



# The Implant Platform – Engineered for Success

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## About the Authors

**M. K. (Bobby) Baig BDS., AEGD., Cert Prosthodontist., F.R.C.D.(C).** received his dental degree from H.K.E.S Dental College, Gulbarga University, India in 1997. He has completed his residency at Government Dental College and Hospital in Hyderabad India.

Dr. Baig completed Advance Education in General Dentistry program and Graduate program in Prosthodontics at Eastman Institute for Oral Health, University of Rochester New York state USA.

Dr. Baig is a Associate Professor at University of Rochester in the Department of Dentistry at Eastman Institute for Oral Health, University of Rochester, USA. He also works as a Clinical Instructor in Prosthodontics in Mt Sinai Hospital, and Associate In Dentistry at University of Toronto Faculty of Dentistry, Toronto, Canada, and private practice at Dental Specialists Group, Woodbridge and Prosthodontic Associates, Toronto in Ontario.

Dr. Baig is a board certified Prosthodontist in Canada and serves as a national examiner for NDSE National Dental Specialty Examination board of Canada; the licensing exam to be a prosthodontist in Canada, and national examiner for Prosthodontics fellowship [F.R.C.D.(C)] administered by Royal College of Dentist of Canada. Dr. Baig was awarded the Part time faculty Award for Excellence in Teaching by the University of Rochester, NY, USA for the year 2019, Dr. Baig received his Fellowship In the Academy Award International Academy for Dental Facial Esthetics, Nov 2021. Manhattan New York City.

Dr. Baig has a special interest in aesthetics and implant dentistry, Reconstructive Fixed and Removable Prosthodontics, Dental Ceramics and smile makeover procedures. Dr. Baig lectured extensively to dental study clubs and professional organizations across North America and Southeast Asia.

**Irina Gulerez DMD** received her dental degree with honors from McGill University in Montreal, Canada. She pursued advanced clinical training at the Eastman Institute for Oral Health in Rochester, NY. She currently offers general dental care in a private practice office in Rochester and serves as a Clinical Instructor at University of Rochester's Eastman Institute for Oral Health in the Department of Advanced Education in General Dentistry.

**Dr. Alexis Ghanem** received his dental degree from Central University of Venezuela. He completed his residency in Oral Surgery at Central University of Venezuela and worked for 10 years as an Assistant Professor at the Department of Oral surgery at Central University of Venezuela. He graduated from Eastman Dental Center with Advanced Education in General Dentistry and completed his residency at Strong Memorial Hospital. He currently teaches and practices in Rochester, NY.



## Introduction:

The implant-abutment connection design plays an important role in reducing biological and mechanical failures, such as screw loosening, component fracture or bone loss due to micromotion or bacterial microleakage. Here we present a summary of the different connection designs across implant brands, all engineered for one

purpose: to minimize implant failure and maximize abutment stability.

**The concept of microgap:** The ideal connection would act as a one-piece implant that eliminates the resultant microgap space at the implant-abutment interface. The presence of the microgap contributes to both mechanical and biological failure<sup>1</sup>. Mechanically, this space permits

micromotion of the abutment under loading conditions, leading to preload reduction and screw loosening or fracture. Biologically, the microgap is a potential space for bacterial colonization at the implant-bone interface which can lead to peri-implantitis in extreme cases. In order to minimize the microgap and maximize abutment stability under loading, various implant platform designs have been manufactured.



## External connection

This was the first implant connection to be designed and the one with the most historical data, originally the Brånemark external connection. Here, the connection is superior and exterior to the coronal portion of the implant, and can be either hexagonal, octagonal or spline.

### Advantages:

- Long term follow-up data available
- Compatibility among multiple implant systems

### Disadvantages:

- Screw is the main component securing the abutment and this leads to a less stable screw joint and a higher prevalence of screw loosening.



- Rotational misfit is more likely, and different designs have been created to minimize this, such as micro-stops at the hexagon corners of abutments to better engage the implant hexagon.

## Internal connection

Here, the connection is inferior to the coronal portion of the implant, thus inside the implant body. Internal connections exist in a wide variety of shapes including hexagon, octagon, spline, tri-channel. An important feature of internal connections is that they increase abutment stability and also provide more platform switching options than external connections.



**Platform switching**, whereby a narrower abutment is combined with a wider implant, results in positioning of the microgap away from the implant shoulder and a shift of the loading forces from the implant neck to the center of the abutment interface. This results in decreased marginal bone loss and screw loosening.

### Advantages:

- An internal connection places the center of rotation lower in the implant and increases abutment stability by resisting lateral loads.

- More stable screw joint so less screw loosening
- Better esthetics and improved seal to the external connection (but not as good as conical connection, *see below*).

### Disadvantages:

- Thinner wall at the implant collar to allow for the connection space is a weak spot
- Less historical data compared to external connections

## Conical internal connection

The conical connection is a sub-type of the internal connection. A true conical connection is a Morse Taper connection where the implant and abutment are machined to the same internal taper angle ( $\alpha$ ), allowing for a precise fit, as shown in figure below.

### Advantages:

- The friction between the implant and abutment surfaces that are press-fit together results in cold-welding, minimizing the microgap and allowing the system to behave as one-piece.
- Hermetic seal and increased surface area of implant-abutment connection prevents microbial colonization

and leads to a stabler joint with reduced micromotion and marginal bone loss.

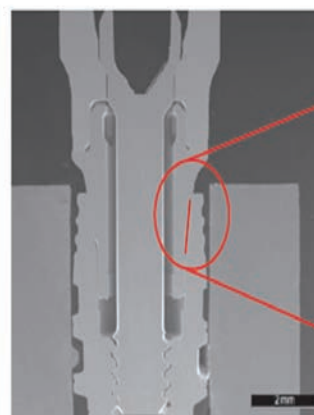
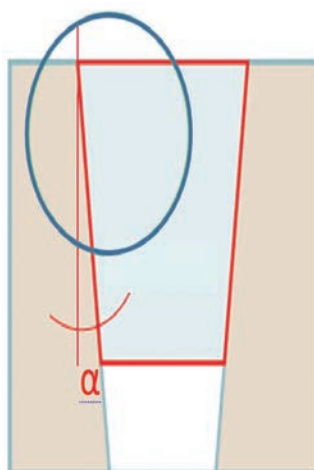
- Incorporating self-locking mechanisms in the platform design besides the conical connection further reduces micromovements and abutment rotation.

### Disadvantages:

- The conical connection elongates the



internal area, and can lead to vertical discrepancy if the abutment is not fully seated on the implant. More likely to require radiographic verification of full seating as opposed to relying on tactile feel.



# NOBEL BIOCARE

Nobel Biocare features a vast array of implant solutions, offering both bone-level and tissue-level, external and internal connection implants, with machined or textured implant collars. Among internal connections, Nobel platforms can be tri-lobed, conical connection, or their newest innovation, the tri-oval conical connection.

## External connection

*Branemark® system MKIII, MKIV and NobelSpeedy® Groovy implant lines*



External hex

### Branemark System MK III TiUnite



Platform	Ø Implant
NP	3.3 mm
RP	3.75 mm
RP	4.0 mm
WP	5.0 mm

### NobelSpeedy Groovy



Platform	Ø Implant
NP	3.3 mm
RP	4.0 mm
RP	5.0 mm
WP	5.0 mm
WP	6.0 mm

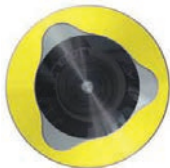
## Internal connection

*(color coded platform diameters- NP purple, RP yellow, WP blue, 6.0 green)*

### Tri-lobe

*NobelReplace® Tapered Groovy, NobelReplace Select™ TC (tissue-level, straight implant) implant lines*

#### NobelParallel Tapered Groovy

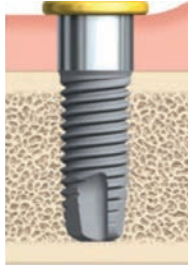


Internal tri-channel



Platform	Implant Ø
NP	3.5 mm
RP	4.3 mm
WP	5.0 mm
6.0	6.0 mm

#### NobelParallel Select TC



Platform	Ø Implant
NP	3.5 mm
RP	4.0 mm

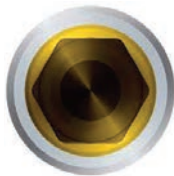
This was one of Nobel's original platforms. It presents a flat, butt-joint implant-to-abutment connection, with three rounded slots to engage the abutment. Tri-lobe connections tend to be easier to restore, since the abutment can only be placed in

three ways. However, a disadvantage of the tri-lobe is that it is thinner at the lobe tips and may fracture, a phenomenon called "flowering". In addition, the flat platform presents a larger microgap, which can be colonized by bacteria over time.

## Conical connection

*NobelReplace® Conical Connection, NobelActive®, NobelParallel™ implant lines*

This presents a 12 degree tapering conical connection with a hex interlocking anti-rotational feature.



Internal conical

### NobelActive



Platform	Ø Implant
3.0 **	3.0 mm
NP ***	3.5 mm
RP	4.3 mm
RP	5.0 mm
WP ****	5.5 mm

### NobelParallel Conical Connection



Platform	Ø Implant
NP	3.75 mm
RP	4.3 mm
RP	5.0 mm
WP	5.5 mm

### NobelReplace Conical Connection

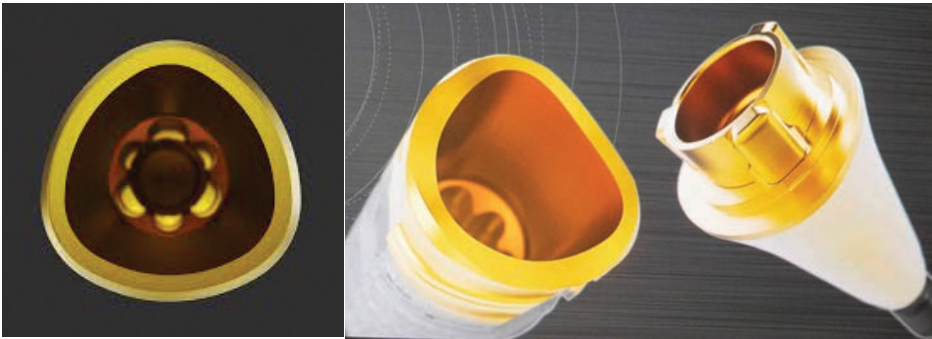


Platform	Implant Ø
NP	3.5 mm
RP	4.3 mm
RP	5.0 mm



Trioal conical connection (NEW)

This is Nobel’s newest innovation in platform design, with the Nobel N<sub>1</sub><sup>TM</sup> implant system. The N<sub>1</sub> connection trades the conical hex connection for a slotted connection. It is a variation of the Tri-lobe Nobel Replace connection, where the slots start below the top of the implant and are square rather than round. The system will be including NP and RP diameters.



STRAUMANN

Straumann features internal connection implants only, but offers a wide selection of tissue-level and bone-level implants. Implants are available in four color-coded endosteal diameters:

Ø 2.9 mm (blue), Ø 3.3 mm (yellow), Ø 4.1 mm (red), and Ø 4.8 mm (green).

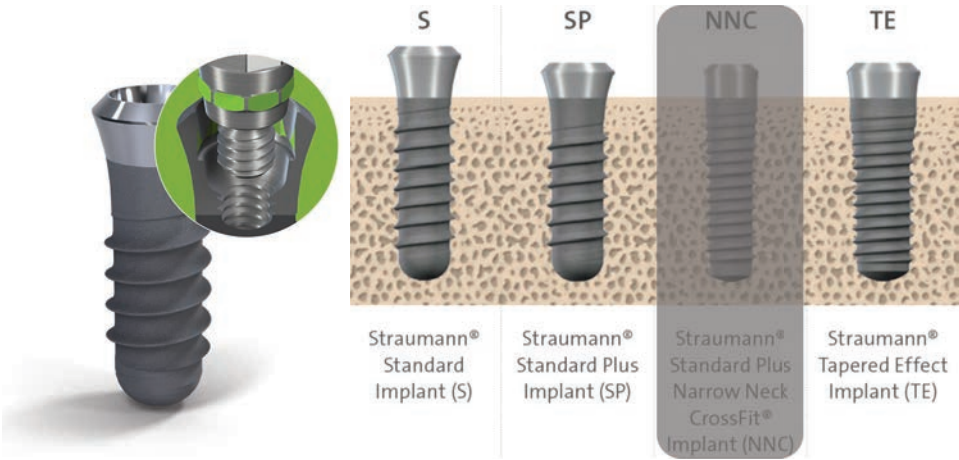
**NOTE:** Color codes above are for tissue-level and bone-level implant diameters. Platform diameters are color coded differently, and only for bone-level implants (see “CrossFit connection” section).

SynOcta® connection

Standard, Standard Plus (RN and WN only),  
Tapered Effect implant lines

The Straumann® synOcta® concept was introduced worldwide in 1999, using the well-known Morse taper design principle developed in 1986. The mechanically locking friction fit of the Straumann® synOcta® internal connection has an 8 degree conical connection and an octagon for the repositioning of prosthetic parts.

**NOTE:** The Standard Plus Narrow Neck (NN) implant is part of the Standard Plus Tissue-Level implant, but uses a CrossFit® connection, described next.



Below is an example of tissue-level implants with the synOcta connection in the Standard Plus line. These are the same diameters as the

Standard line, but Standard Plus includes the NNC (Narrow Neck CrossFit) implant.

NNC	RN	RN	RN	WN
Ø 3.5 mm	Ø 4.8 mm	Ø 4.8 mm	Ø 4.8 mm	Ø 6.5 mm
Ø 3.3 mm	Ø 3.3 mm	Ø 4.1 mm	Ø 4.8 mm	Ø 4.8 mm
			* Not included in TE line	



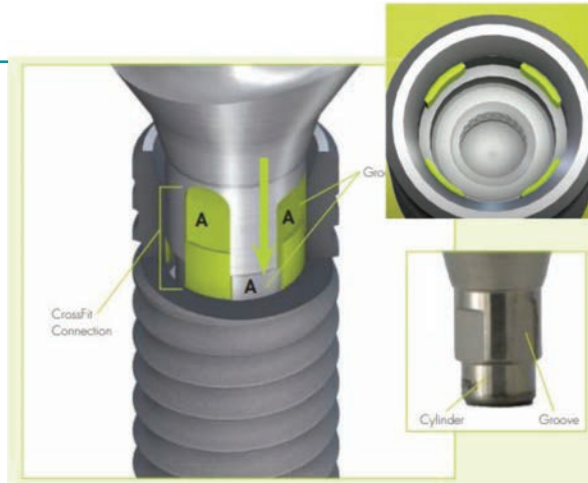
## CrossFit® connection

### Bone Level and Bone Level Tapered implant lines

The CrossFit® connection of Straumann bone-level implants applies the benefits from the Straumann synOcta Morse taper connection to the connection requirements at bone level. Similar to the synOcta connection, the CrossFit features a mechanically-locking friction fit with the help of a conical-cylindrical connection and four internal grooves.

#### NOTE the COLORS:

- Bone Level Tapered  $\varnothing$  2.9 mm implants feature the Small CrossFit connection (SC, blue).
- Bone Level  $\varnothing$  3.3 mm implants feature the Narrow CrossFit connection (NC, yellow).
- Bone Level  $\varnothing$  4.1 mm and  $\varnothing$  4.8 mm implants share the same connection, the Regular CrossFit connection (RC, magenta), and share the same secondary components. The corresponding secondary components are color-coded as well.



Below is an example of implants with the CrossFit connection in the Bone Level Tapered line, including the Narrow Neck CrossFit tissue-level implant (left).

NNC	SC	NC	RC	RC
$\varnothing$ 3.5 mm	$\varnothing$ 2.9 mm	$\varnothing$ 3.3 mm	$\varnothing$ 4.1 mm	$\varnothing$ 4.8 mm
$\varnothing$ 3.3 mm	BLT $\varnothing$ 2.9 SC	BLT $\varnothing$ 3.3 NC	BLT $\varnothing$ 4.1 RC	BLT $\varnothing$ 4.8 RC


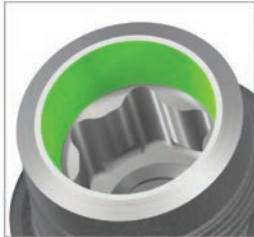













\*SP tissue-level line

\*Not included in BL line

## TorcFit™ connection

This connection is used in Straumann's new BLX implant system. The TorcFit supports self-guiding insertion for tactile feedback. Six-lobed positions enable alignment and protection against rotation. The TorcFit also presents the 8 degree conical prosthetic platform (highlighted in green), allowing for a precise frictional fit.

As shown below, all BLX Implants have the same inner geometry regardless of the diameter of the implant. This allows the use of one set of prosthetic components and simplifies the prosthetic steps.

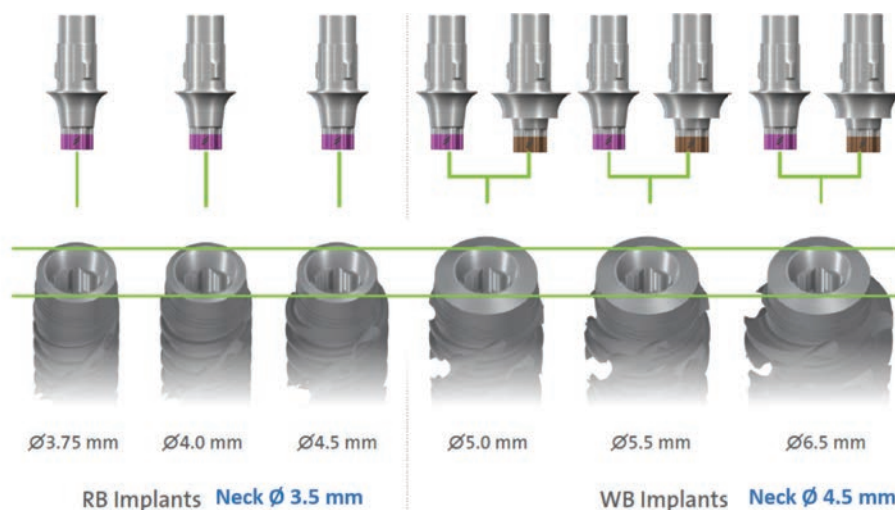
						
	Ø3.75 mm	Ø4.0 mm	Ø4.5 mm	Ø5.0 mm	Ø5.5 mm	Ø6.5 mm
Color code	 (red)	 (gray)	 (green)	 (magenta)	 (brown)	 (black)
Prosthetic Base	RB (Regular Base)			WB (Wide Base)		
Connection	TorcFit™					
Picture						





Up to implant diameters of 4.5 mm, implants have a neck diameter of 3.5 mm. All other BLX implants have a neck diameter of 4.5 mm. Prosthetic abutments are color coded (**Regular Base, RB**, magenta and **Wide Base, WB**, brown).

**NOTE:** RB abutments fit on all BLX implants. WB abutments help create a wider emergence profile and only fit on implants with a diameter of 5.0 mm and above (neck diameter 4.5 mm).



## ZIMMER-BIOMET

Biomet 3i was acquired by Zimmer in 2015, and Biomet's T3® implant line is now part of Zimmer-Biomet, including T3's external connection implants. Among internal connections, Zimmer Biomet offers several types, as shown below.

### Friction-fit internal hex, also called PlatformPlus™ connection

*Tapered Screw-Vent® (TSV®) and Trabecular Metal™ implant lines*

Zimmer's proprietary friction-fit internal hex connection is a unique combination of designs that has been shown to reduce stress on crestal bone and resist abutment screw loosening. It features a lead-in bevel and a conical platform of 45 degrees each, followed by a 1.5 mm deep internal hex with a one degree taper, creating a friction fit that resists micromovement.

One-degree taper forms a friction-fit connection with the implant to **virtually eliminate micromovement**<sup>1</sup>



Lead-in bevel designed to reduce **horizontal stresses** on crestal bone<sup>1-3</sup>

1.5mm deep internal hex shields the retention screw from excess loading<sup>1</sup>



Below are available implant and platform diameters for the Tapered Screw-Vent and the Trabecular Metal implant lines (color-coded according to platform diameter):

3.5 mmP- green, 4.5 mmP- purple, 5.7 mmP- yellow

Both these implant lines offer a variety of collar and implant body surface textures.

Implant Diameter (Ø)	3.7 mmØ	4.1 mmØ	4.7 mmØ	6.0 mmØ
Implant Platform (P)	3.5 mmP	3.5 mmP	4.5 mmP	5.7 mmP



Tapered Screw-Vent

Implant Diameter (Ø)	4.1 mmØ	4.7 mmØ	6.0 mmØ
Implant Platform (P)	3.5 mmP	4.5 mmP	5.7 mmP



Trabecular Metal

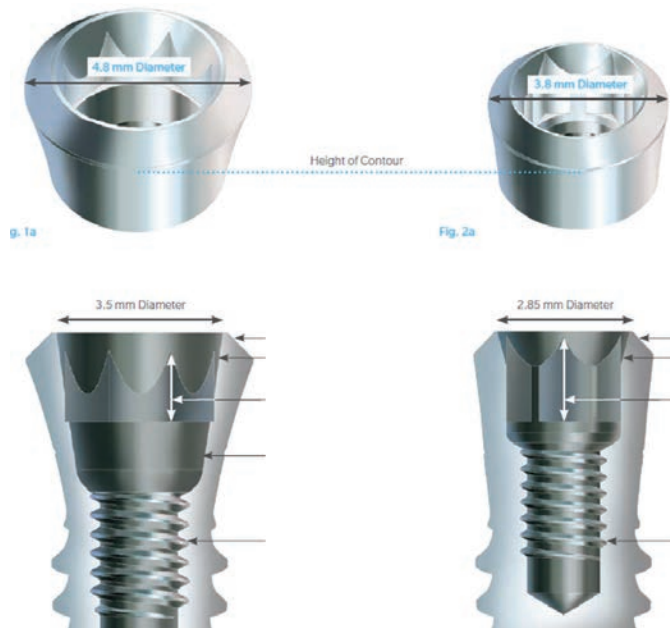




# Tissue level internal hexagon/ octagon connection

*Tapered SwissPlus® line*

The Tapered SwissPlus line is Zimmer Biomet's tissue-level implant. Implant platform diameters offered are 3.8 mm and 4.8 mm. The 3.8 mm platform features a 15 degree tapered internal beveled wall leading to a 1.85 mm deep hexagon (left). The 4.8 mmD platform features an 8 degree tapered internal beveled wall leading into a 1.5 mm deep octagon (right).



Implant Diameter (Ø)	3.7 mmØ	3.7 mmØ	4.8 mmØ
Implant Platform (P)	3.8 mmP	4.8 mmP	4.8 mmP
Connection	Tissue Level Internal Hexagon		Tissue Level Internal Octagon



# Certain® (QuickSeat®) internal connection

*T3® and Osseotite lines (ex-Biomet 3i)*

Both the T3 and Osseotite implant lines feature the Certain (QuickSeat) internal or external hex connection (see right) and are available as either tapered or parallel-walled, platform switched or non-platform switched, with various surface treatments, or as the T3 short implant.

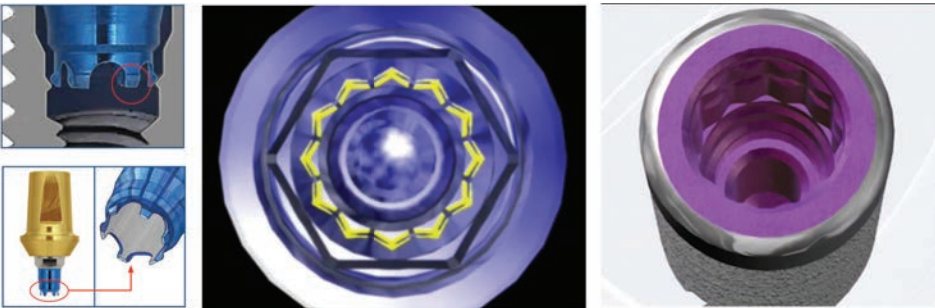
The QuickSeat connection produces an audible and tactile “click” that confirms engagement of prosthetic parts to the implant. As shown right, abutment “fingers” cause the click and provide retention even before the screw is placed. A screw is needed to fully seat

the components at definitive placement. The internal connection features a 6-point hex for antirotation for straight abutments, and a 12-point double hex for 30 degree rotational positioning for pre-angled abutments.

Both T3 and Osseotite implants are color-coded according to platform diameter:


3.4 mm- purple, 4.1 mm- blue, 5 mm- yellow, 6 mm- green


**NOTE:** The 6 mmP diameter is not available in the platform switched implant types.



Shown below are the diameters for tapered and parallel-walled non-platform switched (left) and tapered or parallel-walled platform switched (right) T3 implants.

T3 non-platform switched					T3 platform switched		
Implant Diameter (Ø)	3.25 mmØ	4.0 mmØ	5.0 mmØ	6.0 mmØ	4.0 mmØ	5.0 mmØ	6.0 mmØ
Implant Platform (P)	3.4 mmP	4.1 mmP	5.0 mmP	6.0 mmP	3.4 mmP	4.1 mmP	5.0 mmP

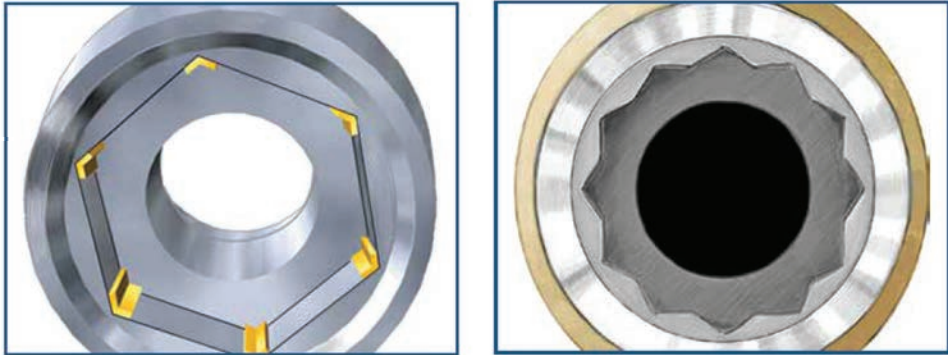




Certain® (QuickSeat®) external hex connection

*T3® and Osseotite lines*

The external hex connection in the implant is a classical external connection. However, the abutments have a patented design incorporating machined microstops within the corners of the hex in the abutment (see left image). This reduces the rotation between the implant and the abutment. Pre-angled abutments have a 12-point double hex that provides 30 degree rotational positioning on the implant hex (see right image).



Implant Diameter (Ø)	3.25 mmØ	4.0 mmØ	5.0 mmØ	6.0 mmØ
Implant Platform (P)	3.4 mmP	4.1 mmP	5.0 mmP	6.0 mmP



External hex T3 implants are offered in the same diameters as the internal connection implants and can be either parallel-walled or tapered.

BIOHORIZONS

BioHorizons features two main implant products: the Tapered and the Legacy implants.

The Tapered implant lines

- Include bone-level and tissue-level implants, all unified by the same implant-abutment connection, a 45 degree conical internal hexagon connection.
- Implant lines distinguished by

different implant body and platform diameters (see table).

- The implant platforms and prosthetic parts are color-coded.

The Legacy implant line (not shown in detail here)

- Parallel-walled implants
- Bone-level and tissue-level internal connection implants (45 degree conical internal hex), as well as external connection implants. Platform diameter color coding remains the same.

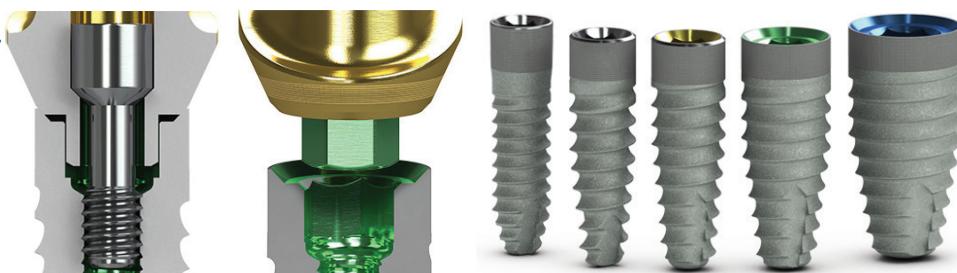








## Conical internal hexagon connection

(see different Tapered implant lines in table below)

The BioHorizons implant-abutment connection platform is very similar to Zimmer's internal hex connection, featuring a 45 degree conical lead-in bevel. Unlike Zimmer's internal hex however, BioHorizons internal hexagon is entirely parallel.



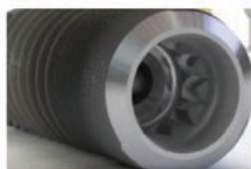
Implant Platform Ø	Implant Body Ø	Tapered Internal	Tapered Plus	Tapered Pro	Tapered Short	Tapered IM*	Tapered Tissue Level	Tapered PTG*
 3 mm	3.0	X						
	3.4	X						
	3.8		X	X				
 3.5 mm	3.0						X	
	3.8	X					X	
	4.2			X				X
	4.6		X	X	X			
 4.5 mm	4.6	X					X	
	5.2			X				
	5.8		X		X			
 5.7 mm	5.8	X					X	
	7.0					X		
	8.0					X		

\*IM – Immediate Molar, \*PTG- pterygomaxillary

## ASTRA TECH (now part of Dentsply Sirona)

### Conical Seal Design™ internal connection

Astra Tech's early implant line was the



Conical Seal Design  
internal connection

OsseoSpeed™ TX (Tapered Apex) line, launched in 2010 (see implant platform diameters and color coding below). It featured

the Conical Seal Design™ connection, a conical tapered double hexagon internal connection with an 11-degree lead-in bevel.



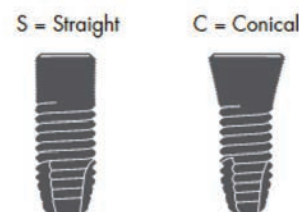
In 2014, the OsseoSpeed™ EV (Evolution) line was launched:

- Uses the same internal conical 11-degree tapered connection, but with an added feature: a “one-position only” indexing feature (see right image).
- The internal connection has seven slots- six symmetrically-placed and one additional slot. This design allows for three indexing options: index-free placement (for non-indexed abutments), 6 positions (for indexed abutments), or one-position only for Atlantis CAD/CAM abutments.



OsseoSpeed™ EV implants are available in 5 platform diameters, color coded as shown below. Implants can be straight or conical, with lengths ranging from 6 mm to 17 mm.

Conical implants are only available for the 4.2 mm and 4.8 mm platforms, and the implant body diameters are 0.6 mm smaller.



## KEYSTONE

Keystone Dental offers multiple implant variants, all bone-level internal connection implants.

- The PrimaConnex®, Prima Plus™, Genesis and TILOBEMAXX® (Molaris) all feature the same internal connection,

the Ti-Lobe™ connection described below. The PrimaConnex® line is the only one that offers both tapered and straight implants. The lines differ in the implant body thread design, diameters, and surface characteristics.

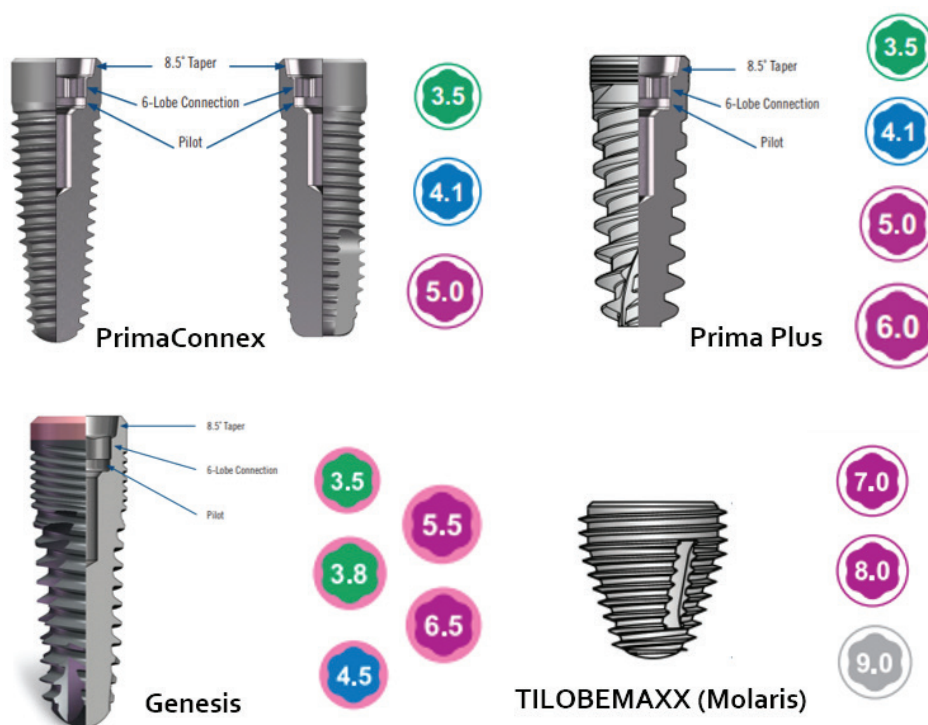
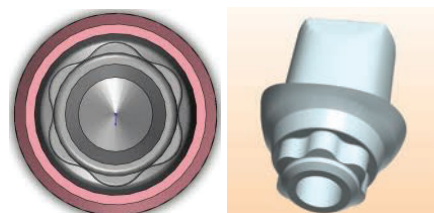
- The PrimaSolo® implant is a one-piece implant with an integrated abutment; Zeramex® are ceramic implants; Paltop was acquired by Keystone in 2019. These three are not described here.

## Ti-Lobe™ internal connection

*PrimaConnex®, Prima Plus™, Genesis, TILOBEMAXX® (Molaris)*

The Ti-Lobe™ connection is an internal six-lobed connection with a lead-in taper of 8.5 degrees. This platform provides the benefits of a tapered, internal lobed design and integrated pilot (self-aligning feature) and results in a secure implant-abutment connection.

Platform diameters are color coded for the different implant lines as shown below:



## HIOSSEN

Hiossen offers three main implant solutions: the ET line of Tapered bone-level implants (with ETIII SA being the most popular), the MS line of mini implants (not discussed here) and the SS line of tapered tissue-level implants.

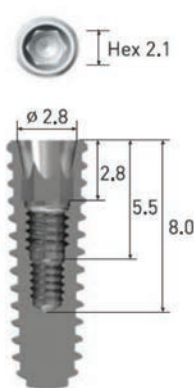
### Conical hexagon internal connection

*ETIII SA, ETIII NH, ETIII 3.2, ETII*

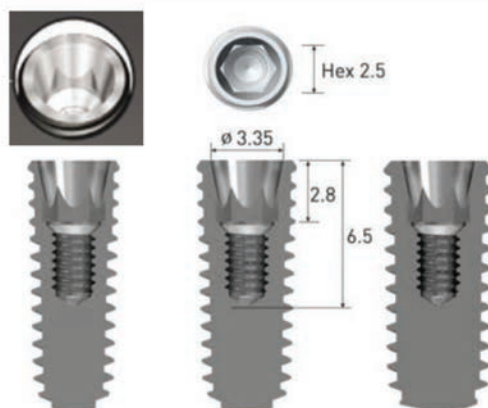
The ET implant line features a conical Morse taper internal connection with a lead-in bevel of 11 degrees, and a hexagon indexing design.

- Connection platform can be **Mini** ( $\varnothing$  2.8 mm)- for implant body diameter of 3.5 mm, OR
- **Standard** ( $\varnothing$  3.35 mm)- for implant body diameters of 4.0 mm, 4.5 mm or 5.0 mm.

Mini [3.5]



Standard [4.0/4.5/5.0]



### Conical octagon internal connection

*SSII, SSIII SA*

The SS implant line features a conical Morse taper internal connection as the ET implants, but with an octagon indexing feature.

- Connection platform can be **Regular** ( $\varnothing$  4.8 mm)- for implant body diameter of 3.5 mm, 4.0 mm, 4.5 mm OR
- **Wide** ( $\varnothing$  6.0 mm)- for implant body diameter of 4.5 mm (shown below) and 5.0 mm

Regular

Platform  $\varnothing$  4.8

Diameter  $\varnothing$  4.5



Wide

Platform  $\varnothing$  6.0

Diameter  $\varnothing$  4.5



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## MEGAGEN

MegaGen was initially established in South Korea in 2002. It is well known for its two implant systems: AnyRidge® and AnyOne®, with internal hex conical connections of 5 degrees and 11 degrees respectively. The AnyOne® implant system (not detailed here) is designed as an ‘all-around’ implant for ‘anyone,’ to be used in straight-forward restorative scenarios with predictable initial stability. The AnyRidge® is the more popular implant line launched in 2009, detailed below. We also briefly introduce the BLUEDIAMOND IMPLANT®, the new addition to the AnyRidge® family.

### Conical hexagon internal connection

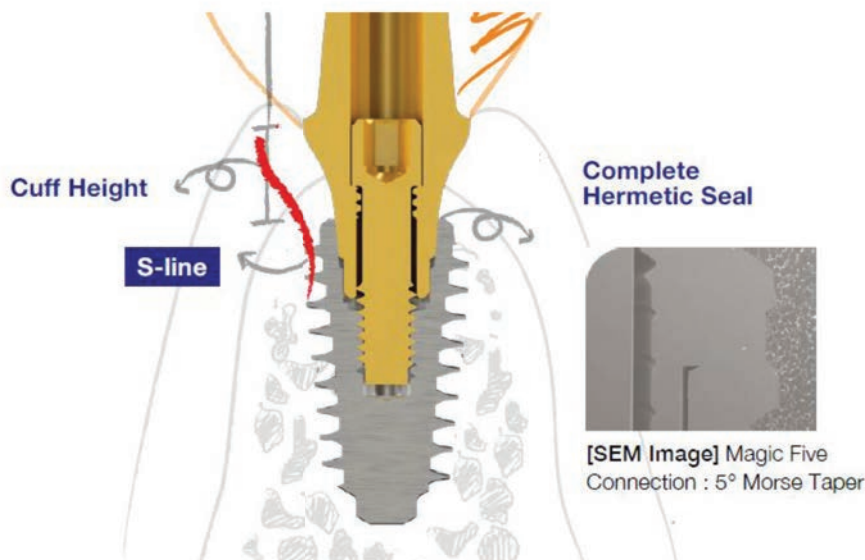
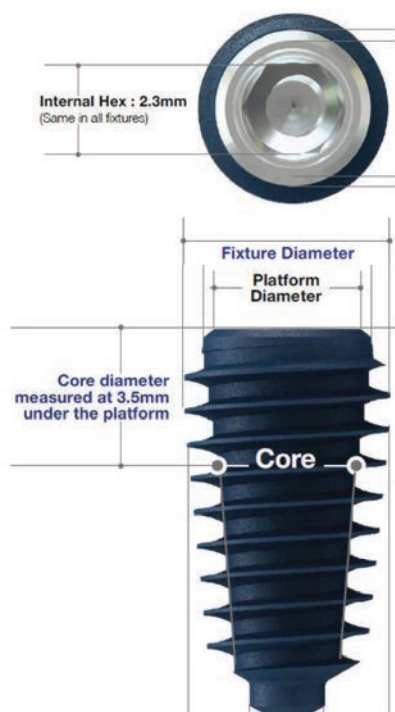
*AnyOne®, AnyRidge®*

The AnyRidge® implant-abutment connection features a 5 degree internal hex conical connection which maximizes the “cold welding” effect. The slimmer implant

cuff combined with the S-shaped abutment cuff lead to a “double offset®” effect that preserves cortical bone and promotes soft tissue volume and esthetics (see below). Through this design, MegaGen guarantees

no screw loosening and reports minimized biologic width (no microgap).

**NOTE:** Due to extremely strong hermetic seal, MegaGen offers a special abutment removal screwdriver.























The AnyRidge® implant is designed to achieve initial stability in any bone density (D1-D4). This feature is made possible by the patented KnifeThread® design, where implant thread depth differs for each core diameter, and can be selected based on the type of bone that will receive the implant.

Similar to Keystone’s TILOBEMAXX® system, AnyRidge® has color-coded implant fixture diameters (Small, Regular, Wide and Super Wide, see table) rather than color-coded platform diameters. While the internal hex is a constant 2.3 mm across all fixtures,

implant platform diameters range from 3.5 to 5 mm, and can receive abutments of various profile diameters.



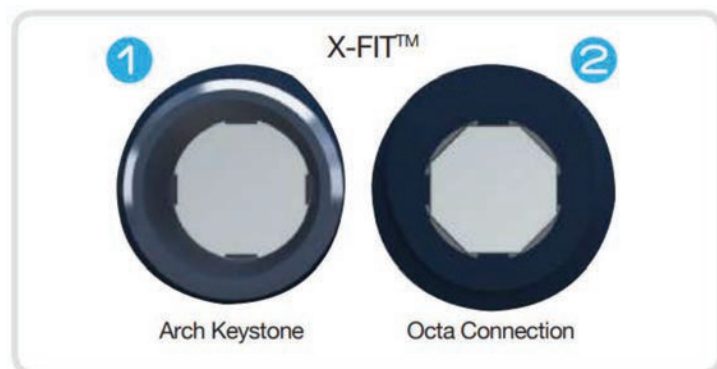
Core Diameter	Fixture Diameter									
	Ø3.5	Ø4.0	Ø4.5	Ø5.0	Ø5.5	Ø6.0	Ø6.5	Ø7.0	Ø7.5	Ø8.0
Ø2.8										
Thread depth	0.3									
Ø3.3										
Thread depth		0.35	0.6	0.85	1.1					
Ø3.8										
Thread depth			0.35	0.6	0.85					
Ø4.0										
Thread depth				0.45	0.7	0.85				
Ø4.3										
Thread depth				0.35	0.6	0.85				
Ø4.8										
Thread depth					0.35	0.6	0.85	1.1	1.35	1.6

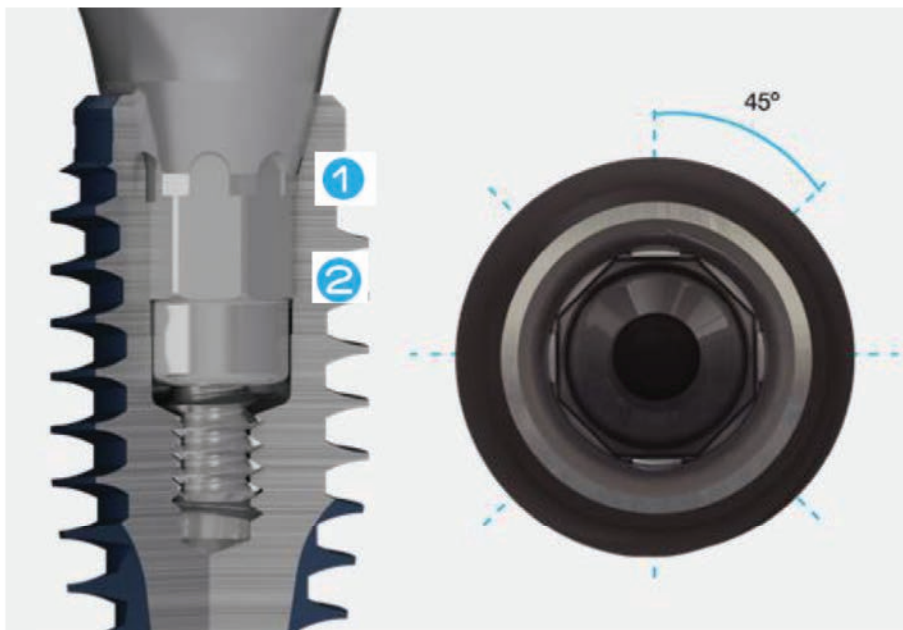
## X-FIT™ conical octagon internal connection

### BLUEDIAMOND IMPLANT®

This implant line has many of the key features of the AnyRidge® family, but was created for clinicians who prefer old-style implants with more standard protocols than the uniquely different AnyRidge®.

The implant abutment X-FIT™ connection features a 30 degree internal conical connection with a double fastened internal structure of an arch keystone and an octa combination (see below). When correctly mounted in one of 8 possible positions, the abutment and implant snap together with a click.





Like the AnyRigde® line, the BLUEDIAMOND IMPLANT® is offered in multiple implant (fixture) diameters where the core size is constant and the thread depth differs (0.4 mm- Regular thread and 0.6 mm-Deep Thread). Fixture diameters correspond to Narrow or Regular Connection platform sizes that are color coded NC or RC (see table), with prosthetic components of different profile diameters also organized into NC or RC categories.

- REGULAR thread recommended for hard bone (D1 & D2)
- DEEP thread recommended for soft bone or poor bone density (D3 & D4)

	Fixture Diameter							
	Ø3.3	Ø3.7	Ø4.1	Ø4.4	Ø4.8	Ø5.3	Ø5.8	Ø6.3
Regular Thread								
Thread Depth	0.4	0.4	0.45	0.45	0.4	0.45		
Deep Thread								
Thread Depth	0.6	0.6	0.65	0.6	0.65	0.65	0.9	1.15

















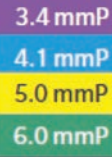
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


















## IMPLANT-ABUTMENT CONNECTIONS IN DIFFERENT IMPLANT BRANDS

Internal/ External	Connection type/ name	Implant systems	Color coding/diameters		
Platform					Implant
Nobel Biocare					
External	External connection	Branemark® System NobelSpeedy® Groovy		Diameters differ between implant systems	
Internal	Trilobe (butt-joint)	NobelReplace Select™ TC (tissue) NobelReplace® Tapered Groovy ReplaceSelect Tapered			
	Conical (12 degree)	NobelReplace® conical connection NobelActive® NobelParallel™			
	Trioval conical	NobelN1™	NP, RP		
Straumann					
Internal	SynOcta® (conical 8 degree) Tissue-level implants	Standard Standard Plus (RN and WN only) Tapered Effects	RN Ø 4.8 mm WN Ø 6.5 mm	 2.9 mm (only BLT)  3.3 mm	
	CrossFit® (conical 15 degree)	Bone Level (BL) Bone Level Tapered (BLT) Narrow Neck CrossFit (NNC)- tissue level	SC Ø 2.9 mm NC Ø 3.3 mm RC Ø 4.1 mm Ø 4.8 mm	 4.1 mm  4.8 mm	
	TorcFit® (conical 8 degree)	BLX	RB (all implant Ø) WB (5.0 mm & above)	 3.75  5.0  4.0  5.5  4.5  6.5	
Zimmer Biomet					
Internal	Friction Fit internal hex (PlatformPlus™) (conical 45 degree)	Tapered Screw-Vent® Trabecular Metal™		Ø 3.7 mm Ø 4.1 mm Ø 4.7 mm Ø 6.0 mm	
	Internal hexagon/octagon	Tapered SwissPlus® (tissue-level)	3.8 mmP (hex) 4.8 mmP (oct)	Ø 3.7 mm Ø 4.8 mm	
	Certain® internal connection	T3® Osseotite		Ø 3.25 mm Ø 4.0 mm Ø 5.0 mm Ø 6.0 mm	
External	Certain® external connection	T3® Osseotite			



Internal/ External	Connection type/ name	Implant systems	Color coding/diameters	
PlatformImplant				
BioHorizons				
External	External hex connection	Legacy External Dental Implants	    3.04.05.06.0	Diameters differ between implant systems (see table p.2)
Internal	Conical internal hexagon (45 degree taper)	Legacy Single Stage (tissue-level)	   3.54.55.7	
		Tapered implant variants	    3.03.54.55.7	
Astra Tech (now part of Dentsply Sirona)				
Internal	Conical Seal Design™ (11 degree taper) Double hexagon	OsseoSpeed™ TX	   3.03.5/4.04.5/5.0	Not specified
	Conical Seal Design™ (11 degree taper) Hexagon with one additional slot	OsseoSpeed™ EV (straight/conical)	    	
Keystone Dental				
Internal	Ti-Lobe™ (8.5 degree taper) Lobed hexagon	PrimaConnex® (tapered/straight)	  	Ø 2.4/3.3 mm Ø 2.7/4.0 mm Ø 3.3/ 5.0 mm
		Prima Plus™ (tapered)	  	Not specified
		Genesis (tapered)	  	Ø 2.4/3.2 mm Ø 3.8 mm Ø 4.8/5.8 mm
		TILOBEMAXX® (tapered)	  	Ø 5.5 mm* Ø 6.5 mm* Ø 7.5 mm*
Hiossen				
Internal	Conical hexagon (11 degree taper)	ET implant line (e.g. ETIII SA) (straight)	Mini Ø 2.80 Standard Ø 3.35	Ø 3.5 mm Ø 4.0/4.5/5.0 mm
	Conical octagon (11 degree taper)	SS implant line (tissue-level tapered)	Regular Ø 4.8 mm Wide Ø 6.0 mm	Ø 3.5/4.0/4.5 mm Ø 4.5/5.0 mm

\* NOTE: In TILOBEMAXX®, the platform and implant body diameter values are inverted (i.e. platform diameters are 5.5, 6.5 and 7.5 mm, implant body diameters are 7.0, 8.0, 9.0 mm)

