn before final wound healing.
- if necessary use following medications e.g.
  - Antibiotics
  - Anti-inflammatory agents (not based on acetylsalicylates)
  - Analgetic agents
- rinse mouth with 0.2%chlorhexidine solution (40second rinses) for the whole healing period

Sutures can be removed after 7-10 days, however, the time may vary depending on particular clinical cases. The existing prosthesis should be adjusted and relined so that the implants are not loaded during the integration phase. The integration time of 3 months for the mandible and 6 months for the maxilla should be seen as an advisory period rather than a fixed time. Operator is always obliged to check for successful (e.g. X-ray photo) osteointegration before proceeding with the second phase.

7.8 Second surgical phase

Once the healing period has elapsed, the area is locally anaesthetised (infiltration) implants are located and recovered with scalpel or tissue punch. In most cases it is enough to make small incision(s) parallel to the ridge.

The colour coded titanium covering screw is unscrewed from the implant and replaced with the chosen healing screw of the same colour. In some situations a layer of the bone covering the implant has to be removed first. It is important then to remove enough bone to screw the healing abutment tightly to the implant.
Please notice:
For Octalock healing abutments use Dyna Sulcus reamer

Dyna Sulcus Reamer

The Dyna Sulcus Reamer is a special instrument designed especially for shaping the bone around Dyna Octalock® implants and simplifying the placement of the healing abutments during the second surgical phase. The Reamer is available as hand sulcus reamer (art.no. 18PD1)

Notice:
Using Dyna Sulcus Reamer is limited to Dyna Octalock® Implants. The use of Dyna Sulcus Reamer during second surgical phase is strongly recommended.

1. Anaesthetise locally the area
2. Identify and expose the cover screws either with separate incisions or with one supracerstal incision.
   *Incision should always be done whenever possible in the attached mucosa even though this should not be exactly over the implants. Optionally punch can be used to remove tissue above the cover screws*
3. Unthread the cover screws (hex driver, art.no. 5181S)
4. Head the reamer into the implant. Remove the overgrowing bone around the implants
   **PLEASE NOTE:**
   Take all necessary measures not to damage the implant. Make sure to replace the reamer when it is worn out
5. Screw the healing abutments into place. If necessary suture the mucosa between abutments. Check the fit with an x-ray.
The inside of the fixture should also be checked for any debris and if necessary cleaned (e.g. saline).

The type of healing abutment depends on the type of prosthetic construction to be applied. To achieve better gingival adaptation suturing the wound may be recommended.

During the healing period (usually 7 – 10 days) the healing abutment enables the gingival margin to adapt and form properly. To ensure favourable aesthetics and emergence profile we recommend a longer maturation.

**Please notice:**
The interdental papilla is very important for determining the final aesthetic result within fixed constructions. It is therefore possible to extend the healing period by producing the temporary restoration. The contact points should be designed so that the papilla fills in spaces between the teeth fully. According to the literature regaining 100% of the papilla’s height is possible only when the distance between the contact point and the bone is not longer than 5mm. (see tab. below). Having done the temporary construction it is easy to determine the proper position of the contact points and design the final restoration.

<table>
<thead>
<tr>
<th>distance between the contact point and the bone</th>
<th>% of the papilla regaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5mm</td>
<td>100%</td>
</tr>
<tr>
<td>6mm</td>
<td>50%</td>
</tr>
<tr>
<td>7mm</td>
<td>25%</td>
</tr>
</tbody>
</table>
8. Prosthetics

The prosthetic procedure shall be presented on simple examples of different types of prosthetic constructions.

8.1 Choosing the Right Abutment Height.

The proper height of the transgingival part of the abutments is very important for the final result. It determines not only the proper function of the whole prosthetic construction but aesthetic outcome as well.

When choosing proper abutment height it is helpful to determine the gingiva height (GH = distance between gingival margin and the implant.). This should be done after healing period (full gingiva maturation) using grooves on the healing abutment (2mm, 4mm and 6mm the abutment top).

For overdentures it is important to choose the lowest abutment possible (the higher the abutment the higher the lateral-leverage forces on the implant). Therefore, in some cases it would be indicated to do gingiva correction rather than choose higher abutments!

When choosing the right abutment hygiene should be taken into consideration. It is extremely important to enable the patient proper cleaning of the prosthetic construction. Therefore, in some situations too short abutment may be an obstacle for good hygiene (especially for bar overdentures).

Bite relation can also influence the abutment choice. In cases when there is not sufficient space between the maxilla and the mandible using certain types of abutments or even type of restoration may be impossible or strongly contraindicated!
For fixed constructions it is the general rule to choose the abutment so that the future margin of the crown be hidden under the gingiva. This because of higher aesthetic demands for crown and bridge works. For Octalock system, however, which has a range of abutments that can be easily prepped to fit particular clinical situation, the dentist can choose a higher abutment and let his lab correct margins in height to follow exactly the contour of the gingiva.

Every situation should be judged individually and the prospective decision should be a balanced choice between local bite relations, implant mechanics, patient’s motivation and possibility to keep the prosthesis clean.

Considering hygiene requirements we recommend the following:

<table>
<thead>
<tr>
<th>Abutment</th>
<th>Height above the gingiva</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>~1.5 mm</td>
</tr>
<tr>
<td>Bar</td>
<td>~0.5-1 mm</td>
</tr>
<tr>
<td>Ball</td>
<td>~0.5-1 mm</td>
</tr>
<tr>
<td>fixed &amp; memory</td>
<td>so that the ridge of the future crown is covered under the gingiva</td>
</tr>
</tbody>
</table>

1.5 Transgingival height - OCTA

Dyna Octalock System has been design to be flexible and universal. All abutment lines are compatible with both implant diameters, which in practical term means, that any of the Octalock abutments will fit either Ø3.6 or Ø4.0 interchangeably. Such solution does not require colour coding system for different diameters. It saves also the need to have excessive stock of prosthetic parts.

However, when choosing the proper abutment one should remember that the effective transmucosal height for the same abutment placed on different implants will be different. To understand this clearly please see the picture below.

Given the same total height of abutments placed on different implant diameters there will be a discrepancy in height between the top of the implant and the margin of chamfer preparation (or the top of the abutment). This discrepancy is caused by the fact that the same abutment “fits somewhat deeper” in the Ø4.0mm implant.

When using the product catalogue please notice information between ( ) giving the exact transgingival height for Ø3.6 and Ø4.0mm.
8.2 Screwing the Abutment

All final abutments must always be torqued onto the implants with 32 Ncm using the torque wrench instrument and adequate screwdriver. Every abutment should be checked for fit (X-ray photo). This will prevent undesired loosening and possibility of the abutment fracture. The abutment must be screwed in full contact with the implant without any debris between.

All final abutments, **must be checked for loosening** after a few weeks, meaning that the final restoration may only be produced/finally cemented after re-screwing (Torque Wrench) of the abutment.

8.3 Torque Wrench Use

The Dyna Torque Wrench is a special instrument used to screw Dyna abutments to the torque of 30 or 35Ncm*. It should be used with all Dyna abutments to screw them into implants definitively and prevent from unscrewing. (see also instruction for use delivered with the Dyna Torque Wrench).

*Apply **35 Ncm** indication for all abutments placed directly on implant level
Apply **30 Ncm** indication for all abutments placed on extension level

The Dyna “S” drivers can also be used in combination with the ITI Straumann Torque Wrench.*(see also 5.3)

Dyna Torque Wrench should be calibrated **once a year** for proper torque.

*ITI Straumann is a registered name of the ITI Straumann(CH)
8.4 Anti-rotation IMPLANT-ABUTMENT

It has been proven that loosening of the abutments, especially with single tooth replacements, can be prevented by screwing the abutment into the implant with sufficient torque. This torque will result in an upward force (preload) onto the implant threads so friction will prevent the abutment from rotating.

Research showed the torque of 32Ncm to be ideal to prevent the Dyna abutments form loosening without overloading them. The desired amount of torque depends on the materials used and the quality of the threads, No compromises are in the production of Dyna products. All implants and abutments are made of Ti grade 5 and are equipped with the most accurate threads (6H/6h).

It is recommended to reapply the same torque to the abutment, after one or two weeks, before cementing the prosthesis. As there is some relaxation in every material, causing a reduction of the pre-load. Retightening can prevent the abutments from unscrewing.

Therefore, in cases of fixed constructions producing a temporary crown or bridge has two major advantages:
- possibility to screw the abutment again
- possibility to form the gingiva in desired way and achieve maximally aesthetic result.
Octalock System has been designed to achieve 0 degree rotation in the clinical use, as well as to enable easy transfer of the situation in the patients mouth to the lab model. The use of the octagon and conical connection has been carefully chosen.

Any antirotation is of no use when there exists a significant freedom of movement between an abutment and an implant. Most of the systems present on the market, nowadays, have a rotational freedom of 4 to 12 degrees. This may influence clinical performance of any prosthetic construction and make the accurate transfer mouth-model virtually impossible. Only a 0 degree rotational freedom can guarantee the best results, as only then the implant analogue position in the model will be the same as in the mouth.

Dyna Octalock system has been designed to make transfer procedure as precise as possible.

To assure this, the octagon connection has been planned so that the external octagon has slightly tapered walls (around 1 degree). Due to this modification by means of micro deformation, abutments are prevented from any rotation once seated and screwed in the implant. This 0 degree rotational freedom results in a perfect, trouble-free transfer from mouth to the model and vice versa. This means in terms of practical usage, no more problems with taking impressions. The fixed prosthesis is made in the lab on the same abutment as the one placed later in the mouth of the patient, and therefore, it will always have a prefect fit.

Because of the fact that the tapered octagon suffers only minor deformations, the conical connection placed above it provides a perfect seal from the outside environment. Choosing two different angulations always results in a 100% closed connection between the implant and the abutment. At the same time this conical connection provides a stable fit in the implant, which makes the whole construction very solid and generates the ideal distribution of the applied forces. To protect the fixation screw from braking and unscrewing it has been added a conical head. This provides the same stability as the conical connection and makes the whole system self centring. Due to friction forces only a small amount of the applied torque will be transferred to the thread of the screw resulting in a considerable tension relaxation. This, in combination with the conical connection, makes it almost impossible to overload, and brake the screw during normal physiological use.
The internal octagon has been introduced for several reasons:

- Increase of the implant wall strength (comparing with the hexagon design) – allowing for the same diameter of the fixating screw and the hexagon/octagon wall, the minimal thickness of the implant wall for hexagon design is about 30% thinner than for analogue situation with octagon design.

- Improved aesthetics – the octa has been chosen to be internal instead of external so that no space is lost from the connection upwards. In this way it is possible to use a very low abutment in all those situations where the gingiva thickness is insufficient, so that no compromise in aesthetics has to be made.

- Possibility of adding the morse taper above it – in this way the new connection joins the best features of the other renowned implants systems in one, giving the security of equal force distribution, brake protection and the best aesthetics.

- Increase of the prosthetic positions for e.g. the angulated abutment

4.3 Antirotation ABUTMENT-CROWN

Dyna Octalock System has been provided in a reliable system preventing loosening of the abutments during clinical function. Combination of internal octagon and conical surfaces gives the guarantee for precise fit and stabilisation. Nevertheless, when restoring single elements its is important not to forget about antirotation for the crown (crown-abutment antirotation). Dyna OCTALOCK abutments have no special antirotational structures solving that problem (contrary to all-in-one Dyna abutments that have standard either special grooves or castellated parts).
It is the user’s responsibility to provide the finally prepared abutments in antirotational structures.

In case of using standard abutments it is possible to create a “side groove” on it or prepare the upper part so that it would have sort of U formed cuts. In case of using Universal abutments it is the technician who makes antirotational structures.

8.5 Impression Technique

There are several impression techniques that can be used for the Dyna abutments:

8.5.1 Transfer technique/pick up technique (ball abutment)
Special standardized transfer copings for transferring the position of the abutment exactly and reliably onto the master model are needed in this technique. Once the gingiva has healed the healing abutment is unscrewed and replaced by the proper ball abutment. The transfer coping is then clicked onto the abutment and the usual impression with individual tray can be taken. As the impression material has set the impression is pulled out and the position of the coping in it is checked. Ball laboratory analogues are then clicked into the copings and the master model is casted.

8.5.2 Open-tray technique (bar abutment, alternatively medical or fixed abutment)
An alternative method (transferring the position of the implant) is to use an open tray technique. In this case the individual tray is provided with opening(s) over the implants. The impression copings are screwed in with the long fixation screws, replacing the healing abutments. The tray is checked in the mouth. There should be enough space for impression material, and the screws should stick out of the opening(s). The opening(s) should be covered with soft wax and the impression may be taken. Once the material has set the long fixation screws are unscrewed and the impression is pulled out. Using the same screws the lab implant analogue is connected by the dentist or technician to the impression copings, and the master model poured out. It is important not to change the position of the copings in the impression material during manipulation. When taking the impression over more implants we recommend splinting the impression copings with one another before actual impression taking.

For Octalock system, designed so that both the technician and the dentist could work on the same abutment, the open tray technique is the method of choice.

8.5.3 Standard impression (fixed abutment)
Some situations demand taking a standard impression as for eg. crowns and bridges on natural dentition. In such cases first the healings have to be replaced by chosen abutments and the impression can be taken as usual. After pulling out, the model can be cast directly after repositioning of the laboratory abutment analogues.*

*more details about this technique will be given on Dyna courses
8.6 Sterilization

All prosthetic components are supplied clean but not sterile. Operator is obliged to sterilize them or disinfect in appropriate manner.

8.7 Shape of the Fixed and Memory Abutments  GG GN

Transgingival part.
The transgingival shape is made according to the aesthetic principle*  The GG abutments, with a diameter of 6mm for the Ø 3,6mm and Ø 4mm implants and 7mm for the Ø 5mm implants, are indicated for central incisors and first and second molars. The GN abutments for the Ø3.6mm and the Ø4.0mm implants have a diameter of 5mm and a diameter of 5,5mm for the Ø5mm implants. The GN abutments are available in a trans-gingival height of 2, and 3mm and are meant for all crown & bridge indications. Ø 3.6, 4.0, 5.0 GG and GN memory abutments can be screwed into the implants by means of the special GG instrument and torque wrench. Ø3.0 memory abutments have the outer diameter Ø5.0 and are produced without the castellated part. They should be screwed with the universal memory instrument.

*The abutments are designed with a convex shape offering the following advantages:
1. the different diameters allow the technician to produce fixed prosthetics with better aesthetics
2. the convex shape provides more freedom for the papillae
3. there is no downward pressure on the surrounding gingiva, so the margins of the crown or bridge stay more subgingivaly.
Supragingival part (abutment-head)
The height of the abutment head is always 6mm. Because of the castellated design of the GG abutments and the GN Memory abutments the Torque Wrench can be used to obtain the optimal torque. The GN fixed abutments are screwed into the implant by means of the Memory instrument without Torque Wrench and therefore are not meant to be used for single tooth restorations*.
*This limitation can be solved with Dyna Octalock implants and abutments. Please refer to Dyna Octalock Manual.

Note:
Always bend the Torque Wrench twice manually before use! Read the instructions of use!

The new GG instrument (art. code 5383) that can be used in combination with the Torque Wrench (art. code 5083) exactly matches the castellated shape of the abutments.

Note:
The previous (concave) healing abutments for crown & bridge for Ø4.0mm implants (5815) can not be used with the new (convex) GG and GN abutments!

8.8 Memory Abutment

In many clinical situations it is not possible to obtain an ideal path of insertion (especially in the maxilla) for fixtures, corresponding with the loading axis of the prosthetic construction. Bone quality and quantity limitations, position of anatomical structures are one of the reasons influencing potential choice of implantation place. The main reason, however, seems to be the protrusive shape of the anterior maxillary part which develops due to the horizontal resorption of the alveolar bone.

In such cases the clinician faces two options: applying advanced bone remodelling techniques or using angulated abutments. The latter solution though biomechanically unfavourable seems to be much easier and more useful in everyday practice.
One of the solutions is to offer besides standard straight abutments also pre-angulated ones. They can be angulated between 5° and 20°. Consequently, there is a necessity to have whole range of these abutments, available at the moment of abutment installation, to meet all possible modalities. Moreover, they often have to be additionally adjusted to achieve desired parallelism.

Dyna memory abutment is an adjustable abutment system based on the use of shape memory alloy allowing to avoid aforementioned problems. The system consists generally of one type of abutment that can be angulated between 0° to 20°.

This eliminates the need to have very expensive stock in hand and allows for obtaining uncompromised parallelism.

The world wide patented Dyna memory abutment is an assembled two part implant abutment to be used in all types of fixed prosthetic appliances together with Dyna Implant System. The transmucosal matrix part is produced out of titanium and the patrix out of nitinol.. Both parts create a sort of a ball joint and thanks to sufficient friction are rigidly connected in body temperature. When the temperature of the patrix decreases to around 0° the abutment head can be moved with Memory Instrument to the desired angle.

The idea of this abutment is based on a friction force, strong enough to create sufficient retention between two elements, that can be changed (using the memory shape effect). Memory effect is used in such a way that the two parts of the patrix ball that in room temperature are under considerable pressure (high friction) inside the matrix would move to each other when cooled to 0 degree, thus releasing internal pressure (low friction) and allowing the abutment head to rotate inside the cup. With an increase of temperature the two halves of the ball regain their pressure by going back to their primal position (shape memory) and fix rigidly matrix and patrix.

A similar idea though achieved by applying sufficient mechanical force is used to fixate the abutment itself in the implant. Screwing it with around 32 Ncm torque creates friction force between screws of the abutment and implant that can be in physiological conditions considered as antirotation protection.

8.9 Hygiene Requirements

Every construction made on implants should include in its design hygiene aspects. This means that patient should be able to keep the prosthesis clean. It is the dentist task to access patient’s ability and motivation to perform everyday hygiene and afterwards decide on type of the prosthesis. On the other hand it is the technician task to produce a construction easy to clean arranging e.g. interproximal spaces to be easily accessible with interproximal brushes. Proper hygiene is *conditio sine qua non* for predictable functioning of the implant supported prostheses.
8.10 Overdentures

Using Dyna Implant System it is possible to produce three different types of overdentures:

- Overdenture with magnets used as a retention element
- Overdenture with ball abutments used as a retention element
- Overdenture with bar abutments used as a retention element

The choice of one of them depends to great extent on the particular situation and on the dentist’s preferences. Following recommendations may be given to allow easier choice:

<table>
<thead>
<tr>
<th>High alveolar ridge + possible low leverage forces (lateral stability)</th>
<th>→ bar construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate alveolar ridge height + possible moderate leverage forces</td>
<td>→ ball construction</td>
</tr>
<tr>
<td>Low or very low alveolar ridge + possible high leverage forces</td>
<td>→ magnets</td>
</tr>
</tbody>
</table>

Please notice:
For every overdenture in the second surgical phase the covering screw should always be replaced with the healing abutment which has the same diameter as the used implant (GN or GG healings abutments are not to be used for overdentures).
Octalock system has apart healing abutment for overdentures.
8.10.1 Magnet retained overdenture.

Full description of producing a magnet retained overdenture can be found in Dyna Magnet Manual.

Indications:
- severely resorbed jaws and small implants → minimal lateral forces
- (elderly) patients with diminished motoric ability → easy maintenance

**DENTIST**

Replace the healing abutment with properly chosen medical abutment (see 6.3, 8.1) and screw it with the torque wrench (35Ncm).

*In case of lack of the torque instrument, it is possible to use the implant puller and screwdriver. In such a case you have to screw the medical with the finger force and than using the puller turn it about 60° more which corresponds to 10 minutes on the clock scale. The torque put on the abutment in this way is more or less 32Ncm. Dyna Dental recommends using in all cases Torque wrench.*

Take a full arch impression (alginate).

**LABORATORY**

Pour the impression in dental stone and separate cast after it sets. Fabricate the custom tray as usual.

**DENTIST**

3 Make the definitive individual impression.

*In some situations it might be necessary to block out the undercuts around the abutments. You can use then e.g. soft wax or impression material.*

**LABORATORY**

Pour out the master model and fabricate baseplate and create occlusal registration rim.
DENTIST
Insert the baseplate with the wax occlusal rim and make a bite registration at the vertical dimension of occlusion. Remove it from the patient’s mouth and reassemble everything on the working cast. Select the teeth and send the materials to the lab for fabrication of the wax try-in.

LABORATORY
Mount the working cast and opposing model on an articulator. Produce wax try-in and send the denture to the dentist.

DENTIST
Place the try-in the mouth. Make necessary adjustments. Ask for patient’s approval. Remove the denture from the mouth and return the denture to the lab.

LABORATORY
Finish the denture leaving enough space above abutments for later magnet installation.

Dyna Dental recommends a wear-in period of several weeks before installing magnets into the denture.

DENTIST
Using the denture take a local impression around abutments. Close mouth technique. Ask the patient to occlude maximally during the impression taking.

LABORATORY
Block out any undercuts in the denture and pour out a model. Glue the magnets onto the abutments on the model. Create enough space in the denture, above magnets so that they are not displaced during pressing. Use Dyna Magnet Bond to create chemical bonding between the magnet and the denture. Press and finish the denture.

Please notice:
Never damage the magnet capsule; because the magnetic alloy, which is not resistant to the oral environment, will be exposed. Do not polish magnets. Always check the position of the magnets with a fit checker material. If it indicates excessive pressure on magnets they must be repositioned. Perform regular rebasing in a common manner. Magnets should not be autoclaved. Regular check-ups are necessary to maintain good functioning.

For detailed description of magnet installation please refer to Dyna Magnet Manual.
8.10.2 Bar constructions (e.g. Dolder bar, screw retained prosthesis)

The Dyna bar abutment is an attachment designed to be used with Dyna implants. With this system both bar-clip retained overdentures and full arch screw retained prosthesis can be made. The cementation procedure of the bar delivers stress-free construction, that can be easily removed by the dentist. Different ways of producing the overdenture can be adjusted to the individual preferences of the dentist.

The procedure requires the practitioner to adhere to the basic principles of removable prosthodontics. The attachment and bar design selected must allow for movement of the denture or the implants will be subjected to excessive torquing forces during normal function.

Notice:
Do not use with implants 8mm,10mm Ø3.0 and 8mm Ø3.6

DENTIST
Make a full arch alginate impression of the healing abutments and edentulous areas. Send it to the lab for pouring in a working cast and impression tray.

LABORATORY
Pour the impression in dental stone and separate cast after it sets. Block the space over, and around the abutments to simulate the position of impression copings that will be used. Fabricate the custom tray as usual. Create openings above the abutments to allow access to fixation screws (open tray technique).

DENTIST
Determine the height of the bar abutment using the markings on the healing abutments. Choose the lowest possible allowing for proper hygiene.
Remove the healing abutments and tighten the impression transfers with torque wrench to 32Ncm. Verify the connection with X-ray photo.
Verify intraorally the custom tray. The screw should penetrate through the top of the tray without any hindrance.

To obtain maximum precision, when a large number of implants has been used, it is recommended to interconnect the impression copings (before taking the impression) with for example a cold curing resin (Duralay®).
Cover the access opening with softened piece of baseplate wax. Carefully try in the tray and let the screws penetrate through the wax, creating small access holes.

Take functional impression. Molding the border of the tray eg. with greenstick compound material first and using afterwards elastomeric material is recommended. Unthread the screws from the transfers and remove gently the tray from the mouth.

Make an opposing arch impression. Retighten the healing abutments. Send all parts to the dental laboratory.

LABORATORY
Attach the implant analogue. Pass the screw through the embedded in the impression transfers and thread it into the implant replica. Do not change the position of the transfer in the impression. Pour in the working cast.

[Because the bar is going to be cemented on abutments it is possible that the whole construction will not fit back on the model after cementation. To avoid this problem implant analogues can be covered with a thin layer 1mm of silicon material (e.g. Gingifast Zhermack®) before pouring out the master model. Thanks to certain flexibility achieved in this way it will be possible to screw the construction back in case of minor faults afterwards.]
Separate the model from the impression. 
Fabricate baseplate and create occlusal registration rim. 
[The bite can be registered using standard baseplates or, more precise, with help of special plates screwed to the implants in the mouth produced on the master model.]

**DENTIST**
Insert the baseplate with the wax occlusal rim and make a bite registration at the vertical dimension of occlusion. 
Remove it from the patient’s mouth and reassemble everything on the working cast. 
Select the teeth and send the materials to the lab for fabrication of the wax try-in

**LABORATORY**
Mount the working cast and opposing model on an articulator. 
Produce wax try-in and send the denture to the dentist.

**DENTIST**
Place the try-in in the mouth. 
Make necessary adjustments. Ask for patient’s approval. 
Remove the denture from the mouth, replace healing abutments and return the denture to the lab.

**LABORATORY**
Make a putty slot of labial and lingual surface of the waxed denture (this enables easier positioning of the bar or primary bridge structure). 
Verify the height of the bar abutments. (in case you find the height of the abutment not appropriate you can consult the dentist)

Screw the bar abutment with the dentist (short) screws onto the model. 
*For easier waxing it is preferable to use laboratory long fixation screws*

Place the casting sleeves (narrow side up) on the abutment centre and fix them with e.g. sticky wax. The space between sleeves and abutments should exist in finished bar. 
*This gives the dentist the possibility to cement the bar completely stress free.*
Determine the position of the bar. (notice hygiene requirements, load distribution, sleeves passive fit, insert way and aesthetics, hinge axis). Use the labial and lingual slots and, if necessary, the surveyor

Wax the connecting bar between the sleeves keeping embrasure areas open.
Attach spures and invest according to standard laboratory procedures.
Cast, devast and finish metal construction. It should fit loosely on abutments. If not remove enough metal from the inside.
For better retention roughen the inner side of the casted sleeves.
Send the construction with all spare parts and models to the dentist.

Please notice:
It is also possible to cast the sleeves first and than solder prefabricated bar (e.g. Dolder bar)

For this procedure:
- cast the sleeves in the desired alloy.
- attach the prefabricated bar in the desired position with self curing resin (e.g. Duralay®)
- place the construction in the soldering investment.
- solder and polish the construction.
- the bar should fit loosely on abutments. If not remove enough metal from the inside.

*see also the instruction manual of the prefabricated bar producer in order to determine preferable casting alloy and solder to be used.
DENTIST

Tighten the final abutment into the implants.

Try the casting in the mouth. Passive and precise fit is essential to the success of the implants. If necessary adjust it by removing enough metal from the inside of the sleeves.

Cement the bar onto the abutments using a two-component cement (e.g. Resiment®). Remove any cement excesses.

Unscrew the whole construction and put it back onto the model. If it does not fit (no silicon layer around implants analogues) take a new impression together with the bar with the previously used individual tray and long fixation screws (open tray technique - in place of impression copings use the bar itself.)

Please notice:
If the model was poured with the silicon layer around the implant analogue the cemented construction should fit back on the model without any problems.
LABORATORY
Screw the construction with the short polymerisation screws onto the model.

Place the retention clips according to the producer’s recommendations, block the whole out (with plaster or any other preferred material) leaving free only the retention parts of clips.

Please notice:
To activate or deactivate the clips afterwards sufficient space around the clips should be blocked out. There should also be enough blocking material around abutments to enable the overdenture some moving possibility.

Fabricate the denture following standard laboratory procedures.
Return the denture and the bar to the restorative dentist.

DENTIST
Place the bar over the implants and secure it with dentist screws (finish tightening with Torque Wrench!).

Insert the finished denture into the patient’s mouth and snap I onto the bar. Make final adjustments to the occlusion.

Instruct the patient in the use and care of the prosthesis, and provide adequate hygiene information and training.
**Please notice:**
To increase the retention of the bar retained overdenture it is possible to cast extra cantilevers. It is, however, important to remember how much it can extend from the most posterior implant on both sides of an implant-supported bar.
Several methods are known to determine it.
One method is to draw a line through the most anterior implant, and another through the two most posterior implants. The distance between the two lines can then be measured. A suggested maximum cantilever would be 1.5 times this distance.
The number of implants, their respective lengths and locations, the quality of bone support, the posterior ridge anatomy, occlusal forces, and the opposing dentition are of greater importance in determining the appropriate cantilever than a suggested formula.

### 8.10.3 Screw retained prostheses

Retrievable screw retained constructions like semi fixed bridges or freeded bar constructions with or without precise anchoring elements can be produced using the Dyna bar abutment. The procedure is almost identical as for the Dolder bar described above. The difference is that in place of modelling the usual bar technician models retrievable construction. In those situations special attention should be paid to hygiene requirements.

However, some remarks have to be made:

- When taking the impression it is recommended, especially for bigger constructions on more implants, joining (screwed in) impression copings with one another. You can complete it by, joining them e.g. with a dental floss (which serves as a frame) and then with auto-polymer material (e.g. Duralay®) placed over the “frame”.
- The length of the cantilever for full bridges should not be longer than 14mm in the mandible and 10mm in the maxilla, measured from the centre of the most distal implant
- **Please notice:**
  For these sort of constructions more implants should be used, and length and diameter are important factors. Therefore, do not use Ø3 implants. Longer and bigger diameter of implants should be used the longer the cantilever.
- After try in the metal structure the laboratory can finish the desired construction. In case of bridges when firing of porcelain or other facing material is needed there will be openings left (occlusal or lingual side) for screwing the construction. Those openings can be afterwards filled with composite or auto-polymerise material (depending on aesthetic needs) in the patients mouth.
- The ready construction is screwed with titanium dentist screws provided with closing ring.
- In some cases, as a result of not favourable implant positioning, the openings must be made on the buccal side. In such situations a secondary screw or cement retained metal superstructure can be made. Depending on particular clinical situation numerous variations are possible.

*For more information ask for Dyna training courses.*
8.10.4 Ball retained overdenture

The Dyna ball abutment is an attachment designed to be used with Dyna implants. With this abutment overdentures with ball attachments (dr. Dalla Bona idea) can be made.

**Note:**
Do not use with Ø3 implants 8mm,10mm long, and Ø 3,6 8mm.

**DENTIST**
Make a full arch alginate impression of the healing abutments and edentulous areas. Send it to the lab for pouring in a working cast and impression tray. Determine the height of gingiva using the markings on the healing abutments.

**LABORATORY**
Pour the impression in dental stone and separate cast after it sets. Block the space over, and around the abutments to simulate the position of impression copings that will be used. Fabricate the custom tray as usual (pick-up technique).

**DENTIST**
Remove the healing abutments. Select and tighten the final ball abutments with torque wrench to 35Ncm. Verify the connection with e.g. X-ray photo. Verify intraorally the custom tray. There should be enough space around and over the abutments.
Place the ball impression copings on the ball abutments. Inject the light body material around the ball abutments and fill the tray with heavier body material.

**Please note:**
To make tray checking easier you can ask your lab to produce it with openings over abutments. After placing impression analogues you will be able to see whether there is enough space around them for impression material and whether the tray does not give pressure on analogues. During impression taking openings should be blocked out e.g. with soft wax.

Take functional impression. Molding the border of the tray eg. with greenstick compound material first and using afterwards elastomeric material is recommended.

**Note:**
It is possible to take the impression without plastic copings. In such a situation the hex on the abutment must be totally blocked out so that the laboratory can place the lab analogue in the impression without any problems (lab analogue has no hex!)

Make an opposing arch impression

**LABORATORY**
Verify the position of the impression copings in the impression. Press the ball laboratory analogues into the copings.
Pour the impression in die stone – lab analogues are incorporated within the working cast.

Fabricate baseplate and create occlusal registration rim.
**DENTIST**
Insert the baseplate with the wax occlusal rim and make a bite registration at the vertical dimension of occlusion.
Remove it from the patient’s mouth and reassemble everything on the working cast.
Select the teeth and send the materials to the lab for fabrication of the wax try-in.

**LABORATORY**
Mount the working cast and opposing model on an articulator.
Produce wax try-in and send the denture to the dentist.

**DENTIST**
Place the try-in the mouth.
Make necessary adjustments. Evaluate aesthetics and phonetics. Ask for patient’s approval.
Remove the denture from the mouth, replace healing abutments and return the denture to the lab.

**LABORATORY**
Place the tin foil spacers over the abutments so that they cover 2-3mm around, and fix them with a drop of cyanoacrylate. Tin spacers provide necessary mobility for matrixes and relieve the load on the surrounding gingiva.
Choose the right insert way for the denture. Snap the matrices onto the patrices and block out the undercuts. **Position of the matrices during pressing must be unchanged.**

**Please note:**
Placing the matrixes parallel to each other makes the lamellae loading equal. This in turn adds to the long function of the ball attachment.
Remember:
- Check the position of the transparent ring, the lamellae need to be covered entirely.
Matrixes are delivered with PVC rings placed around the matrix lamellae. It protects lamellae and enables de- and activation after finishing the prosthesis. In cases where the PVC ring is missing it has to be placed before fixing the matrix. Use the matrix inserting instrument. (see product catalogue)
Before pressing the denture check the position of the plastic ring around the lamellae. Block out space underneath as shown on the drawing (e.g. Flexistone®, wax, etc.)
- A - free space
- B - plastic ring
- C - blocking material.
• Check the position of the matrix on the patrix
To minimise the instability of the denture (wobble effect) we recommend using a so called resilient matrix fixation method. Use the positioning rings to create space between the matrix and the patrix. The rings simplify additionally not only the parallel positioning of the matrices but blocking out the undercuts as well.

• Blocking out the undercuts and creating space around the abutments
All undercuts from the transparent ring down, need to be blocked out. You can use e.g. wax, plaster or silicone material (Flexistone®).

Fabricate the denture following standard laboratory procedures.
Finish and carefully polish the overdenture.

DENTIST
Insert the finished denture into the patient’s mouth and snap it onto the all abutments. Make final adjustments to the occlusion. Instruct the patient in the use and care of the prosthesis, and provide adequate hygiene information and training.

Please note:
Matrices are delivered with set pull out force. When activating or deactivating use only original instruments and always do it carefully. Too strong deactivating may push lamellae too much outside which makes the activating impossible !!!.

It is possible to fix matrixes chair side with Dyna Bond. In this situation the laboratory has to produce the prosthesis with sufficient space over and around abutments. Then the dentist has to place matrixes on patrices himself block it out and fix with Dyna Bond.
8.9.5 Rebasing.

Remove matrices from the denture. *Take care not to damage it.*
Place the impression copings on the patrix.
Take the impression (pick up technique with existing denture)
   Check the impression. Place the ball laboratory analogues in copings and check whether they fit well.
   Cast the working model.
   Place everything in the muffle and remove the prosthesis.
   Fix the tin foils
   Place the PVC rings around matrix lamellae (matrix inserting instrument)

**Note:**
The PVC should be placed around the lamellae not covering the retention ridge.

Place matrices over patrices
Follow usual pattern of rebasing.

Insert the overdenture and check for fit, function and aesthetics. Make necessary adjustments.
8.11 Fixed constructions.

8.11.1 Single tooth restorations

Indications:
- any single tooth replacement

To achieve sufficient anti-rotation force in single tooth restoration cases castellated abutments are recommended.

Furthermore, from the aesthetic point of view, using GG abutments (together with GG healings abutments) for central incisors (maxilla) and molars, and GN abutments for replacement of other teeth is preferable. In all those situations, however, one should measure the distance between neighbouring elements, or analyse set up in wax, and only then decide on GG or GN abutment.

Abutments for fixed construction made by Dyna Dental are supplied with two different antirotation structures. These are: either castellated hexes or singular grooves. The structures should be used only for single tooth replacement cases. For bridge constructions they should be blocked out before modellation which makes it easier without influencing the final result.

Please notice: See also Dyna Octalock Manual

Fixed abutments.

DENTIST
Replace the healing abutment with proper final abutmen.
Tighten the abutment with to 32Ncm with torque wrench.

The abutment should not be unscrewed anymore.

Please note:
We recommend screwing retightening the chosen abutment with torque wrench after minimum of two weeks, before proceeding with final prosthetic reconstruction.

Make a full arch impression (no alginate! - we recommend using vinyl polysiloxane material) Make sure the chamfer is clearly seen in the impression.
Make interocclusal records and an impression of the opposing arch. Produce a temporary.
LABORATORY
Put the lab analogue(s) into the impression. Check the position of the analogue (antirotation structures should fit precisely into the impression; no misfitting is allowed).

Make gingiva mask. Pour the impression in dental stone and separate cast after it sets.

After pouring the opposing arch impression, utilizing the interocclusal records, mount the cast in the articulator.

Make necessary adjustments to the abutment.

Apply a dye spacer, covering abutment head completely including the special hex or groove.

Produce a wax-according to routine crown-and-bridge procedures.

Cast it.
Follow conventional laboratory techniques to fit and finish the cast

Please notice:
We recommend trying in the metal structure.

Apply porcelain to the metal according to routine laboratory procedures.

DENTIST
Remove the provisional restoration from the patient’s mouth. Seat the crown and verify fit, bite relation aesthetics and phonetics.
Cement the crown.
Provide the patient with oral hygiene instructions prior to release.

Note:
We advise cementing the crown first with the temporary cement and after a period of problem-free functioning cementing it definitively. Trying in the metal is advisable.
For the best result we recommend also producing temporary crown (see also anti rotation)
Fixed abutment  Method 2

This method can be used when lab analogues are not available, however, very high level of precision is demanded to produce good quality work.

Pour out the impression partially with an epoxy material. Check if the castellated hex has been copied well. Apply a dye spacer, covering the complete abutment head including the special hex or groove.

The metal framework of the crown is waxed as usual.

Before applying ceramics try it first intraorally.

Memory abutments

DENTIST

Replace the healing abutment with proper final abutment. Tighten the abutment with to 32Ncm with torque wrench.

Adjust the angulation of the patrix part (use cool spray and cooling aid) and if required the shape/length of the abutment (a high speed carbon steel bur under excessive cooling).

The abutment should not be unscrewed anymore.

Please notice:

We recommend screwing the memory abutment again with torque wrench after minimum of two weeks, before proceeding with further prosthetic steps. Make a temporary crown.

To change the angulation of the memory abutment more easily use the Dyna Memory Instrument

Make a full arch impression (no alginate! - we recommend using vinyl polysiloxane material) Make sure the chamfer is clearly seen in the impression.

Make interocclusal records and an impression of the opposing arch.
Transfer the angulation of the abutment onto the lab analogue.

In order to do so the following is recommended:

- Make a transfer jig to reproduce the angle of the memory abutment screwed in the mouth to the memory lab analogue. Use a temporary crown with for example (Duralay®).

- Cool the abutment and push it gently into the jig. Double-check the fit and place the lab analogue into the impression.

If the abutment height has to be adjusted:
- Cut it under excessive cooling and produce a jig but with opening corresponding exactly with the cut surface.

- Cool down (cooling spray) the lab analogue and press it into the jig.
- Cut the analogue using the jig.
- Take the analogue out of the jig and put it gently into the impression. Make sure it fits precisely!

Produce a provisional restoration.

LABORATORY
Put the lab analogue(s) into the impression. Check the position of the analogue (antirotation structures should fit precisely into the impression; no misfitting is allowed).
Make gingiva mask. Pour the impression in dental stone and separate cast after it sets.

After pouring the opposing arch impression, utilizing the interocclusal records, mount the cast in the articulator.

Apply a dye spacer, covering abutment head completely including the special hex or groove.

Produce a wax-according to routine crown-and-bridge procedures.

Cast it. Follow conventional laboratory techniques to fit and finish the cast.

Please notice:
We recommend trying in the metal structure.

Apply porcelain to the metal according to routine laboratory procedures.

DENTIST
Remove the provisional restoration from the patient’s mouth. Seat the crown and verify fit, bite relation aesthetics and phonetics.
Cement the crown.
Provide the patient with oral hygiene instructions prior to release.

Please note
In case of minor misfitting it is possible to cool down the abutment first and press the crown on it to get a proper fit. Trying in the metal is advisable.
We advise cementing the crown first with the temporary cement and after a period of problem-free functioning cementing it definitively.

Memory abutment Method 2
*This method can be used when lab analogues are not available, however, high level of precision is demanded to produce high quality work.*

Pour out the impression partially with an epoxy material. Check if the castellated hex has been copied well. Apply a dye spacer, covering the complete abutment head including the special hex and the chamfered margin. The metal framework of the crown is waxed as usual. Before applying ceramics try it intraorally first.
Use the memory abutments as a reference to obtain precise fit of every single restoration.
DENTIST
Make a full arch alginate impression of the healing abutments and edentulous areas. Send it to the lab for pouring in a working cast and impression tray.

LABORATORY
Pour the impression in dental stone and separate cast after it sets. Block the space over, and around the abutments to simulate the position of impression copings that will be used. Fabricate the custom tray as usual. Create openings above the abutments to allow access to fixation screws (open tray technique).

DENTIST
Determine the height of the final abutment using the markings on the healing abutments. Remove the healing abutments and tighten the impression transfers with torque wrench to 32Ncm. Verify the connection with X-ray photo. Verify intraorally the custom tray. The screw should penetrate through the top of the tray without any hindrance.
Cover the access opening with softened piece of baseplate wax. Carefully try in the tray and let the screws penetrate through the wax, creating small access holes.
Make the impression with elastomeric material.

Please notice:
When taking the impression press with your finger tips on the wax so that the fixation screws are “pushed through”. In this way it will be possible to unscrew them easily after material set.

Unthread the screws from the transfers and remove gently the tray from the mouth.
Make an opposing arch impression. Retighten the healing abutments.
Send all parts to the dental laboratory

Make a bite registration at the vertical dimension of occlusion.
LABORATORY
Attach the implant analogue.
Pass the screw through the embedded in the impression transfers and thread it into the implant replica. Do not change the position of the transfer in the impression.

Make gingiva mask. Pour in the working cast.
Unscrew the fixation screws and free the tray.

Mount the working cast and opposing model on an articulator.

Choose proper final abutments.
Process the abutments accordingly. You can e.g. redesign the chamfer line to follow the gum contour. If you use universal abutment wax and cast individual abutments.

Follow up the usual way of production the crown and bridge works on implants.

Please note:
Incorporate antirotation elements for the crown into the abutments.
DENTIST
Try the abutments intraorally. Make necessary adjustments.

LABORATORY
Fabricate the crown following standard laboratory procedures. Finish and carefully polish the final work.

DENTIST
Replace the healing abutment with final abutments and tighten it with torque wrench to 32Ncm. Insert the finished crown into the patient’s mouth and place it on the abutment. Make final adjustments to the occlusion. Cement the work temporarily.

Instruct the patient in the use and care of the prosthesis, and provide adequate hygiene information and training.

After a period of undisturbed functioning cement the crown semi-permanently.
8.11.2 Multi-unit constructions

Indications:
- any cement retained bridge

Any desired Fixed or Memory abutment can be used for bridge constructions. GG abutments, because of their wide diameter, are in general recommended for molars and central maxillary incisors replacement, whereas, in all other situations the GN abutments are indicated.

For multiple unit bridges it is not necessary to make use of the antirotation shape of the abutments. In these cases it is the construction itself that is antirotational and because of the fact that bridges are cemented there exist no risk of unscrewing the abutments.

**In all prosthetic phases after screwing the final abutment the castellated part can be blocked out to avoid problems with casting and placing final construction.**

Although we do not recommend it, the original Memory or Fixed abutments can be reinserted into the impression and thus used as analogues for the laboratory (pick up impression technique).

When fabricating bridges with OCTA abutments it is not necessary to use internal octagon. In fact, in some situations, where implants has been inserted appareled, using octagon may be simply impossible.

In every case we recommend screwing the abutments again with torque wrench after a period of time before proceeding with further prosthetic steps (See 8.3).

**Bridges with fixed abutments**

**DENTIST**
Replace the healing abutments with proper final abutments. Tighten the abutments with torque wrench to 32Ncm with torque wrench. The abutments should not be unscrewed anymore.

**Please note:**
We recommend screwing/retightening the chosen abutment with torque wrench after minimum of two weeks, before proceeding with final prosthetic reconstruction.
Make a full arch impression (no alginate! - we recommend using vinyl polysiloxane material) Make sure the chamfer is clearly seen in the impression.
Make interocclusal records and an impression of the opposing arch. Produce a provisional restoration.

LABORATORY
Put the lab analogues into the impression. Check the position of the analogues (antirotation structures should fit precisely into the impression; no misfitting is allowed).

Make gingiva mask. Pour the impression in dental stone and separate cast after it sets.

After pouring the opposing arch impression, utilizing the interocclusal records, mount the cast in the articulator.

Make necessary adjustments to the abutments.

Block out the antirotational elements. Apply a dye spacer, covering abutment’s heads completely including the special hex or groove.

Produce a wax-according to routine crown-and-bridge procedures. Cast it.
Follow conventional laboratory techniques to fit and finish the cast

Please notice:
We recommend trying in the metal structure.

Apply porcelain to the metal according to routine laboratory procedures.
DENTIST
Remove the provisional restoration from the patient’s mouth. Seat the bridge and verify fit, bite relation aesthetics and phonetics. Make necessary adjustments.
Cement the bridge.
Provide the patient with oral hygiene instructions prior to release.

Note
We advise cementing the bridge first with the temporary cement and after a period of problem-free functioning cementing definitively.

Fixed abutment Method 2
Pour out the impression partially with an epoxy material. Block out the hex totally. Apply a dye spacer, covering the complete abutment head including the special hex and the chamfered margin. The metal framework of the fixed prosthesis is waxed as usual. Before applying ceramics try-in, the metal framework first intraorally.

Memory bridges
DENTIST
Replace the healing abutments with properly chosen memory abutments or combination of memory and fixed abutments. Tighten the abutments with torque wrench to 32 Ncm. Adjust the angulation of the patrix part of the memory abutments (use Dyna cool spray and special cooling aid) and if required the shape or length of the abutment with a high speed carbon steel bur under excessive cooling. Abutment should not be unscrewed anymore.
Make a full arch impression (no alginate! - we recommend using vinyl polysiloxane material) Make sure the chamfers are clearly seen in the impression. Make interocclusal records and an impression of the opposing arch.
Transfer the angulation of the abutment onto the lab analogue. (see single tooth restoration /memory/)
Produce a provisional restoration.

LABORATORY
Put the lab analogues into the impression. Check the position of the analogues (antirotation structures should fit precisely into the impression; no misfitting is allowed).
Make gingiva mask. Pour the impression in dental stone and separate cast after it sets.
After pouring the opposing arch impression, utilizing the interocclusal records, mount the cast in the articulator.
Make necessary adjustments to the abutments.
Block out the antirotational elements. Apply a dye spacer, covering abutment’s heads completely including the special hex or groove.
Produce a wax-according to routine crown-and-bridge procedures. Cast it.
Follow conventional laboratory techniques to fit and finish the cast.
Apply porcelain to the metal according to routine laboratory procedures.
DENTIST
Remove the provisional restoration from the patient’s mouth. Seat the bridge and verify fit, bite relation aesthetics and phonetics. Make necessary adjustments.
Cement the bridge.
Provide the patient with oral hygiene instructions prior to release.

Memory abutment Method 2
Pour out the impression partially with an epoxy material. Block out the hex totally. Apply a dye spacer, covering the complete abutment head including the special hex and the chamfered margin. The metal framework of the fixed prosthesis is waxed as usual. Before applying the ceramic first try-in the metal framework of the fixed prosthesis intraorally. (see also single tooth restoration)

Please note :
• When seating the bridge, in case of minor misfitting, it is possible to cool down the abutment first and press the crown on it to get proper fit.
• We advise cementing all the crown-and-bridge works first with the temporary cement and after a period of problem-free functioning definitively. For definitive cementation, to make the work retrieval easier, we recommend using a mixture of ready to use cement and Vaseline in 50/50 proportion,
• When transferring original abutments into the impression as lab analogues after casting and re-screwing the abutments it may happen that the restoration can no be placed over the abutments. In this situation :
  firstly: check whether there are no storing parts inside the crowns (if so carefully drill them out).
  secondly: if there are no other problems than the angulation try the following procedure: screw in the best fitting abutment and check fit of the bridge on it. Then pull it out screw another abutment, cool it down (protect gingiva!) and press the bridge on both abutments till achieving the satisfactory fit (as the cooled abutment is movable it will adjust to the bridge itself). Repeat described procedure for other abutments screwing them and cooling one by one.

Remarks concerning provisional restorations.

The purpose of provisional (temporary) restorations is twofold:

1. They serve as a diagnostic aid which enables the dentist to properly evaluate tooth shape, form and function.
2. They protect the abutments and gum tissues during the course of dental treatment. In highly demanding aesthetic cases they are also a tissue formers.

When wearing the provisional restorations meticulous tooth brushing and flossing are essential once a day, to keep the gum tissues in their optimum state of health.
4.3 Bridges OCTA

**DENTIST**
Make a full arch alginate impression of the healing abutments and edentulous areas. Send it to the lab for pouring in a working cast and impression tray.

**LABORATORY**
Pour the impression in dental stone and separate cast after it sets. Block the space over, and around the abutments to simulate the position of impression copings that will be used. Fabricate the custom tray as usual. Create openings above the abutments to allow access to fixation screws (open tray technique).

**DENTIST**
Determine the height of the final abutment using the markings on the healing abutments. Remove the healing abutments and tighten the impression transfers (without OCTA) with torque wrench to 32Ncm. Verify the connection with X-ray photo. Verify intraorally the custom tray. The screw should penetrate through the top of the tray without any hindrance.

Cover the access opening with softened piece of baseplate wax. Carefully try in the tray and let the screws penetrate through the wax, creating small access holes. Make the impression with elastomeric material.
Please notice:
When taking the impression press with your finger tips on the wax so that the fixation screws are “pushed through” it. In this way it will be possible to unscrew them easily after material sets.

Unthread the screws from the transfers and remove gently the tray from the mouth.
Make an opposing arch impression. Retighten the healing abutments.
Make a bite registration at the vertical dimension of occlusion.
Send all parts to the dental laboratory.

LABORATORY
Attach the implant analogue.
Pass the screw through the embedded in the impression transfers and thread it into the implant replica. Do not change the position of the transfer in the impression.

Make gingiva mask. Pour in the working cast.
Unscrew the fixation screws and free the tray.

Mount the working cast and opposing model on an articulator.

Choose proper final abutments.
Process the abutments accordingly. You can e.g. redesign the chamfer line to follow the gum contour. If you use universal abutment wax and cast individual abutments.

Follow up the usual way of production the crown and bridge works on implants.
**DENTIST**

Remove the provisional restoration from the patient’s mouth. Seat the bridge in metal and verify fit. Make necessary adjustments. Verify the occlusion.

**LABORATORY**

Apply porcelain to the metal according to routine laboratory procedures.

**DENTIST**

Remove the provisional restoration from the patient’s mouth. Screw in the final abutments (use Torque Wrench!). Seat the bridge and verify fit, bite relation aesthetics and phonetics. Make necessary adjustments. Cement the bridge.

Provide the patient with oral hygiene instructions prior to release.

After a period of undisturbed functioning cement the crown semi-permanently.
FOLLOW UP
9. Follow up.

The actual implantation technique and well performed prosthetic procedure is not enough to achieve predictable long term success with Dyna implants. To guarantee problem free functioning during the whole follow up period regular and well planned check-ups should be performed.

Each control program for every patient should include at least:

- Scrupulous individually designed mouth hygiene.
- Regular control visits to mouth hygienist to check quality of mouth hygiene of the patient. (Frequency varies from 3 to 6 months depending on manual capability of the patient and his motivation).
- Regular visits to the dentist to verify condition of the implants and suprastructures as well as tissues, and overall local situation. When necessary X-ray photo should be taken.

9.1 General notices.

The level of surgical skills needed to place dental implants in some situations may be very high. Therefore, though we tried to described all basic procedures in detail, in this manual we strongly recommend attending complimentary practical and theoretical courses before starting with dental implant surgery. Also for the operators with sufficient experience in the field of dental fixtures placing we advise special training focused on specific technical aspects of Dyna Implant System.

Faulty implantation technique may lead to many problems and implant failures. Dyna Implant System should only be used with instruments (drills, parallel pins etc.) supplied by Dyna Dental bv. During the prosthetic phase only prosthetic components produced by Dyna Dental can be used. Elements produced by others suppliers may not comply with all standards that apply to original Dyna parts and they can cause various problems (including implant loss) for which Dyna Dental bv. can not be held responsible.

Dyna implants are produced out of titanium covered with HA and are supplied in double peel pouch packaging. They must not be touched with metal instruments or hands and all manipulations should if possible be done with a special plastic holder. If there is absolutely no any other possibility it is allowed to grab them with sterile powder free gloves or plastic instruments.
In case of contamination of an implant with the blood or the saliva of one patient it can not be used, under no circumstance, for another patient. Sterilization or re-sterilization of Dyna implants is strictly prohibited whatsoever.

Changing the shape of implants in any way is strictly forbidden whatsoever.
Using electro surgical instruments around implants or abutments is not recommended.
Implant mobility, bone resorption or infection may indicate possible implant failure. Such an implant should be removed as quickly as possible if the reason for failure can’t be helped. Site after the implant removal should be handled as after regular extraction.

9.2 General

- Keep implants in closed clean space moist free in room temperature.
- Make sure that the packaging stays undamaged (if damaged, do not use the product)
- Do not use the product after expiry date
- Do not use the product if it is in any way contaminated.
- If the markings on the packaging are not readable return the product to your supplier (see guarantee)
- Do not use the product if you think it differs substantially from the ones you have used before.

9.3 Possible complications.

A Implant failure.
Among many factors that are generally considered to be important in contributing to the breakdown and failure of fixtures are improper techniques, poor case selection, excessive occlusal forces, and implant-host bioincompatibilities. Like natural teeth dental implants may additionally suffer from destructive periodontal diseases. Sometimes under specific circumstances primary well integrated implants may fail without clear general medical reason. The following should be taken into consideration:
- Overload of the implant caused by wrongly designed prostheses, unfavourable implant position, loose abutments or bruxism. Such overload manifests on the X-ray photos usually with small angular bone defects around the implant and can develop without noticeable inflammation signs. Combination of the overload with bone resorption may lead to weakening of the implant material and eventually fracture of the implant.
- Insufficient mouth hygiene - may be seen on X-ray photos as a wider easy to detect angular bone defect. This may lead to slow but steady lost of integration and finally to implant failure or fracture. The brake may occur as a result of increased leverage forces put on the implant when the bone loss creates situation of unfavourable “crown to root” ratio.
- Combination of overloading and bad hygiene results in most of the cases in early failure caused or by total integration loss or fracture.
- Wrong implant choice. Especially when, as a result of not favourable bone conditions, small diameter implants are chosen. In those situations bone resorption is especially dangerous and may lead to problems even within physiological conditions.
- All possible combinations of above described factors, especially when poor bone quality exists (the maxilla), general medical disorders (osteoporosis) or other external factors as e.g. smoking are present.
For example: small overloading in the mandible with good bone quality would probably give no problems whereas the some overload in the maxilla in very poor bone may causes implant failure.

To treat implant failure successfully, it needs to be determined what the cause of the failure was.

B Abutment failure.
Screwing abutments to the implants properly is of extreme importance. Adequate torque applied on such abutments prevents them from unscrewing and allows for optimal force distribution within screw threads and the screw itself.
The most common reason for abutment breakage is failing to apply right torque on the screws. This in turn may result in two general conditions:
- too excessive torque placed on the abutments – forces transmitted to the screw are too high.
- too small torque placed on the abutments – unscrewing and creating detrimental lateral forces.
In both situations the end result may be abutment fracture having serious consequences especially for more complex constructions. All abutments should be regularly controlled for unscrewing and if necessary re-tightened. This may be more difficult for fixed constructions but it is always easier to take off the crown or bridge in time than be forced to produce new construction or place new implants. Overdentures constructions, on the other hand, preset no problem as the access to the abutments is very easy.
When screwing abutment one must be sure than it is always in full contact with the implant (x-ray photo) otherwise the chances are that between those two the bone may be trapped, the mucosa or any other debris. In such cases after a period of time one may be confronted with the situation where the abutment becomes loose as e.g. bone resorps.

Using original instruments, inspecting them and replacing if necessary is also important as the second large group of abutments problems is damage caused by the use of improper instruments or applying the wrong technique.
9.4 Failure prevention.

In most cases implant failures can be prevented. The following should always be taken under consideration:
- Precise planning including the use of all available diagnostic possibilities (in vivo and x-ray photos measurements, x-ray photos, CT scans, models analysis, try ins etc)
- Adequate, actual knowledge of implantology including sufficient knowledge of the system used.
- The choice of implants and placing them according to producer’s indications. Depth and angle of insertion should be properly defined to prevent overloading. Too small implants in combination with bruxism should be avoided. If it is not possible to use sufficient implants pre prosthetic surgery should be considered.
- Long enough and undisturbed integration period. Any overloading at this time should be avoided.
- Screwing abutments tight enough. The abutments should be always screwed with 32Ncm torque making sure there is no intervening tissue between the implant and abutment (control X-ray photo). In some exceptional situations abutments can be fixed with a drop of glasionomer cement.
- Properly designed and produced prosthesis. Ideal occlusion and articulation is a must. Any prosthetic construction should be designed so that the bite loads are transferred possibly parallel to and through the long axes of implants. Free levers in lever constructions should be as short as possible. Connection with natural element may be done only if really necessary (no periodontal problems, flexible connection)
- Total height of the abutment and prosthesis must not be longer then the implant itself.
- Prosthesis should be so designed that it would allow for maintaining proper and easy hygiene.
- The patient should be instructed about the most effective hygiene techniques. The results should be assessed during regular control visits. If necessary professional hygiene should be performed.
- The follow up care should be standardized. During the first year after placing the prosthesis four control visits are recommended and at the end a control X-ray photo. After this time patients should be individually evaluated and the new scheme can be set up. In any case regular X-ray photos are recommended to detect or confirm any possible problems.
- Removable prosthesis should be regularly rebased.

In case of faults made during planning and performing surgery, prosthetic procedures or not taking sufficient preventive measures one may be confronted with failed (fractured) or failing implants.

Implant mobility, bone loss or inflammation may indicate implant failure. Each failed implant or one that appears to be failing should be removed as soon as possible and the site treated in an appropriate fashion. If the implant removal deems necessary inflammatory tissue should be removed and implant site curetted. Only then can the undisturbed healing (similar to that after extraction of natural element) take place.
9.5 Failed or fractured implants

If the failed implant is a part of a bigger prosthetic construction supported by more implants it is of utmost importance to remove this construction to prevent further possible problems with other implants. In cases of simpler constructions the risk should be adequately judged and if necessary preventive measures taken. If the risk for natural elements or other implants is minimized and the patient is provided with a temporary appliance, the existing situation can be analysed and a new treatment plan done.

After removing the implant a period of 3 to 6 months is recommended to give the bone time to heal. Then the new implant can be placed (if required in combination with bone regeneration or membrane techniques).

In some situations it is possible to replace the failed implant directly. It is possible only when proper preparation can be done for an implant with bigger diameter (no inflammatory tissue). After new osteointegration the new superstructure can be made or the old adapted.

The cause of failure of the implant should always be eliminated!

9.6 Treatment of failed or fractured implants

If anatomically possible and if there are no signs of severe infection, the remaining fragment of the implant can be left in situ and a new implant inserted next to the fractured one. After integration time the existing prosthesis can be adapted or remade. This treatment should never result in insertion of an implant in an unfavourable position! This means that leaving a fractured implant in situ will not always be possible, presuming that it was originally inserted in the most favourable position.

- In most cases the remaining implant fragment will have to be removed. This is not an easy procedure as the visibility is limited and the implant fragment can still be firmly integrated. There are different techniques to remove fractured implants (all involving a complete incision with mucoperiosteal flap):

  If the bone width is sufficient, a hollow trephine-drill of the proper size can be used to remove the bone around the implant-fragment. If the outer diameter of this trephine drill corresponds with a larger size of implant, and if the condition of the peri-implant tissue is good, the new implant can be inserted immediately. If it is not possible to obtain a good initial fit for the larger diameter implant, it should not be inserted. In this case it is recommendable to use a membrane and if desired a resorbable bone filling material to restore the defect. In a second stage (after min. 6 months) a new implant can be inserted.

- In case of insufficient bone width, the use of a trephine drill will lead to defects in the buccal and lingual cortical bone plates. In these cases immediate placement of a new implant is usually not possible, and even if it is, more complicated techniques with a membrane and a resorbable bone filling material must be involved. Otherwise, the above described two-stage technique should be performed. If there is preserved internal thread
in the remaining implant-fragment, another technique can be applied. With a small diameter (Ø 0.8 mm) cylindrical steel drill, the bone mesially or distally of the implant should be removed down to the apex. Subsequently, an abutment or pull out instrument is screwed into the implant-fragment and with some force the implant can be moved into the direction of the removed bone. This method has the advantage that the loss of bone is limited, and that in most cases a new preparation can be made with the final spade drill in such a way that sufficient initial stability for a new implant can be obtained. The disadvantage is that in many cases, especially in the posterior region, it may be impossible to drill deep enough, because there is no access for the hand-piece.

9.7 Managing broken abutments.

Fracture of an abutment or a screw can occur:
- because loosening of the abutment
- because of leverage forces
- as a consequence of heavy bruxism
- as a consequence of premature contacts
- combination of the above mentioned factors

In case of abutment break there are several methods that may help in managing the problem. In most of the situations you will be faced with a broken screw remaining in an implant.

- If the broken screw sticks out from the implant try using small pliers or forceps to grab it and unscrew.

- If the broken screw is broken right under the implant top try the following:
  A
  - with very small diamond round drill make a small incision (groove) in the middle of the screw
  - take a small single slot screwdriver and try unscrewing the broken screw.
  B
  - take a small rose drill and mount it in the handpiece
  - after letting it turning in the opposite direction try, gently pushing on the screw, unscrewing the broken part.

  C
  In cases when the screw was cemented or could not be removed as described in A and B
  - use ultrasonic device prior to trying get it loose as described above or
  - make a little groove in the broken screw and with a small screwdriver or other tiny instrument and a surgical hammer give it a “knock”; it is meant to break the interface between the cement and the screw; follow than A or B
• If the screw is broken deeply in an implant one can try the above described methods but often, in such situations, the only solution is to drill it out, trying to preserve the upper implant threads!

**Whatever you do when managing the broken abutments always remember to proceed with extreme care. Try not to damage the internal implant thread as otherwise the only option to use the implant may be cementing the new abutment in it.**

9.8 Remarks concerning the Dyna Implant System

The 3 mm diameter Dyna Implant is one of the smallest implants in the world. This logically means that, under extreme loading conditions, it is more sensitive to fractures than implants with a larger diameter. Fracturing of a Ø4 mm Dyna implant is almost impossible. Mechanical fatigue tests have shown that it is most unlikely that a 3 mm Dyna implant which is completely surrounded by bone will fracture. However, as soon as substantial resorption of the surrounding bone occurs, the risk of fracture automatically increases.

As a consequence one should:
1. Be very cautious with the indication of Ø3 mm implants for fixed prostheses. Overdentures will in general cause no problems.
2. Perform radiological examinations regularly when Ø3 mm implants are used for fixed prostheses, in order to detect bone defects before they develop into real problems.

The original Ø3 mm Dyna implants were provided with a short cylindrical section at the upper part of the implant. In 1992 a design change has resulted in a longer cylindrical upper part. As fracture will never happen in the cylindrical part but in the threaded part of the implant, extra attention should be given to the original, old design Ø3 mm implants. When bone resorption has proceeded to the threaded part of the implant, the risk of fracturing increases and periimplant treatment becomes necessary.
9.9 Information for the patient.

Herewith we present an example piece of information that can be given to the patient before any treatment*.

*Dyna Dental has a specially printed brochure with this text.

What are implants?
Natural teeth consist of two main parts: the crown and the root. The crown is the part situated over the oral mucosa (gums) which protrudes into the mouth, whereas the root is the part situated under the oral mucosa and surrounded by the jawbone.

An implant can be considered as an artificial root made of a special biocompatible metal with a modified surface. This means that, after insertion, the living tissue will tolerate and not reject it. The bone has the ability to grow into direct contact with the implant, creating a strong chemical bonding. When the process of bone ingrowth is completed the implant can be used as a basis for the reconstruction of a crown or the support of a prosthesis. Those elements placed over the implant and the mucosa have a common name: superstructure. So, for example, the superstructure can mean a single crown, a bridge or a prosthesis.

In what situations can implants be used?
- Fixed constructions
  - a) when replacing a single tooth
  - b) when replacing more teeth
Removable constructions

Implants can also be used to increase the stability and retention of dentures. Such dentures are called overdentures. There are different types of connection possibilities between the implants and the dentures. The choice depends on the particular clinical situation and the financial possibilities of the patient.

Who can have implants?
In general, almost everyone. However, the following conditions are important:
1. be in good health (heavy smoking can be a problem)
2. have enough bone to allow undisturbed ingrowth of the implants
3. have healthy gums
4. have good motivation (proper hygiene is indispensable for long-term implant functioning)
What does the implantation procedure look like?
Before every implantation the patient undergoes a medical examination. General health will be checked and special X-ray photo is taken to see the quantity and quality of the available bone. Than the type and the quantity of implants and the superstructure will be determined.

The treatment consists of two phases:

In the first phase the implants are placed. Usually it takes about 45 minutes. However the planning for the total treatment is one hour. First local anaesthesia is given. Then the bone is exposed by pushing the gum aside. Little holes are then made (1) using special drills and the implants pushed into them (2). Finally the gum is sutured (3).

Now the healing period, of at least 3 months for the mandible and 6 months for the maxilla, may begin, as the bone must have time to grow over the implants. After the first two weeks the sutures are removed and the dentist checks the situation in the mouth. The existing prosthesis is adjusted and the patient can wear it during the whole healing period (4).

The second phase, following the healing period, involves connecting the implants with an extension part (abutment). This is realized by a small incision under local anaesthesia. The abutment will be the foundation for the crown, bridge or overdenture.

The total time needed to receive the new denture, including all stages, will be about 5 to 8 months.
**Follow up**

Perfect hygiene is crucial for good functioning of the implants. Special care should be taken to clean the gums around the abutments. In order to do so special toothbrushes, dental flosses (superfloss) or other cleaning aids can be used. Given good hygiene the gums will remain healthy and the implants can function undisturbed for a long time.

Regular check-ups are recommended to monitor and, if necessary, rebase the denture.

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**How much is it going to cost?**

The question of cost depends on the particular clinical situation and should be discussed directly with the dentist. The rule is that the more implants used the more expensive the work. Generally, fixed constructions are more expensive. The costs may increase if any presurgical modifications are needed. In some countries and under certain circumstances implant treatments are paid by the insurance companies.

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**More info?**

Perhaps you want to have more information about implantology after reading this brochure. Today there are several dental clinics specialized in implantology, also in your area. In the office where you have found this brochure they surely can help you with all your questions.
10. Guarantee

10.1 General Terms of Guarantee

1. Purchaser assumes all risks and liability resulting from the use of products produced by Dyna Dental Engineering b.v., whether used separately or in combination with other products not of Dyna Dental Engineering’s manufacture.

Dyna Dental Engineering b.v. strongly recommends completion of postgraduate dental implant education and strict adherence to the procedures for use instructions contained in related manuals and those accompanying our products.

Dyna Dental Engineering b.v. cannot be held responsible for any other use or application than indicated by Dyna Dental Engineering b.v., that these products may be put to, neither from the user nor the consumer. Such misuse will void any rights for claims under this guarantee.

2. Dyna Dental Engineering b.v. makes no warranty, express or implied, except that its products shall be free from defects in material and/or workmanship after date of purchase and shall be of merchantable quality for a period of one year. The products should however be storaged in a clean, dry, dark, dustfree room at roomtemperature. This warranty applies only to the original purchaser.

In the event of defect of products of Dyna Dental Engineering b.v., Dyna Dental Engineering b.v. will at its option either repair, replace or issue credit for such defects. Any other costs incurred with the replacement, reparation or issuing credit for products are not covered by this guarantee.

3. Dyna Dental Engineering b.v. continually strives to improve its products and therefore reserves the right to improve, modify or discontinue products at any time, or to change specifications without notice and without incurring obligations.

4. Return Policy:

- Products returned must be new and unopened, and must be received within 30 days of the invoice date, and full replacement or credit will be given.
- Products returned after 30 days will be subject to a 15% restocking fee.

All products must be returned to Dyna Dental Engineering b.v. headquarters or its dealer accompanied by the copy of the original invoice or packing list. Returns that were purchased by credit card will be refunded by credit to the client’s account minus costs of creditcard payment; no cash refunds for returns on credit card purchases. No return after 90 days from the invoice date. Products received in other conditions, e.g. opened, damaged, polluted, etc. will not be accepted for return.

Shipping discrepancies: any shipping discrepancies should be reported to Dyna Dental Engineering b.v. headquarters by fax or e-mail within 7 days after receipt of the products.

5. In the event of alleged defect under warranty, the purchaser is obliged to follow the instructions for return of the products:
a. Every claimed product should be send to Dyna Dental Engineering b.v. headquarters:
   Dyna Dental Engineering b.v.
   P.O. Box 70
   4600 AB Bergen op Zoom
   The Netherlands

or its appointed dealer

List of authorised dealers can be sent on request or found on
(www.dynadental.com)

b. No claim will be accepted and proceeded unless accompanied by
   - Copy of the original invoice
   - Completely filled in guarantee request form (FRM821-03) available at dyna Dental Engineering b.v. headquarters

c. All products should be clearly marked, sterilized and delivered in sealed plastic packaging. Dyna Dental Engineering b.v. will at its option replace or credit all alleged products within 20 workdays from the date of receipt.

d. All claims will be given standard or individual information-letter concerning the decision taken by Dyna Dental Engineering b.v.

e. Dyna Dental Engineering b.v. reserves the right to change time obligation in point c if any other further research would be needed to establish the reason for the product failure.

6. All claims against the manufacturer for failure due to malfunction or any other reason will be settled under the Dutch law, in accordance with accepted commercial practices.

7. Upon publication of these terms of guarantee all previous versions are no longer valid.

10.2 Terms of Guarantee Dyna implant

Dyna Dental Engineering b.v. is pleased to present the Dyna 5 year implant guarantee program, our comprehensive guarantee package that provides the confidence you need for your dental implant practice.

The benefits in this guarantee program are exclusively for the benefit of eligible treating clinicians and are not for the benefit of any other entity, including the patients of eligible clinicians.

Eligibility
To receive the benefits described above, the surgical doctor and the restorative doctor must fill in the registration form.

To be covered all products must be installed in accordance with the Dyna Implant Manual and in accordance with accepted dental practices. Contraindicated implant and restorative procedures such as described in the Dyna Implant Manual will void the guarantee program.

The Dyna 5 year guarantee program requires the patient to comply with the generally accepted standards of good oral hygiene. Implants failed as a result of poor hygiene maintenance and/or infection may not be covered under this program.

Respective treating clinician must enrol the patient into a yearly check-up recall system.

Completion of additional Dyna sponsored certification courses is not required as long as all implant procedures are performed in accordance with Dyna Implant Manual instructions and generally accepted dental practices, and all program conditions are met. However, potential operator must be able to prove his or her specific experience in implant procedures.

1. Failure prior to loading

If an implant surgical treatment fails for any reason prior to loading and Dyna implant has to be removed, the implant(s) will be delivered for replacement to the eligible doctor free of charge by Dyna Dental Engineering b.v. providing the doctor sends to Dyna Dental Engineering b.v.:

- the actual failed implant,
- pre- and post-operative pantographs and/or other pertinent radiographs and
- completed questionnaire.

2. Failure subsequent to loading

Dyna Dental Engineering b.v. guarantees all Dyna implants and abutments for a period of 5 years after insertion of the implant or the placement of the abutment. Subject to the limitation and exceptions described above Dyna will at its option replace at no charge or credit the implants and/or abutments.

Dyna Dental Engineering b.v. will not provide the benefits under this program if:

1. Failure of warranted product is the direct result of trauma.
2. Implants are placed with patients with a medical history indicating possible compromise to the healing process including, but not limited to, alcoholism, uncontrolled diabetes, chronic drug use, tobacco usage, recent history of chemotherapy, etc.
3. Implants are not placed in accordance with guidelines for patient evaluation and selection contained in the Dyna implant Manual.
4. The requirements of section 5 of the general terms of guarantee are not met.

This program does not apply to any implants or components, regardless whether these are manufactured by Dyna Dental Engineering b.v. or any other producer, which are custom
designed or specially manufactured or modified at the request or by a treating doctor. And no warranty of merchantability or fitness for particular purpose is made here under.

Dyna Dental Engineering b.v. reserves the right to modify or terminate this guarantee program at any time upon providing participating clinicians not less then 30 days prior written notice of such action.

Dyna Dental Engineering b.v. reserves the right to terminate the eligibility of any participating clinician for this program by providing 30 days prior written notice of such action.

This 5 year implant guarantee program covers the following:
1. Dyna implants placed before loading
2. Dyna implants placed and restored exclusively with Dyna prosthetic components
3. Dyna prosthetic components used to load Dyna implants
4. Dyna prosthetic components to be used in combination with other brand implants according to Dyna specifications

Accidental misuse, inappropriate installations or failure to follow manufacturer’s directions voids the warranty.

See our general terms of guarantee (10.1) for other warranty issues.

10.3 Terms of Guarantee Dyna implant abutments

Loosening of abutment screw components, and screw fracture are frequent problems related to dental implants, and re often the result of either too little torque or excessive torque placed on the abutment screw. While all torque wrenches are calibrated at the factory when new, the accuracy of a torque wrench can change if the wrench is more than 12 months old, has never been calibrated or has been autoclaved many times. Not calibrated wrenches may give 2 to 3 times more torque, resulting in screw fracture.

The Dyna Implant manual recommends that the torque wrenches have to be calibrated a minimum of once per year (free of charge in Dyna headquarters).

Dyna Dental Engineering b.v. reserves the right to ask the operator for recalibration proof in case of alleged warranty claim for Dyna abutments.

Dyna Dental Engineering b.v. disclaims any liability resulting from the use of abutments of diameter 3mm for any fixed constructions except for restoring lower incisors. Claims deriving from the use of these abutments in above mentioned situations will be treated individually after consulting Dyna Dental Engineering b.v. headquarters.

Accidental misuse, inappropriate installations or failure to follow manufacturer’s directions voids the warranty.

See our general terms of guarantee (10.1) for other warranty issues.
10.4 Terms of Guarantee Dyna implant drills

The Dyna Implant Manual recommends drills to be replaced when worn, corroded, dull, or otherwise compromised. Drills should be replaced after 20 uses. Drills produced by Dyna Dental Engineering b.v. may only be used in combination with standardized and fully operational handpieces. Any use of drills in combination with not standardized equipment will void this guarantee.

Dyna Dental Engineering b.v. Warrants the drills against defects in material or workmanship for a period of 90 days from the date of the original invoice. Dyna’s sole obligation under product warranty is, at its discretion, to replace or repair defective components in part or whole.

Accidental misuse, inappropriate installations or failure to follow manufacturer’s directions voids the warranty.

See our general terms of guarantee (10.1) for other warranty issues.

10.5 Terms of Guarantee Dyna magnets

Dyna Dental Engineering b.v. is pleased to present the Dyna 5 year magnet guarantee program for the Dyna WR magnets – and 1 year for the regular Dyna magnets (1101, 1102 and 1106) – our comprehensive guarantee package that provides the confidence you need for your dental implant practice.

The benefits in this guarantee program are exclusively for the benefit of eligible treating clinicians and dental technicians. The program is not for the benefit of any other entity, including the patients of eligible clinicians.

Eligibility

To be covered all products must be installed in accordance with the Dyna Magnet Manual and in accordance with accepted dental practices. Contraindicated restorative procedures as described in the Dyna Magnet Manual will void the guarantee program.

The Dyna guarantee program requires the patient to comply with the generally accepted standards of good oral hygiene and regular check-ups to determine any overloading that may appear during prospective functional use of the denture.

Respective treating clinician must enrol the patient into yearly check-up recall system.

Completion of additional Dyna Dental Engineering b.v. sponsored certification courses is not required as long as all magnet restorative procedures are performed in accordance with the Dyna Magnet Manual instructions and generally accepted dental practices, and all program conditions are met. However, potential operator must be able to prove his or her specific knowledge concerning magnets usage.
Dyna Dental Engineering b.v. guarantees all Dyna WR magnets for a period of 5 years after fixation of the magnet but no more than 6 years from the date of the purchase on the invoice. Dyna Dental Engineering b.v. guarantees all regular Dyna magnets (1101, 1102 and 1106) for a period of 1 year after fixation of the magnet but no more than 2 years from the date of the purchase on the invoice. Subject to the limitation and exceptions described above Dyna Dental Engineering b.v. will at its option replace at no charge or credit the magnets and related restorative components providing the doctor sends to Dyna Dental Engineering b.v.:

- the actual failed magnet
- copy of the original invoice
- completed questionnaire.

Dyna Dental Engineering b.v. may at its option ask the operator to send any essential proof that could help in establishing the real reason for the product failure.

Dyna Dental Engineering b.v. will not provide the benefits under this program if:

- Failure of warranted product is the direct result of trauma.
- Magnets are placed with patients with a medical history indicating possible compromise to the use of magnetic attachments.
- Magnets are not placed in accordance with guidelines for patient evaluation and selection contained in the Dyna Magnet Manual.
- The requirements of section 5 of the general terms of guarantee are not met.
- Mechanical damage to the magnet during placing and/or replacing procedures
- Damage caused by improper shape of the root cap (for Dyna System) or using materials other than Dyna products.

Dyna Dental Engineering b.v. reserves the right to modify or terminate this guarantee program at any time upon providing participating clinicians not less than 30 days prior written notice of such action.

Dyna Dental Engineering b.v. reserves the right to terminate the eligibility of any participating clinician for this program by providing 30 days prior written notice of such action.

This program covers all Dyna Magnets purchased by eligible doctor.

Accidental misuse, inappropriate installations or failure to follow manufacturer’s directions voids the warranty.

See our general terms of guarantee (10.1) for other warranty issues.