

Aadva Implant System

GC Tech.Europe Study compilation

A world of proof

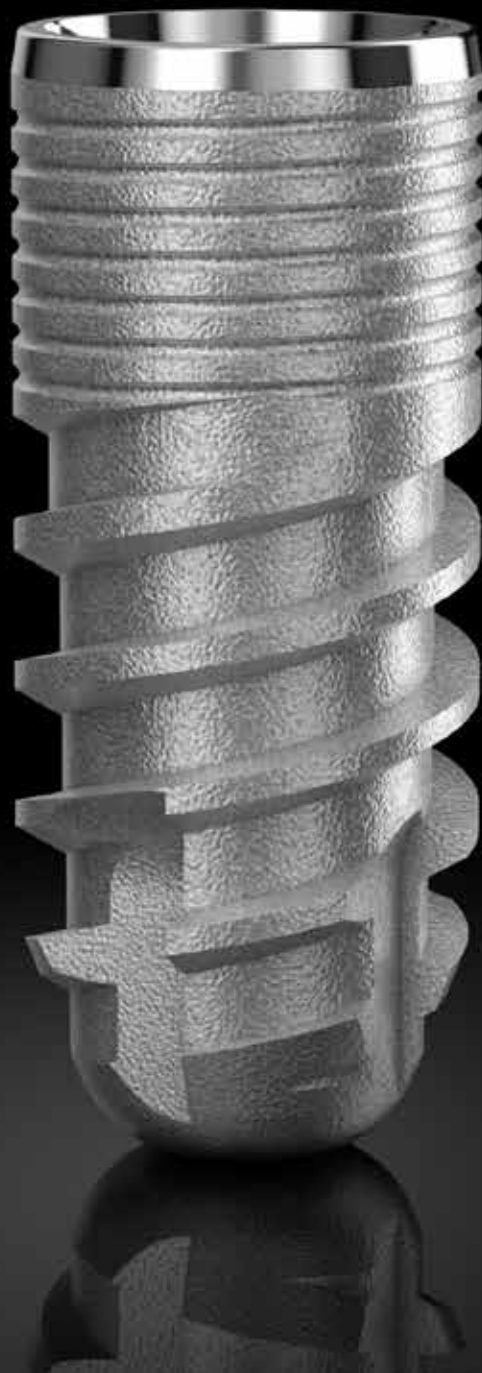


February 2024



Aadva implants from GC

The Aadva implant system is optimized with regard to modern synergies of implant prosthetics and CAD/CAM technology. The high-quality product range allows you to treat all implant cases. All components comply with the latest **state-of-the-art technology** and represent **GC's uncompromised commitment to quality**, based on decades of research and expertise in the area of dental materials. In this way, GC makes its contribution to 21st century healthcare.

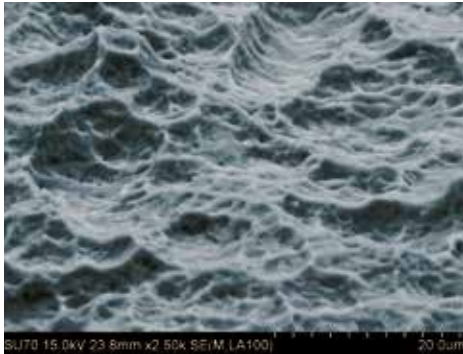


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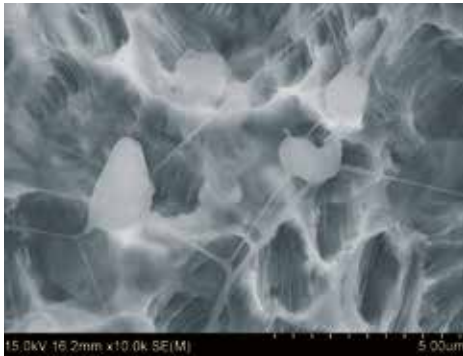
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Expertise across technology

The fundamentals in the development of the GC Aadva Implant.



The unique surface of the Aadva Implant system was developed utilizing proven technology. Its characteristics are created through homogeneous sandblasting with high purity of alumina particles and acid etching which enhance and stimulate osseointegration. (**Aanchor® Surface Technology**).



The self-tapping function of the implant's progressive thread promotes the preparation of the implant site allowing a stable insertion creating an optimal primary stability.

The **geometry of the implant body** is designed to distribute mechanical stresses evenly over the entire implant length. The **design of the coronal micro-threads**, combined with an angulated implant collar, creates a favorable contact zone which promotes and maintains bone healing.



The combination of a **hermetic conical seal**, as well as the **"switching" effect**, discourages bacterial infiltration from the area of the epithelial connective joint.

The result of these two principles enables better preservation of bone and soft tissue volumes, thus improving the long-term aesthetic results.



Titanium implants are widely used in dentistry nowadays, whether they are required to replace a single tooth or serve as anchoring point for a wider prosthetic suprastructure. Overall, the literature shows encouraging clinical results related to implant-based prosthetic treatments. As a consequence, a rapid increase in the amount of commercially available implant systems has been observed. The ideal implant systems, however, should prove to perform effectively even in more demanding clinical situations, be it due to systemic compromising conditions or problems related to the implantation site itself. Aadvia implant system is supported by a significant amount of scientific reports based on both laboratorial and clinical results. What is more, it has been shown to perform effectively even in the most challenging clinical situations.

I. Aadva implant system

Versatility

Many aspects may play a role in the clinical performance of an implant system. Its versatility may be the first point to be taken into account. Aadva implant system offers a wide range of surgical and prosthetic components to solve even the most challenging clinical situations. The surgical components are represented by the endosseous implants themselves and can be found in three main designs to address any clinical situation: Standard, Tapered and Short implants. The prosthetic components, mostly represented by implant abutments, allow for a smooth connection between the endosseous implants and the prostheses. Aadva implant system offers a wide variety of implant abutments in different diameters, heights and angulations for both cement-and screw-retained configurations allowing the dental professional to ensure a long-term function and optimal aesthetics for the patient. Even the most challenging requirements can be addressed with the support of GC's advanced CAD/CAM Production Centre which will fully support your entrance in the era of digital dentistry. Altogether, Aadva implant system will always have a tailored solution that fits the needs of your patients. In the references bellow you will find some interesting and challenging clinical cases, all of them concluded thanks to the versatility of Aadva implant system.

1. Managing congenitally missing lateral incisors implants. The key factors to reach an excellent result. Puig MAI. GC Get Connected 12, 42-48.
Managing congenitally missing lateral incisors with Aadva Implant and individual zirconium CAD-CAM abutment layered with ceramic and cemented to a Blend Hybrid Abutment.
2. Case report. Full arch implant rehabilitation. Baeza DG. Implants. 2018;19(4):18-23.
Improving esthetics, functionality, and proprioception in a lower jaw rehabilitation with a hybrid prosthesis connected to six Aadva Tapered implants by means of Aadva SR Abutments.
3. Implant retreatment. Leclercq P, Martinez JF, Brüh M. Implants. 2018;19(3):22-29.
Successful retreatment of a full arch rehabilitation with an overdenture based on a, customized zirconium framework produced by GC's advanced CAD/CAM Production Centre supported by Aadva Standard implants.
4. Unterstützung von unterkiefertotalprothesen durch interforaminäre implantate. Gockel F. GC Tech Europe GmbH Brochure.
High aesthetic requirement in the treatment of a maxillary anterior gap with an Aadva Standard implant followed by a zirconium abutment cemented on a Blend Hybrid Abutment in a digital workflow supported by GC's advanced CAD/CAM Production Centre.
5. Versorgung einer Schalltlücke im Oberkieferfrontzahnbereich mit einem Aadva-Implantat. Gockel F. GC Tech Europe GmbH Brochure.
Full-arch oral rehabilitation of atrophic lower jaw with an overdenture supported by Locator™ Abutments on Aadva Standard implants.
6. Implantes inmediatos con carga inmediata en el paciente periodontal. Consideraciones. Iglesia Puig MA. Labor Dental Clínica. 2017;18(2):56-68.
Challenging oral rehabilitation with immediate implant insertion and immediate load in the aesthetic zone of patient who have lost his teeth due to periodontitis. Aadva Tapered implants and Aadva SR Abutments were used.

II. Aadva implants and abutments

Composition and physical and biological properties

Commercially pure grade 4 titanium (cp-Ti) and grade 5 titanium alloy (TiAl6V4) are widely used in the manufacturing of dental implants and are generally known for their excellent corrosion resistance, passivation capacity and biocompatibility. They also present favorable surface morphology, topography, phase composition and chemistry, both leading to satisfactory osseointegration and biomechanical anchorage. Aadva implants and most Aadva abutments and screws are made of TiAl6V4 alloy. Despite all similarities and proven clinical performance, the titanium alloy seem to present better mechanical properties when compared to commercially pure titanium (static bending strength, tensile strength, yield strength at 0.2 % offset and ductibility). When testing the fracture toughness of Aadva implants according to ISO14801, even Aadva Short implants showed favorable results, thus implying promising clinical results when used within the correct indications.

1. Commercially pure titanium (cp-Ti) versus titanium alloy (Ti6Al4V) materials as bone anchored implants — Is one truly better than the other? Shah FA, Trobos M, Thomsen P, Palmquist A. *Materials Science and Engineering C* 62 (2016) 960–966.
2. Comparison of strength titanium and titanium alloy implant. Ogata N, Seto M. *Clin Oral Implants Res.* 2016;27(S13):abstract PBR126. Special Issue: Abstracts of the European Association for Osseointegration Congress 2016.
3. Fatigue strength of short implant. Hanada S, Noguchi T. *Clin Oral Implants Res.* 2016;27(S13):abstract PIM635. Special Issue: Abstracts of the European Association for Osseointegration Congress 2016.

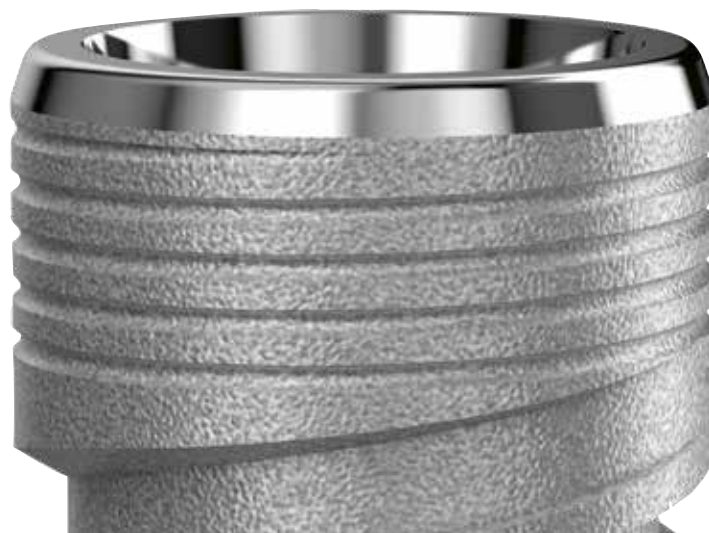


III. Aadvia implants

Surface characteristics and osseointegration

Many efforts have currently been devoted to improve the rate and quality of osseointegration on titanium implants. Important surface characteristics modulating this biological process include chemical composition, topography and hydrophilicity. Aadvia implants are made of grade 5 titanium alloy due to its high corrosion resistance and biocompatibility. As far as osseointegration is concerned, an even more favorable condition is achieved when the titanium surface is mechanically and chemically treated to reach a more hydrophilic and complex topography including both micron- and submicron-scale structures. These characteristics are well known for promoting not only a better bone/implant biomechanical interlocking but also an improved cell attachment, proliferation, and differentiation. In this sense, Aadvia implant fulfills the most important requirements of an ideal implant surface. It is produced by means of the unique Anchor® Surface Technology which includes homogeneous sandblasting with alumina particles and a proprietary acid etching which enhances the implant topography and hydrophilicity. It is also noteworthy to mention that the implant surface obtained by dint of this technology shows no sign of contamination, resulting in highly osteoconductive characteristics.

1. Bone tissue response to implant surfaces functionalized with phosphate-containing polymers. Cardoso MV, Chaudhari A, Yoshida Y, Van Meerbeek B, Naert I, Duyck J. Clin Oral Implants Res. 2014 Jan;25(1):91-100.
2. Dental implant macro-design features can impact the dynamics of osseointegration. Vivan Cardoso M, Vandamme K, Chaudhari A, De Rycker J, Van Meerbeek B, Naert I, Duyck J. Clin Implant Dent Relat Res. 2015 Aug;17(4):639-45.
3. In vitro biochemical evaluations on the implant surface using osteoblast-like cells. Takagi T, Noguchi T, Yamanaka K. Clin Oral Impl Res. 2014;25 (Suppl. 10):212.
4. Identification card and codification of the chemical and morphological characteristics of 62 dental implant surfaces. Part 3: sand-blasted/acid-etched (SLA type) and related surfaces (Group 2A, main subtractive process). Ehrenfest D, Del Corso M, Kang B, Leclercq P, Mazor Z, Horowitz RA, Russe P, Oh H, Zou D, Shibli JA, Wang H, Bernard J, Sammartino G. POSEIDO. 2014;2(1):37-55.



IV. Aadva implants

Macrodesign

Besides modifications in implant surface microstructure, the implant macro design has also been proven to play a significant role on the success of the implant treatment as it can influence the dental implant stability or, in other words, the quality of the implant anchorage in the alveolar bone. Primary stability is represented by the mechanical engagement of the implant in the cortical bone. It prevents the formation of connective tissue around the implant, consequently allowing the bone to heal undisturbedly. Secondary stability, on the other hand, happens through bone regeneration and remodeling, playing a role in the implant steadiness around 4 weeks after implant placement. In this sense, it can be stated that a secure primary stability leads to a predictable secondary stability.

Aadva Standard implants present a cylindrical body with slightly tapered threads towards the rounded apex to improve the self-tapping effect. At installation, the insertion torque increases gradually, ensuring support at both cortical and trabecular bone. The design of the threaded cylindrical body redirects and resist non-axial forces, while the specific taper enables higher primary stability through increased insertion torques. Furthermore, the noticeable micro-threading at the collar part of the implant helps offering the primary stability at installation and transferring the functional load to the bone cortical. The transition between the collar of the implant and the abutment presents a smooth polished texture and it is angled inward to promote an ideal soft tissue evolution.

Aadva Tapered implants assure good primary stability in specific cases, such as surgery protocols in which the clinician searches for better primary stability when inserting the implant in the alveolar locus immediately after tooth extraction.

Finally, Aadva implant has a conical connection with the abutment part, besides presenting an internal hexagon designed as an anti-rotational feature. Both design aspects were developed to diminish the micro-movements and micro-gaps at the interface between implant and abutment, consequently promoting a better sealing capability besides preventing screw loosening and abutment fractures.

The range has three diameters: 3.3 mm (Narrow), 4 mm (Regular) and 5 mm (Wide) available in four lengths: 8, 10, 12 and 14 mm.

1. Evaluation of primary stability of immediate implant placement in extraction sockets in vitro. Wako Y. Clin Oral Implants Res. 2017 Oct;28(S14):144. Special Issue: 26th Annual Scientific Meeting of the European Association for Osseointegration.
2. Biomechanical considerations in solving demanding cases. Brozovic J, Mikulic B. Implants. 2018;19(2):18-24.
3. Dental implant macro-design features can impact the dynamics of osseointegration. Vivan Cardoso M, Vandamme K, Chaudhari A, De Rycker J, Van Meerbeek B, Naert I, Duyck J. Clin Implant Dent Relat Res. 2015 Aug;17(4):639-45.
4. Influence of design of implant body on primary stability. Sakaguchi Y, Ikeya R, Hanada S, Noguchi T. Poster presentation.
5. Primary stability of the tapered implant in very soft bone. Hanada S. Clin Oral Impl Res. 2015;26(S12):20. Special Issue: Abstracts of the EAO Congress, Stockholm, 24–26 September 2015.
6. Micro-movements of implant-abutment-interface (GC – Aadva Standard \varnothing 4,0). Lauer HC. Test Report.
7. Sealing effectiveness against Staphylococcus aureus of five different implant-abutment connections. Discepoli N, Ferrari Cagidiaco E, Landini G, Pallecchi L, Garcia-Godoy F, Ferrari M. Am J Dent. 2018 Jun;31(3):141-143.

V. Aadva implants and abutments

Clinical Performance

Aadva implants have been clinically evaluated in a recent field study in which a total of 393 implants were installed in 137 patients. Two private practices were selected to participate in this study. The objective was to evaluate the clinical performance of Aadva implants on a wide range of indications in patients with different medical backgrounds and on implant sites of different bone quality, thus simulating the clinical routine of a dental office. The statistical analysis showed a 98.5% cumulative success rate for the implants after 42 months. An average bone loss of 0.4 mm was observed during the healing period, which is similar to what would be expected for the best performing implants currently available. Therefore, it was concluded that Aadva implants performed well in many different clinical situations, from single tooth implants to full-arch rehabilitations in all tooth positions and in different bone quality types¹.

Many other clinical cases have been published showing the clinical effectiveness of Aadva implants in a wide variation of indications and clinical situations. Even in challenging conditions, Aadva implants can achieve a high success rate. The articles referred below show some of the many solutions offered by Aadva implant systems, including:

- A randomized clinical trial including thirty patients, restored with cement-retained crowns on soft tissue level implants, in which conical and hexagon connections were compared. The survival rate of all implants and connected crowns was 100% without any biological or technical complications after three years of loading.¹
- The substitution of congenitally missing lateral incisors individual using Aadva implants with zirconium CAD-CAM abutment covered with ceramic and cemented to a Blend Hybrid Abutment with a global vision on patient's health, function and smile. Computer-assisted design and manufacturing of the zirconia custom abutment covered with conventional ceramic offered a successful metal-free aesthetic solution³.
- The use of GC Aadva Standard implants in biomechanically unfavorable conditions like the rehabilitation a lower jaw with an overdenture and the restoration of masticatory function after tooth loss on a pneumatized lateral maxilla and on an atrophic posterior mandible with deficient bone ridge⁴.
- Improvement of aesthetics, function and proprioception on the rehabilitation of edentulous maxilla with a hybrid prosthesis on six Aadva implants⁵.

- The retreatment of a failed implant-prosthetic rehabilitation following a strict protocol, specifically concerning the length of healing periods, using Aadva Standard implants and a customized zirconium framework produced at GC's advanced CAD/CAM Production Centre⁶.
- The aesthetic management of a single central incisor with Aadva Standard implant, customized zirconium abutment and ceramic crown⁶.
- The complete functional and aesthetic rehabilitation of a edentulous maxilla using an immediate loading protocol, thus eliminating the use of a temporary removable prosthesis, reducing the time of treatment and improving patient satisfaction⁸.
- The complete oral rehabilitation with an overdenture on LocatorsTM and the aesthetic management of a single central incisor with Aadva Standard implant, customized zirconium abutment and ceramic crown⁹.
- The planning and execution of an oral rehabilitation with immediate implant insertion after tooth extraction and immediate load in the aesthetic zone of a patient who has lost his teeth due to periodontitis¹⁰.
- A three-year prospective study including twenty-five patients, in which success, survival rate and marginal bone levels were evaluated. An excellent peri-implant marginal bone stability was found in addition to 3-year success and survival rates of 100%.

1. Aadva implant in private practice. Brun JP, Leclercq P, Merheb J, Simons WF, Van Meerbeek B, Quirynen M. *Implants*. 2015;16(1):16-21.
2. Functional Implant Prosthodontic Score of a one-year prospective study on three different connections for single-implant restorations. Ferrari Cagidiaco E, Carboncini F, Parrini S, Doldo T, Nagni M, Nuti N, Ferrari M. *J Osseointegr* 2018;10(4):130-135.
3. Managing congenitally missing lateral incisors implants. The key factors to reach an excellent result. Puig MAI. *GC Get Connected* 12, 42-48.
4. Biomechanical considerations in solving demanding cases. Brozovic J, Mikulic B. *Implants*. 2018;19(2):18-24.
5. Case report. Full arch implant rehabilitation. Baeza DG. *Implants*. 2018;19(4):18-23.
6. Implant retreatment. Leclercq P, Martinez JF, Brüh M. *Implants*. 2018;19(3):22-29.
7. Replacement d'une incisive centrale maxillaire Mise en oeuvre du système GC Aadva®. Rebouillat JB. *L'information Dentaire*. 2011;40/41(23):3-9.
8. Cas de réhabilitation complète maxillaire avec le système Aadva, GC Tech. Riera C, Sarramia P, Gaillard C, Laboratoire Donday – Valade. GC Tech Europe GmbH Brochure.
9. Unterstützung von unterkieferfronttotalprothesen durch interforaminäre implantate & Versorgung einer Schalllücke im Oberkieferfrontzahnbereich mit einem Aadva-Implantat. Gockel F. GC Tech Europe GmbH Brochure.
10. Implantes inmediatos con carga inmediata en el paciente periodontal. Consideraciones. Iglesia Puig MA. *Labor Dental Clínica*. 2017;18(2):56-68.
11. A 3-Year Prospective Study on Radiographic Marginal Bone Evaluation Around Platform-Shifting Implants with Internal Conical Connections. Ogino Y, Matsushita Y, Sasaki M, Ayukawa Y, Koyano K. *Int J Oral Maxillofac Implants*. 2021;36(3):574-580.

Annex.

I) Aadv Implant System Components

Aadv Implant System is composed of three main product groups, namely the **Surgical Equipment** for preparation of the surgical area for the placement of the endosseous implants, the **Surgical Components** represented by the endosseous implants themselves, and the **Prosthetic Components** which allow a smooth connection between the endosseous implants and the prostheses.

1. Surgical Equipment

- a. Surgical Kit S
- b. Drills
- c. Direction Indicator
- d. Implant Driver
- e. Depth Gauges
- f. Prosthetic kit
- g. Screw Drivers
- h. SR Abutment Drivers
- i. Abutment Remover



2. Surgical Components

- a. Standard Implants
- b. Short Implants
- c. Tapered Implants
- d. Implant Impression Copings
- e. Cover Screws & Healing Screws

3. Prosthetic Components

- a. SR Abutments
- b. Smart Abutments
- c. Prep Abutments
- d. Ready Abutments
- e. CAD/CAM Tools
- f. Provi Abutments
- g. UCLA Abutments
- h. Ball Abutments
- i. Locator™ Abutments



II) Features and Benefits

1. Surgical Equipment

Thanks to an adapted step-by-step drill sequence in relation to the bone quality of the patient, the GC Aadvia Implant system ensures optimal primary implant stability.

Each drill bit has a specially treated surface that optimizes its cutting index and controls overheating. The depth markings have been designed in order to obtain perfect visibility regardless of the clinical situation.

The ergonomic design of the GC Aadvia surgical kit allows an optimal navigation through the drilling sequence thanks to an intelligent surgical organization and guarantees efficient cleaning and sterilization of surgical tools.

2. Surgical Components

Hexagonal interlocking of the conical sealed connection:

- Simplifies the fitting and positioning of prosthetic parts.

Surface roughness technology for enhanced osseointegration:

- Homogeneously micro-structured topography using GC's technological expertise (Aanchor® Surface Technology)
- Grade 5 titanium alloy selected for its high quality.

Progressive threads on the implant body:

- Optimizes primary stability by respecting bone physiology.

Implant Features

- Diameter reduced, platform switching
- Optimized thread- and implant geometry for maximal bone to implant contact
- Rounded apex for more security in treatment
- Machined neck for periimplantitis prophylaxis
- Balanced conicity of implant body for secure primary stability while protecting the bone
- Self tapping thread for smooth and minimal invasive insertion

Cumulative effect of shifting and switching platform:

- Active preservation of hard and soft tissue to obtain and maintain aesthetic and functional integration.



External angulated geometry implant collar:

- Promotes the stabilization of the biological width by initiation of an attachment area for epithelial connective tissue.
- Reduces the risk of peri-implantitis

Coronal micro threads:

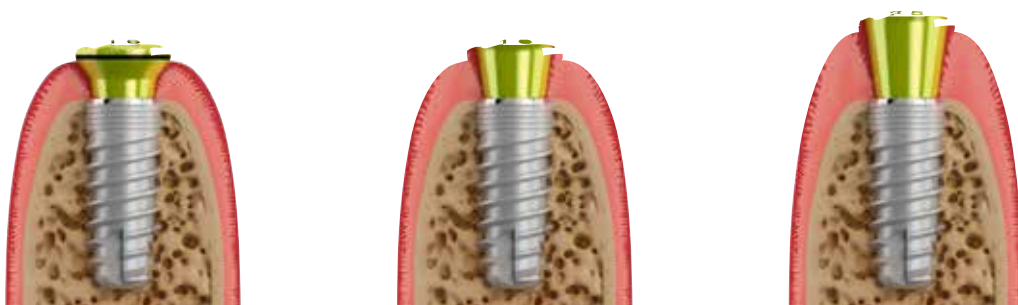
- Promotes rigidity of the implant collar and distributes the peripheral bone stress

Conical seal design:

- Prevents bacterial infiltration and maintains the biological width.
- Promotes hermeticity of the joint.
- Enhances a homogeneous distribution of mechanical stresses.
- Guarantees a stable prosthetic connection

3. Prosthetic Components: prosthetic management of gingival aesthetics

The hermetic conical connection, along with the control of the implant insertion, helps to manage the prosthetic emergence profile. The possibility offered by the transgingival healing screws, available in 4 different sulcular heights (EPH 0.5 - 1.0 - 2.5 - 4.0 mm) and 3 diameters (4 - 5 - 6 mm) guide the vertical and horizontal healing of the soft tissues allowing for an optimized control of the final prosthetic aesthetics.



The GC Aadva Implant system offers prosthetic flexibility.

The versatility of implant abutments for cement-retained or screw-retained configurations in various materials allows the dental professional to ensure a long-term function and optimal aesthetics for the patient.

A large choice of standard abutments or customized CAD/CAM abutments will meet the highest requirements for functional and aesthetic reconstructions.



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