

ACCELERATED LOADING TO BENEFIT YOUR DENTAL PRACTICE

**Making it
easier with
Confidence!**



Accelerated Loading

How does it benefit your dental practice?

96% Of your patients expect recovery at least 2 months.

Accelerated loading provides rapid results, enhancing patient satisfaction and helping your practice stand out.

Five Benefits of Accelerated Loading

- **Boost Patient Satisfaction with Quick Results:** Patients can enjoy their new teeth without a long wait, leading to a significantly improved treatment experience.
- **Make Your Practice the Preferred Choice:** The shortened treatment time and immediate results give patients greater confidence in choosing your practice.
- **Create a Competitive Edge:** By adopting fast loading, you differentiate your services from others, attracting more patients to your practice.
- **Increase Revenue with Efficient Treatment:** Faster procedures mean you can treat more patients, naturally leading to increased revenue.
- **Provides comprehensive solutions, especially for dental tourism.**

CLINICAL ORAL IMPLANTS RESEARCH

Markus Hof
Gabor Tepper
Benoik Seno
Christoph Anshart
Georg Watzek
Bernhard Pommer

Patients' perspectives on dental implant and bone graft surgery: questionnaire-based interview survey

Abstract

Purpose: To assess up-to-date expectations and preferences of patients seeking dental implants.
Material and methods: One hundred and fifty consecutive patients (66 male and 84 female interviewees) were asked to rank their concerns regarding implant therapy and answer a questionnaire on implant and bone graft surgery, cost and time considerations and second-opinion behaviour.

Table 2. Survey questions on patients' expectations regarding dental implants (percentage of positive responses)

Would you expect fixed dentures to last longer than removable dentures?	69%
Would you expect implant-supported dentures to last longer than tooth-supported dentures?	58%
Would you expect dental implants to last for a lifetime?	59%
Would you expect a healing period of at least 2 months after tooth extraction?	89%
Would you expect a healing period of at least 2 months after implant placement?	96%

Would you expect a healing period of at least 2 months after implant placement? 96%



See through the eyes of a manager.

ROI is a crucial metric for effective dental practice management. Let's explore how quick loading impacts your dental practice's ROI through the following scenario.

- ROIs (INTELLECTUEL EFFICIENCY MANAGEMENT)_Max. 100 implants a year scenario

Restorations a year	Total patient costs (EUR)	Total income (EUR)	Treatment time (d)	Potential time (d)	Efficiency difference	Potential increase	MBL Early loading (1Y)	Conventional loading (1Y)
100	1,500	150,000	90	30	3	Up to 3x increase	0.36 ± 0.39	0.27 ± 0.36

* This scenario is a simulation that is randomly compared based on the procedure duration for reference only.

Marginal bone loss is no different!

No differences

All loading strategies were highly successful and no differences could be observed for implant survival and complications when loading implants immediately, early or conventionally.

	Implant placement	Loading	1 year after loading	3 year after loading	Within-group P-value
	N Mean ± SD [95% CI]	N Mean ± SD [95% CI]	N Mean ± SD [95% CI]	N Mean ± SD [95% CI]	
Immediate	16 0.44 ± 0.58 [0.13;0.75]	16 0.44 ± 0.58 [0.13;0.75]	17 0.54 ± 0.40 [0.33;0.75]	18 0.39 ± 0.48 [0.15;0.62]	Baseline - loading N/A Baseline - 1year 0.204 Baseline - 3year 1.0
Early	15 0.23 ± 0.43 [-0.01;0.47]	15 0.39 ± 0.37 [0.19;0.60]	18 0.36 ± 0.39 [0.17;0.56]	17 0.26 ± 0.35 [0.08;0.44]	Baseline - loading 0.180 Baseline - 1year 0.311 Baseline - 3year 0.938
Conventional	14 0.04 ± 0.13 [-0.04;0.11]	16 0.39 ± 0.35 [0.20;0.58]	14 0.27 ± 0.36 w [0.06; 0.47]	14 0.34 ± 0.43 [0.11; 0.57]	Baseline - loading 0.002 Baseline - 1year 0.008 Baseline - 3year 0.004
Between-Group P-value	0.005	0.939	0.125	0.587	

Table 3 Mean radiographic peri-implant marginal bone levels between groups and time periods up to 3 year post- loading. Clinical Trials in Dentistry 2019;01(1):37-50/ Roberto Pistilli, Miltiadis Mitsias, Marco Esposito / Doi:10.36130/CTD.01.2019.04

Why would you hesitate to accelerate loading?

Accelerated loading seems to offer numerous benefits. So why have clinicians hesitated to implement it until now?

The two most critical factors to consider during accelerated loading are initial stability at the time of implant placement and the temporary loss of stability that occurs during the bone remodeling process. The key indicators representing these factors are ITV and ISQ.

Determining loading times according to ITV

Many studies mention the necessary ITV (Insertion Torque Value) for immediate loading, but it generally appears that an ITV of at least 45 Ncm is required for stable functional recovery. However, is it always possible to achieve an ITV of over 45 Ncm in every implant surgery? This is more closely related to the patient's bone quality and the drilling strategy used.

Designated loading Time	Required implant insertion torque	Prosthesis delivery time	
Immediate loading	≥ 35Ncm	Within 1 week after Implant placement	* Malo P, de Araujo Nobre M, Lopes A, Moss SM, Molina G.** (2011). Immediate loading of All-on-4 implants placed in patients with failing maxillary dentition in a medium-term prospective. clinical study with the same day extraction of teeth. The International Journal of Oral & Maxillofacial Implants.
Immediate loading With occlusal contact	≥ 45Ncm	Within 1 week after Implant placement	
Early loading	25-35 Ncm	Between 1 week and 2months after implant placement	* Ottoni JM, Oliveira ZF, Mansini R, Cabral AM.** (2005). Correlation between placement torque and survival of single-tooth implants. The International Journal of Oral & Maxillofacial Implants.
Delayed loading	< 25Ncm	After 2months of implant placement	

- ITV above 30–35 Ncm were considered by numerous authors as the minimum threshold for immediate loading of implants. Eur. J. Oral Implantol. 2012;5:333–342 / Compend. Contin. Educ. Dent. 2017;38:88–95
- In a previous study, it was stated that implants with ITV below 40 Ncm could not withstand a 30 Ncm abutment torqueing after six weeks of healing Implant Dent. 2012;21:474–480. doi: 10.1097/ID.0b013e31826918f1

ITV generally correlates well with bone density, which is an uncontrollable variable in the patient.



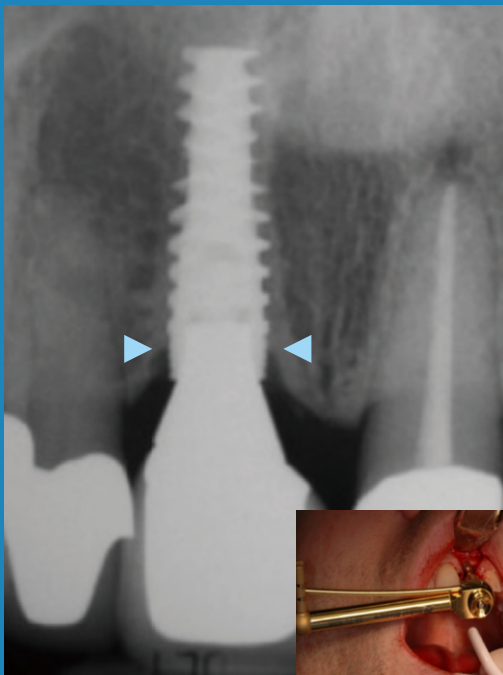
According to Daniel Buser's publication*,

*Journal of Oral and Maxillofacial Implants (JOMI)

around 80% of dental implant patients are over 40, with a significant majority being over 50. These patients often have bone densities below 300 Hounsfield units, similar to D4-type bone.

Location	Mean ± Std. Deviation	
Anterior Maxilla (n=100)	709.75 ± 122.63	
Posterior Maxilla (n=100)	299.66 ± 73.09	D3-D4
Anterior Mandible (n=100)	1093.42 ± 109.42	
Posterior Mandible (n=100)	599.45 ± 626.34	

Table -I Region wise comparison of bone density.



Under drilling can be a solution?

Placing the implant after underdrilling can increase the Insertion Torque Value (ITV), enhancing primary stability?

While underdrilling can enhance initial stability, it also presents several short-term risks and complications, requiring a cautious approach. We need to look for solutions to overcome these challenges by focusing on the features of implant design.

Issues that can arise from securing high initial stability through underdrilling include:

- Marginal tissue stress
- Compression osteonecrosis
- Bone Resorption
- Osseointegration Failure
- Damage to Surrounding Tissues

◀ **The effect of implant placement torque on crestal bone remodelling after 1 year of loading**
Clin Cosmet Investig Dent. * 2018 Oct 9;10:203-209

Isidor, F. (2006). Loss of osseointegration caused by immediate implant loading of occlusal contacts: A clinical and radiographic study in dogs. "Journal of Periodontology", 77(5), 725-732

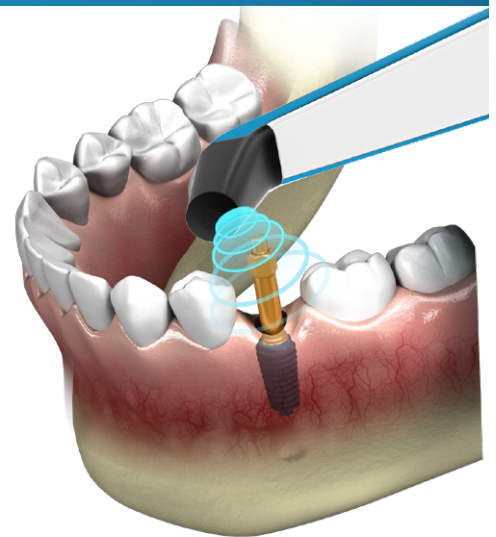
Javed, F., & Romanos, G. E. (2010). The role of primary stability for successful immediate loading of dental implants. "A literature review." "Journal of Dentistry", 38(8), 612-620

Esposito, M., Hirsch, J. M., Lekholm, U., & Thomsen, P. (1998). Biological factors contributing to failures of osseointegrated oral implants. (II). Etiopathogenesis. "European Journal of Oral Sciences", 106(3), 721-764

Biological stability: Implant Stability Quotient (ISQ)

Biological stability, or secondary stability, is the result of new bone forming around the implant and "integrating" the implant into the body. Ideally sufficient secondary stability should be achieved in as short a time as possible so patients can return to normal function with their implant-supported restorations.

ISQ (Implant Stability Quotient) is an indicator used to assess implant stability, and it relates to both **mechanical stability** and **biological stability**.- Initially, ISQ primarily reflects **mechanical stability**, but as time progresses and the implant integrates with the bone, it also reflects **biological stability**.



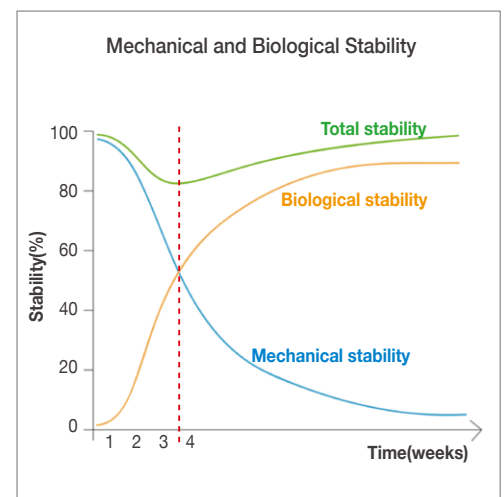
ISQ values dropping up to 3 weeks

However, during the early periods of healing, a drop in ISQ values is generally described in literature at the third week. This drop is due to the osteoclastic resorption, bone remodeling, formation of Secondary Stability and postoperative inflammatory response occurring around implants during early healing phases while transitioning from initial mechanical stability to secondary biological stability.

Therefore, various physiological changes related to the bone remodeling process around the implant are considered the main reasons for the decrease in ISQ values. However, this is regarded as a part of the implant's process of establishing long-term stability, and the ISQ value typically increases again over time.

Raghavendra S., Wood M.C., Taylor T.D. Early Wound Healing Around Endosseous Implants: A Review of the Literature. Int. J. Oral Maxillofac. Implant. 2005;20:425-431

Oates T.W., Valderrama P., Bischof M., Nedir R., Jones A., Simpson J., Toutenburg H., Cochran D.L. Enhanced implant stability with a chemically modified SLA surface: A randomized pilot study. Int. J. Oral Maxillofac. Implant. 2007;22:755-760



What are the **conditions & Solutions** required to confidently establish a comfort zone for **Accelerated loading?**



Macro implant design features that can secure long-term stability, not just short-term high mechanical stability, are needed even in compromised bone quality.

: It should maximize the contact area between the implant and the bone during placement.

: Optimizing the pitch and depth of the threads increases the contact area with the bone, generating higher friction during insertion.



To minimize the drop in ISQ (Implant Stability Quotient) after implantation and reduce the duration of this decline

: Implant's thread design should maintains stability during bone remodeling

: Micro design(Surface treatment) should promote faster bone formation



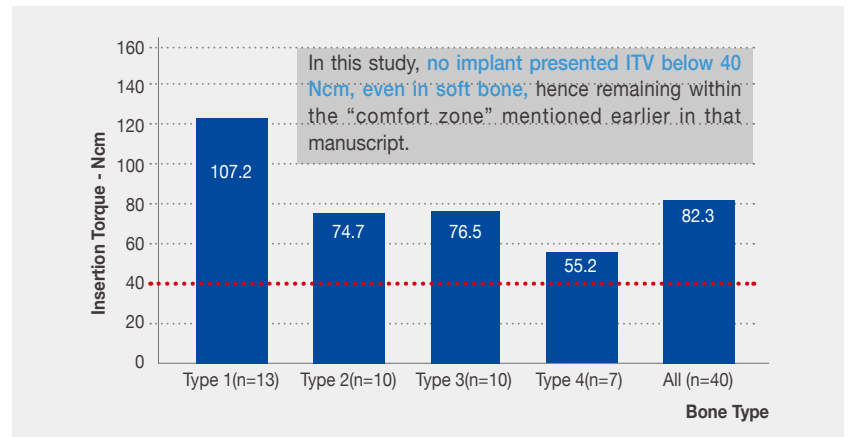
Recently, various research findings have demonstrated that MegaGen implants have successfully provided a solution to the challenges faced in dental implantology.



MegaGen implant presented ITV over 40Ncm, even in soft bone ¹⁾

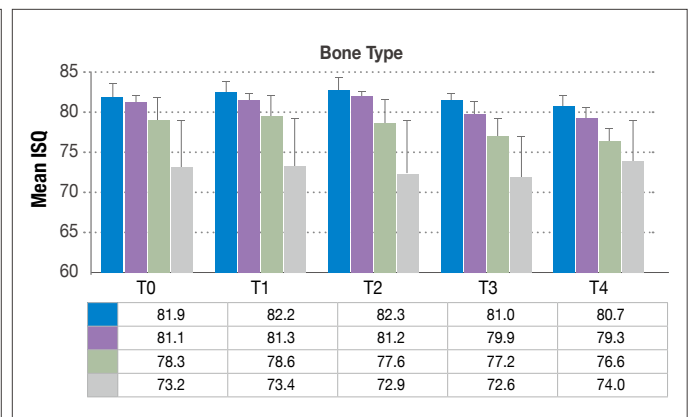
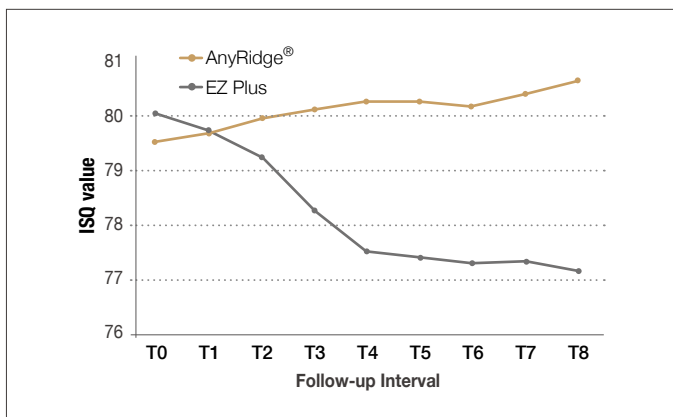
This study showed that matching implant geometry to bone type may control ITV in the majority of cases leading to a “comfort zone” where optimal implant primary stability may be obtained in all bone types.

Also, High ITV do not seem to affect marginal bone levels when using this specific implant design. However, to avoid mechanical issues caused by extremely high ITV, it is necessary to place the implant according to the recommended drilling sequence specific to the bone quality.



No drop in ISQ value ^{1), 2)}

Mean ISQ values in different bone density over time. A minimal drop in ISQ values occurred at three weeks in D1, D2, and D3 classes, while no significant differences were recorded over time in D4 group ($p = 0.07$). Thirty-nine out of forty implants presented an ISQ above 70 and were considered within a “comfort zone” for early or immediate loading. After implant placement, a completely different ISQ pattern was observed. Instead of decreasing at 3-4 weeks, the ISQ values continuously increased. The unique thread design minimizes pressure on the bone during fixture insertion, overcoming the previously challenging issue of reduced initial stability during the 3-4 weeks post-implantation. This advancement opens up greater possibilities for immediate and early loading.



These results highlight a key point that enables accelerated loading.

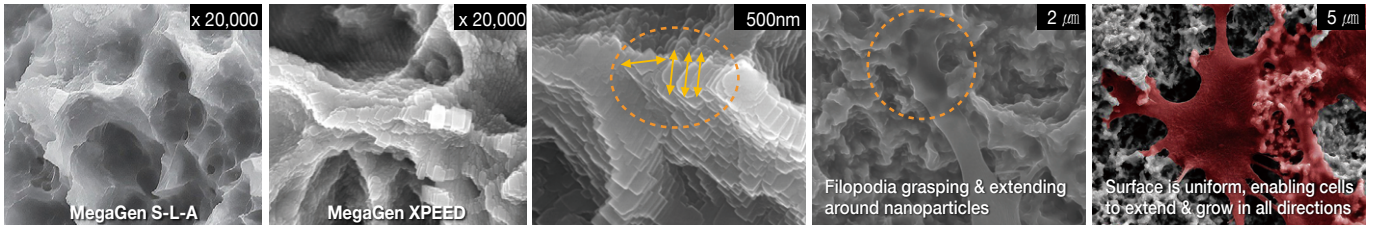
1. Primary Stability Optimization by Using Fixtures with Different Thread Depth According To Bone Density: A Clinical Prospective Study on Early Loaded Implants/ Christian Makary 1, Abdallah Menhall 2, Carole Zammarie 3 /Materials (Basel) 2019 Jul 27;12(15):2398. doi: 10.3390/ma12152398.
 2. The effect of implant macro-thread design on implant stability in the early post-operative period: A randomized, controlled pilot study. / McCullough J.J., Klokkevold P.R. /Clin. Oral Implant. Res. 2017;28:1218–1226. doi: 10.1111/clr.12945. - DOI -
 3. Universal implant surface structure and biological performance analysis, YJ Chae et al, Journal of Future Dentistry. 2023; Vol.3: No. 4: 16-19



CaTiO₃ (calcium titanate) nano structure Improved bone formation 3), 4), 5)

Nanostructure formation due to CaTiO₃ increased surface area and enhanced reactivity of implant surfaces creates positive environment for protein adhesion & bone cell adhesion

Cells grow on ~300nm particles, with filopodia grasping & extending particles
Release of Ca²⁺ ions in the body activates osteoblasts → formation of Ca ion deposited bone matrix layer on fixture surface when combined with PO₄³⁻ ions



Early Loading Human Study
by Dr. Francesco Mangano

1 month after immediate loading in maxillary molar region

Black arrow: Empty space between threads is entirely filled with growing bone tissue
White arrow: Bone traversing implant ridges

Scanning Electron Microscope (SEM) Evaluation of Interface between Nanostructured Calcium-Incorporated Dental Implant Surface and Human Bone.

Human Study
by Prof. Christian Makary

(Left) Test for Mineral Apposition Rate (MAR)

(Right) Comparison of BIC values at 4 and 6 weeks of XPEED and S-L-A placed in soft cancellous bone of the maxillary molar region.

Group	4 weeks	6 weeks
S-L-A	26.1%	30.5%
XPEED	26.1%	30.5%



Upgrade the surface activity to the maximum with Plasma-Treated 6), 7)

Plasma-Treated Nanostructured Calcium-Incorporated Surface (XPEEDActive)

· Filopodia : 14/cell
· Max length of Filopodia : 10.4 µm

S-L-Active

· Filopodia : 11/cell
· Max length of Filopodia : 5.2 µm

ISQ values (Compared to week 0)

Group	2 weeks	4 weeks
XPEEDActive	~22	~38.7
XPEED	~15	~22.4
S-L-A + Activation	~12	~20
S-L-A	~10	~15

≈ 70% increase in ISQ for XPEEDActive at 4 weeks compared to XPEED.

Bone Implant Contact (%)

Group	4 weeks
XPEEDActive	38.7%
XPEED	22.4%

≈ 70% increase in BIC for XPEEDActive at 4 weeks compared to XPEED.

These results highlight a key point that enables accelerated loading.

4. Christian Makary1,*, Abdallah Menhall1, Pierre Lahoud1, Hyun-Wook An2, Kwang-Bum Park3 and Tonino Traini, *nanomaterials*, 2023 Christian Makary1,*, Abdallah Menhall1, Kwang-Bum Park3 *Materials* 2024, 17, 3341. <https://doi.org/10.3390/ma17133341>
5. Francesco Mangano 1,*, Mario Raspanti 1, Hassan Maghaireh 2 and Carlo Mangano 3, *materials*, 2017
6. Evaluating the effectiveness of plasma-treated implants using a rabbit model / Daegu Gyeongbuk Medical Innovation Foundation (2022)
7. Christian Makary 1, Abdallah Menhall 1, Pierre Lahoud 1 *Materials* 2024, 17, 2331. <https://doi.org/10.3390/ma17102331/>



**WELCOMING
THE NANO ERA
FOR _____
IMPLANT SURFACE
TREATMENT**

XPEED® nanotechnology
Tested & proven with 10 years of
F/U & scientific evidence

Learn more →



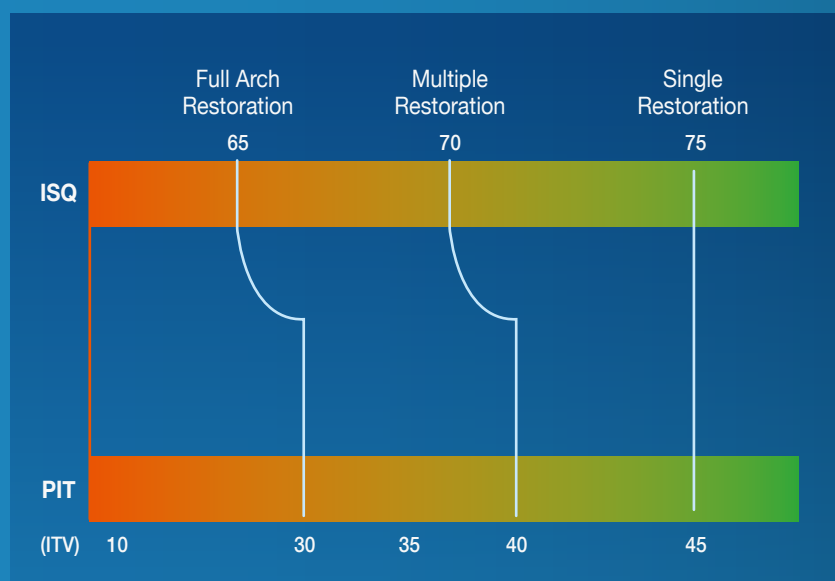
Solution based implantology makes it easier with confidence!

MegaGen proposes safe criteria
for immediate loading.

MegaGen implants feature a unique macro and micro geometry that is designed to achieve both robust primary stability and rapid secondary stability.

This innovative design provides a "safe zone" for immediate loading protocols, enabling reliable results not only by the fourth week after placement but also for achieving same-day implants.

A loading protocol proven through over 15 years of extensive clinical results and scientific evidence.



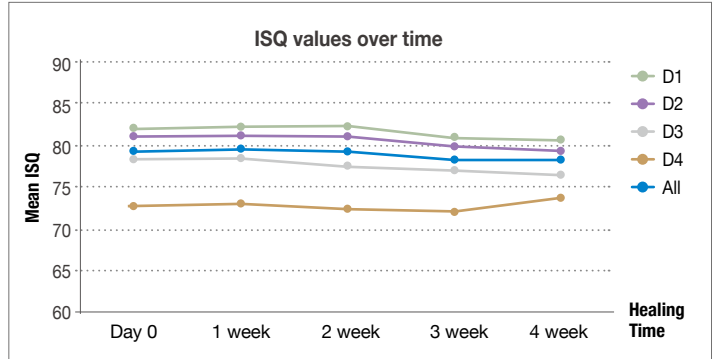
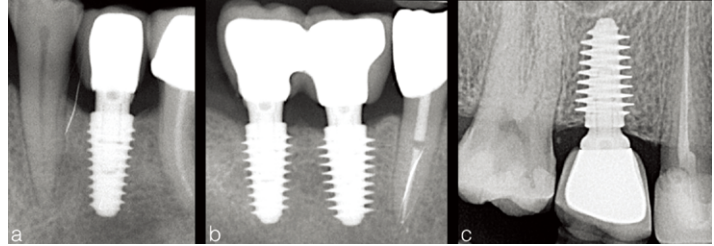
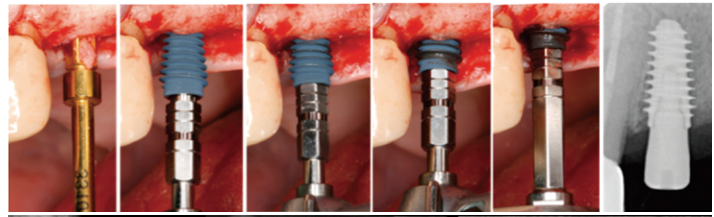
“Here is evidence,”

14 patients were treated with the insertion of 40 AnyRidge implants: Among them, 39 implants showing ISQ > 70 after 3 weeks of healing were loaded with provisional restoration.

_Courtesy of Christian Makary , Abdallah Menhall , Carole Zammarie , Teresa Lombardi , Seung Yeup Lee , Claudio Stacchi , Kwang Bum Park

Following final 3.3 mm bone preparation, a 4.5 mm implant was inserted using an electronic torque wrench and final insertion torque was recorded. Fixtures with four different thread diameters were inserted based on clinical assessment of bone quality.

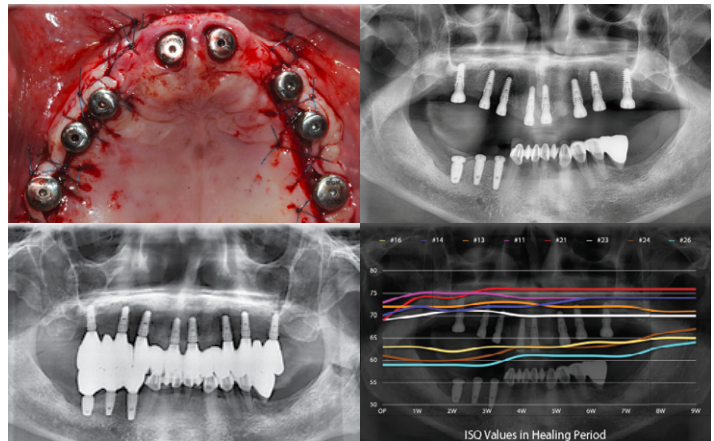
One year post-loading periapical radiographs showing implants placed in different bone density with variable thread depth (a—4 mm, b—4.5 and 5 mm, c—5.5 mm). Implants inserted in hard bone presented minimal thread depth (a) to avoid excessive bone compression, while implants with deep threads were used in soft bone (c) in order to attain higher primary stability.



ISQ values were stable for all implants. Final prosthesis was loaded after 9 weeks when implant ISQ values in grafted area were close to 70.

_Courtesy of Dr. Chang-Hun Han

Immediate implantation was performed in the maxillary central incisor region, and all eight AnyRidge implants were placed using a one-stage surgical procedure. At that time, a combination of conventional RBM surface implants and XPEED surface implants was used.



ISQ values were stable even in soft bone. ISQ does not decrease.

4 BlueDiamond implants were placed in the maxillary molars.

_Courtesy of Dr. Kwang-Bum Park

No.	ITV (Ncm)	ISQ					
		Immediate	After 2w	After 4w	After 6w	After 8w	After 10w
#22	70	68	68	70	71	72	72
#24	70	67	68	70	70	71	72
#25	70	80	80	80	81	80	80
#26	45	80	80	81	81	81	81

How MegaGen Implant system **makes it easier with confidence**

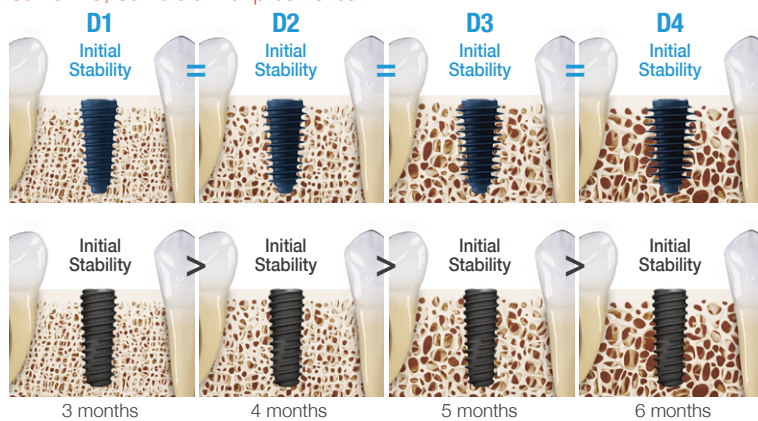
#01

KnifeThread®

Guarantees sustained implant stability

- Stable stress dispersion due to buttress thread shape
- Easier insertion without cutting edge due to thread shape
- Increased surface area due to round-faced design

Same core diameter, but different thread depth!
Same BIC, Same start for prosthetics

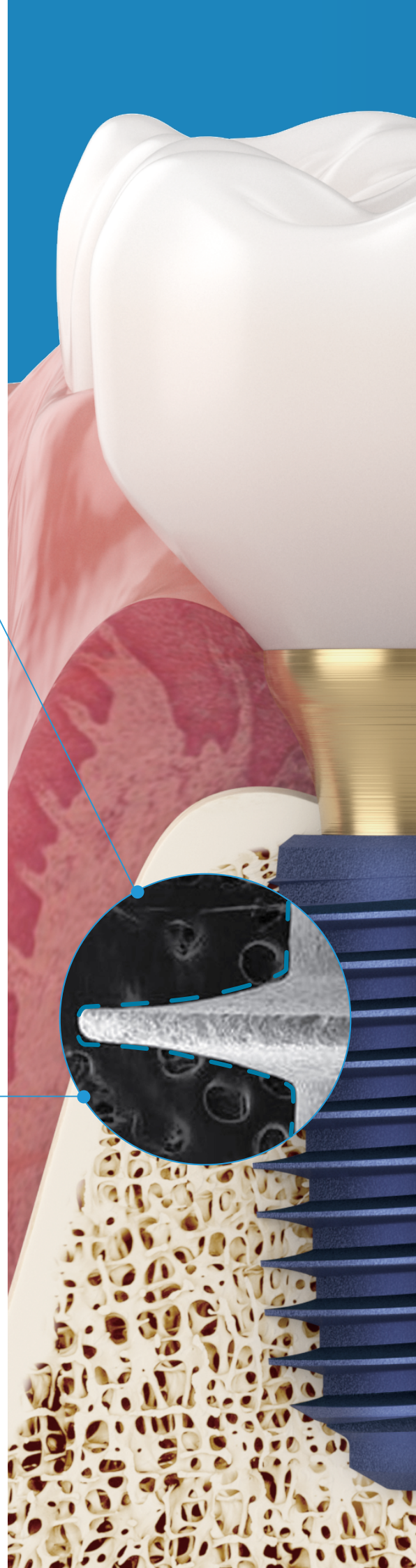


#02

Core & Thread technology

Minimize a bone destruction & maximize BIC

- Minimized compressive force to bone
- Knife thread increase bone contact area
- Preserve bony structure

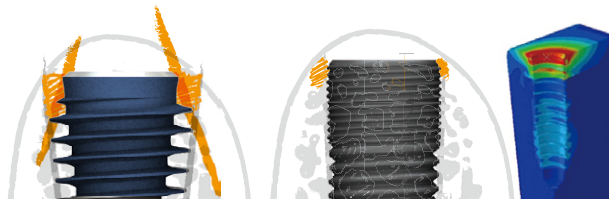


“Always ensure high initial stability, prevent causes of drop-in, and promote faster new bone formation”.

#03

MegaGen implants don't depend on the cortical bone for its initial stability

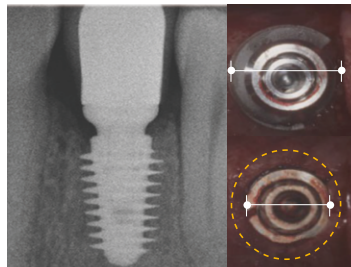
Threadless section for decreasing stress on the cortical bone & maximum preservation of cortical bone * More cortical bone=Less bone loss



study of stress characteristics in surrounding bone during insertion of dental implants

#04

Less invasive surgery Drilling for Ø8.0 fixture is only 4.8mm

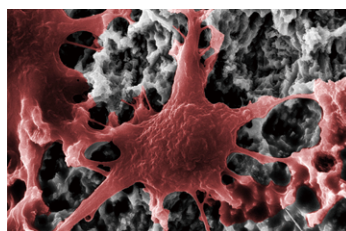


Smaller platform & narrow apical diameter

* Wider fixture possible with narrow ridge

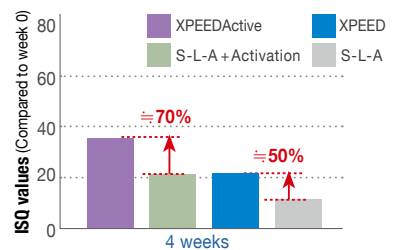
#05

Promoting faster and greater new bone apposition



XPEEDActive surface showed longer & more numerous filopodia connected to surrounding cells than S-L-A Activated surface

*Performed by MegaGen R&D Center



At 4 weeks, XPEEDActive surface showed 70% higher ISQ Value increase compared to S-L-A Activated surface

*Evaluating the effectiveness of plasma-treated implants using a rabbit model / Daegu Gyeongbuk Medical Innovation Foundation (2022)



Solution based implantology **makes it easier!**



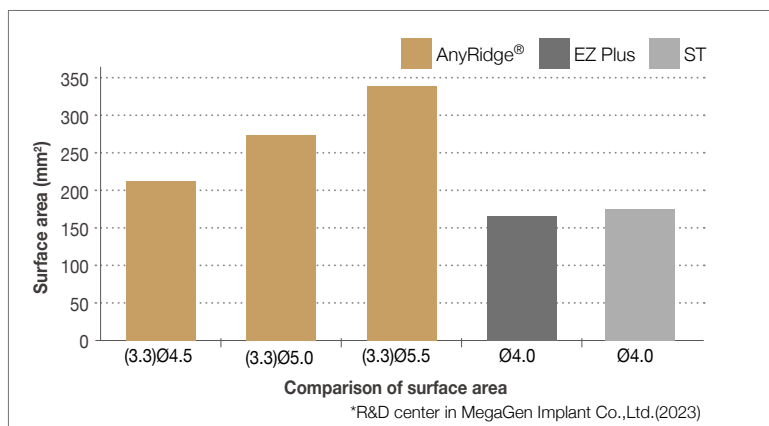
AnyRidge Options

Various thread depths allow you to enjoy the benefits of AnyRidge anywhere, from D1 to D4...

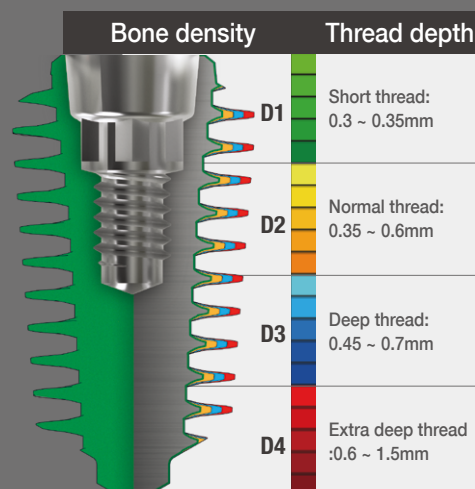
- Thread controls & improves initial stability according to the bone density
- A maximum of 6 different thread depths can achieve accelerated loading

Tooth position	Core diameter	Fixture diameter									
		Ø3.5	Ø4.0	Ø4.5	Ø5.0	Ø5.5	Ø6.0	Ø6.5	Ø7.0	Ø7.5	Ø8.0
Narrow teeth	Ø2.8										
	Thread depth	0.3									
Canine / Pre-molar	Ø3.3										
	Thread depth		0.35	0.6	0.85	1.1					
	Ø3.8										
	Thread depth			0.35	0.6	0.85					
Molar	Ø4.0										
	Thread depth				0.45	0.7	0.95				
	Ø4.3										
Thread depth				0.35	0.6	0.85					
Molar (immediate extraction options)	Ø4.8										
Thread depth					0.35	0.6	0.85	1.1	1.35	1.6	

Available lengths (mm) 7.0, 8.5, 10, 11.5, 13, 15 7.0, 8.5, 10, 11.5, 13

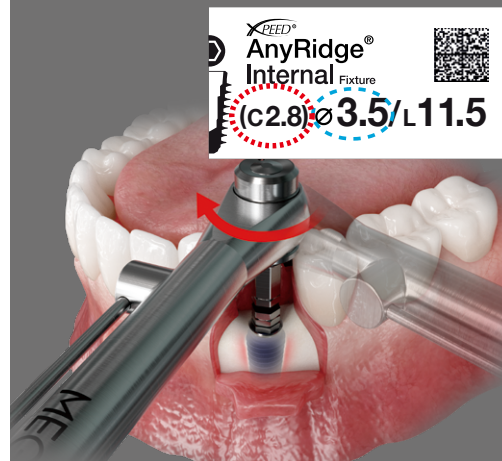


• THREAD for initial stability



Overtorquing can cause irreversible damage to connection &/or linear cracking of fixture wall.

For smaller diameter AnyRidge [$\leq 3.5\text{mm}$ (2.8mm core)], recommended insertion torque is $\leq 50\text{Ncm}$ to avoid any structural damage to fixture.



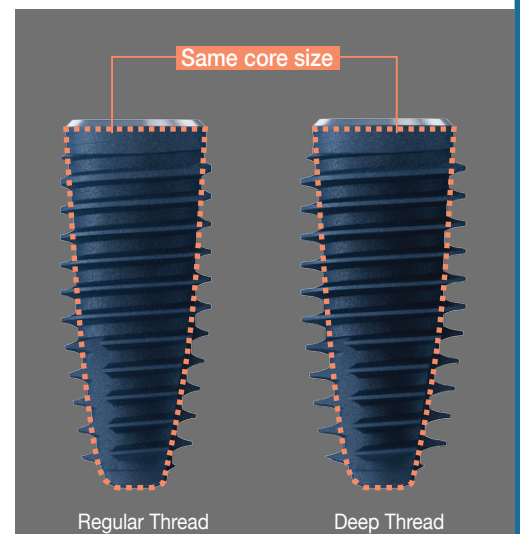


BlueDiamond Options

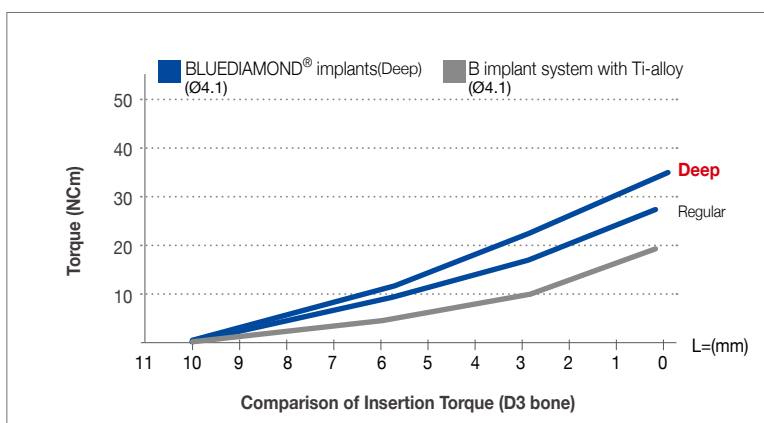
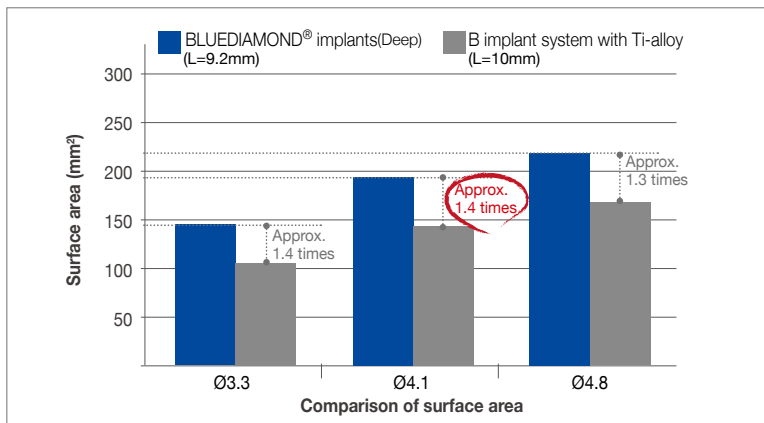
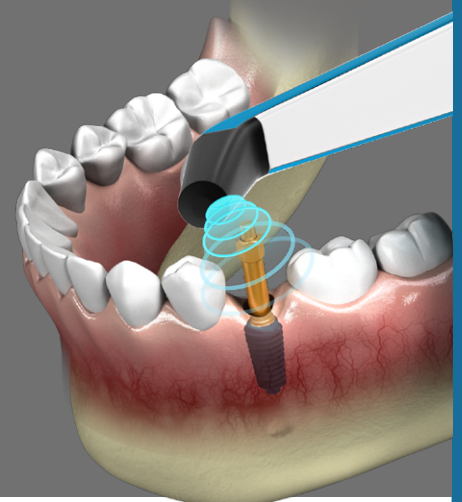
The option of different thread depths (regular or deep) and special KnifeThread® design enable easy implant placement with good primary stability in all bone densities

	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	0.55		
Deep Thread								
Thread Depth	0.6	0.6	0.65	0.65	0.65	0.75	1.0	1.25

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



Mega-ISQ is the best combination with MegaGen Implants.



**Making it
easier with
Confidence!**