

# MP-1<sup>®</sup> HA Surface Technology

History. Performance. Success.



# HA Technology Champion



## MP-1 HA Benefits

Zimmer Biomet Dental has led the industry in hydroxyapatite (HA) technology for over 30 years. Dental literature has widely documented the ability of HA coatings to achieve high bone-to-implant contact.<sup>1-2</sup> The innovative MP-1 HA coating is a technological advancement over conventional HA in both stability and performance.<sup>1-4</sup> The proprietary MP-1 HA coating is unique to Zimmer Biomet Dental with features superior to select competitive HA coatings.<sup>3-4</sup>



- **Better Osteoconductive Potential**

Highly crystalline HA coatings exhibit more bone apposition than those with lower crystallinity. MP-1 HA, with up to 97% crystalline HA content, is significantly higher than the 45-73% crystalline content of the competitive HA coatings tested.<sup>2-3</sup> When compared to major Korean and Japanese HA coated implants, in one study, MP-1 HA is the only coating documented to have the top surface layer entirely composed of HA, further documenting its purity and quality.<sup>4</sup>

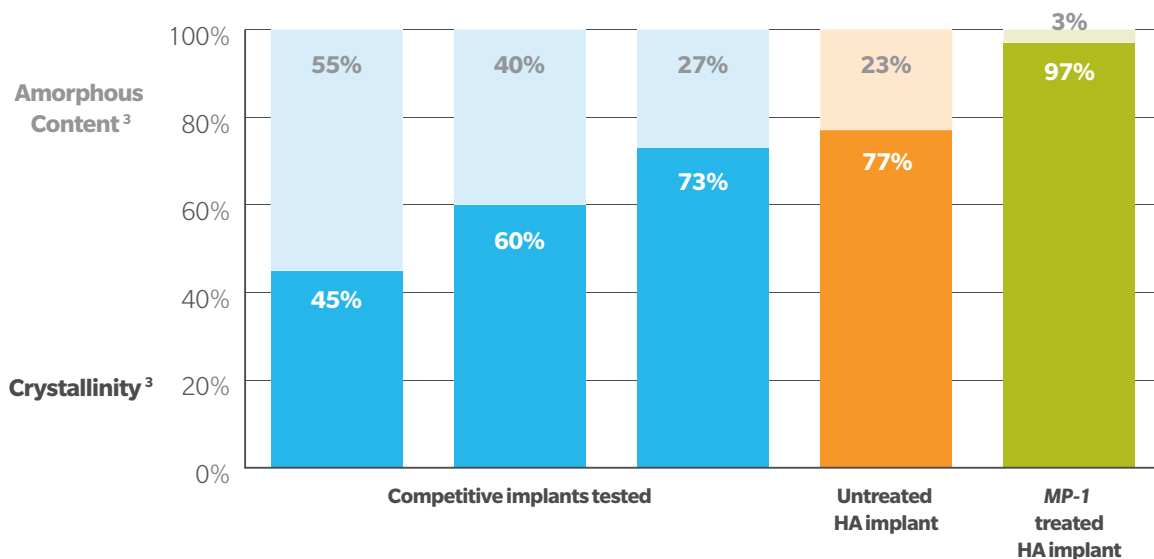
- **Less Resorption**

To minimize resorption, the MP-1HA coating is subjected to a proprietary MP-1 heat treatment that decreases the amorphous content to as low as 3%,<sup>1</sup> significantly lower than the 29-62% amorphous content of other commercial HA coatings.<sup>3</sup>

- **More Stability**

A coating of high crystallinity and low dissolution rate lends stability to the implant bed.<sup>2</sup> Calcium dissolution for MP-1 HA is lower than other commercially available HA coatings.<sup>3</sup>

### HYDROXYAPATITE CRYSTALLINITY COMPARISONS

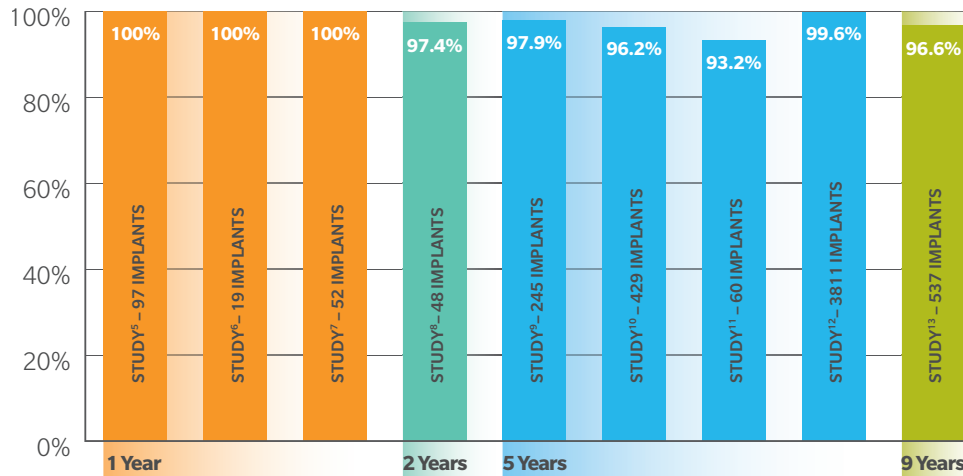


# Documented Clinical Success



Implants with MP-1 HA result in clinical outcomes<sup>5-13</sup> that further demonstrate the quality and performance of the coating.

## CUMULATIVE IMPLANT SURVIVAL RATE



Documented clinical survival rates for 5,147 Zimmer Biomet MP-1 HA coated Implants:<sup>5-13</sup>

- Implant survival rate mean 98.9% (range from 93.2% to 100%)
- Follow-up times range from 12 to 108 months (mean = 56.3 months)

## References:

1. Chang YL, Lew D, Park JB, Keller JC. Biomechanical and morphometric analysis of hydroxyapatite-coated implants with varying crystallinity. *J Oral Maxillofac Surg* 1999; 57: 1096-1108.
2. Tanaka O. A review of Zimmer HA-coated dental implants. *Dental Asia* 2007; 5/6: 37-44.
3. Burgess AV, Story BJ, et al. Highly crystalline MP-1™ hydroxylapatite coating Part I: In vitro characterization and comparison to other plasma-sprayed hydroxylapatite coatings. *Clin Oral Impl Res* 1999; 10: 245-256.
4. Akiyoshi Sugawara: AFM Observations and Composition Analyses of the Top Surfaces of HA Implants. *Journal of Hard Tissue Biology*, 2017, Volume 26 Issue 4, page 331-346.
5. Lee C, Rohrer M, Prasad H. Immediate loading of the grafted maxillary sinus using platelet rich plasma and autogenous bone: a preliminary study with histologic and histomorphometric analysis. *Implant Dent* 2008; 17: 59-73.
6. Lee C. Immediate load protocol for anterior maxilla with cortical bone from mandibular ramus. *Implant Dent* 2006; 15: 153-159.
7. Cannizzaro G, Leone M, Consolo U, Ferri V, Licitra G, Worthington H, Esposito M. Material fundamentals and clinical performance of plasma-sprayed hydroxyapatite coatings: a review. *Int J Oral Maxillofac Implants* 2007; 22: 280-288.
8. Simmons DE, Palaiologou A, Teitelbaum AG, Billiot S, Popat LJ, Maney P. Immediate and Early Loading of Hydrothermally Treated, Hydroxyapatite-Coated Dental Implants: 2-Year Results from a Prospective Clinical Study. *J Oral Implantol* 2016; 24(1): 17-25.
9. Thierrier T, Davliakos J, Keith D, Sanders J, Tarnow D, Rivers J. Five-year prospective clinical evaluation of highly crystalline HA MP-1-coated dental implants. *J Oral Implantol* 2008; 34(1).
10. McGlumphy E, Peterson L, Larsen P, Jeffcoat M. Prospective study of 429 hydroxyapatite-coated cylindrical omniloc implants placed in 121 patients. *Int J Oral Maxillofac Implants* 2003; 18: 82-92.
11. Block M, Lirette D, Gardiner Dm Li L, Finger I, Hochstedler J, Evans G, Kent J, Misiek D, Mendez A, Guerra L, Larsen H, Wood W, Worthington P. Prospective evaluation of implants connected to teeth. *Int J Oral Maxillofac Implants* 2002; 17: 473-487.
12. Pikos M, Cannizzaro G, Korompilas L, Turrillas A, Askary A, Rao W, Carusi G, Lauverjat Y. International Retrospective Multicenter Study of 8130 HA-coated cylinder dental implants: 5-year survival data. *Int Mag of Oral Implantol* 2002; 3(1).
13. Peleg M, Garg A, Mazor Z. Healing in smokers versus nonsmoker survival rates for sinus floor augmentation with simultaneous implant placement. *Int J Oral Maxillofac Implants* 2006; 21: 551-559.
14. Lee Jin Whan, Basset Jeffrey, Wen Hai Bo. Preliminary Biomechanical and Histological Evaluations of Implants with Different Surfaces in an Ovine Model: Abstract presented at AO March, 2013 Conference. Tampa, Florida, United States of America.

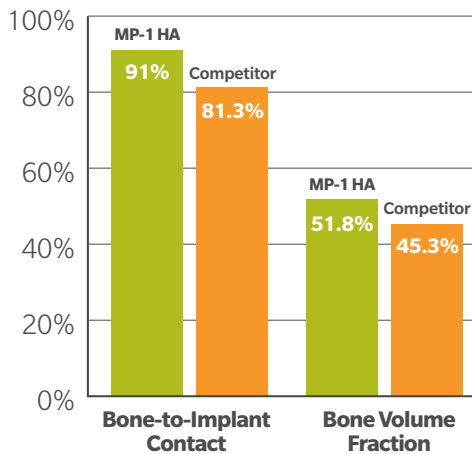
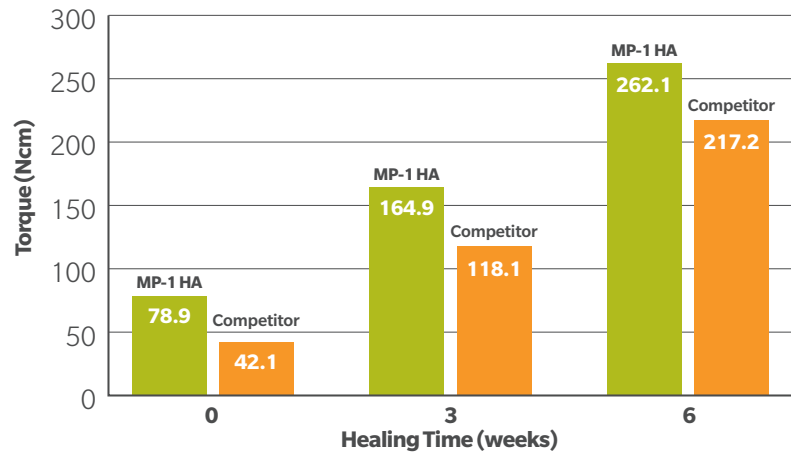
# Biomechanical Evaluations

## EARLY SECONDARY STABILITY<sup>14</sup>

A study was performed in sheep to compare the stability and bone tissue response of MP-1 HA implants vs a flagship surface technology offered by a major European competitor. After 3 and 6 weeks of early healing, results demonstrated that the MP-1 HA implants achieved significantly better stability and osseointegration. This study showed the following benefits:

### SIGNIFICANT BONE FIXATION<sup>14</sup>

- MP-1 HA implants achieved significantly higher reverse torque values after 3 and 6 weeks.
- Reverse torque values demonstrate the degree of bone fixation to implant surfaces.

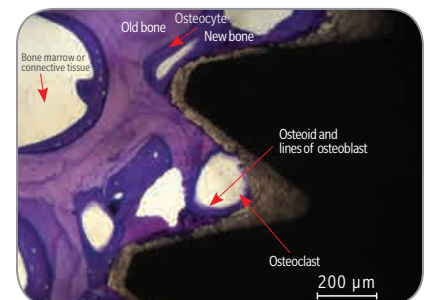


### HIGH BONE TO IMPLANT CONTACT<sup>14</sup>

- MP-1 HA implants achieved significantly higher BIC and bone volume fraction (BV/TV) ( $p < 0.05$ ) after 3 and 6 weeks.
- Bone-to-implant contact (BIC) and bone volume fraction indicate evidence of an implant physically anchored in bone.

### BONE DENSITY AND REMODELING<sup>14</sup>

Bone response to the implant surfaces was conducted by histological evaluations in sheep. MP-1 HA coated surfaces exhibited no adverse tissue responses both at 3 and 6 weeks in this study. New bone with osteoclastic and osteoblastic activity indicated active bone remodeling. Interstitial tissues in the HA implant interface region was predominantly mature while the competitor surface exhibited a less mature marrow closer to implant surface in this study.



MP-1 HA at 6 Weeks

Newly formed trabecular bone was thick and showed an increase in bone density in this study.

# Zimmer Biomet Dental Implants Available with MP-1 HA Coating

## TSVT MP-1 HA: Tapered Screw-Vent® Implants With MTX® Textured Collar, Microgrooves And MP-1® HA Dual Transition Selective Surface - Includes Fixture Mount/Transfer and Cover Screw



Implant Diameter	Implant Platform	Internal Hex Connection	Implant Length				
			8.0 mmL	10 mmL	11.5 mmL	13 mmL	16 mmL
3.7 mmD	● 3.5 mmD	2.5 mmD	TSVTH8	TSVTH10	TSVTH11	TSVTH13	TSVTH16
4.1 mmD	● 3.5 mmD*	2.5 mmD	TSVT4H8	TSVT4H10	TSVT4H11	TSVT4H13	TSVT4H16
4.7 mmD	● 4.5 mmD	2.5 mmD	TSVTWH8	TSVTWH10	TSVTWH11	TSVTWH13	TSVTWH16
6.0 mmD	● 5.7 mmD	3.0 mmD	TSVT6H8	TSVT6H10	TSVT6H11	TSVT6H13	TSVT6H16

## TSVM MP-1 HA: Tapered Screw-Vent Implants With 0.5 mm Machined Collar, Microgrooves And MP-1 HA Dual Transition Selective Surface - Includes Fixture Mount/Transfer and Cover Screw



Implant Diameter	Implant Platform	Internal Hex Connection	Implant Length				
			8.0 mmL	10 mmL	11.5 mmL	13 mmL	16 mmL
3.7 mmD	● 3.5 mmD	2.5 mmD	TSVMH8	TSVMH10	TSVMH11	TSVMH13	TSVMH16
4.1 mmD	● 3.5 mmD*	2.5 mmD	TSVM4H8	TSVM4H10	TSVM4H11	TSVM4H13	TSVM4H16
4.7 mmD	● 4.5 mmD	2.5 mmD	TSVMWH8	TSVMWH10	TSVMWH11	TSVMWH13	TSVMWH16
6.0 mmD	● 5.7 mmD	3.0 mmD	TSVM6H8	TSVM6H10	TSVM6H11	TSVM6H13	TSVM6H16

## TSV MP-1 HA: Tapered Screw-Vent Implants With MP-1 HA Dual Transition Selective Surface

Includes Fixture Mount/Transfer and Cover Screw



Implant Diameter	Implant Platform	Internal Hex Connection	Implant Length				
			8.0 mmL	10 mmL	11.5 mmL	13 mmL	16 mmL
3.7 mmD	● 3.5 mmD	2.5 mmD	TSVH8	TSVH10	TSVH11	TSVH13	TSVH16
4.1 mmD	● 3.5 mmD*	2.5 mmD	TSV4H8	TSV4H10	TSV4H11	TSV4H13	TSV4H16
4.7 mmD	● 4.5 mmD	2.5 mmD	TSVWH8	TSVWH10	TSVWH11	TSVWH13	TSVWH16
6.0 mmD	● 5.7 mmD	3.0 mmD	TSV6H8	TSV6H10	TSV6H11	TSV6H13	TSV6H16

\* While the implant platform color code for the 4.1 mmD Tapered Screw-Vent Implant is green, the implant surgical sequence is color-coded white on the surgical kit surface.

## Spline® Twist™ Implants with MP-1 HA Surface

Includes titanium healing screw and driver mount.



Implant Diameter	Implant Platform	Implant Length					
		8.0 mmL	10 mmL	11.5 mmL	13 mmL	15 mmL	18 mmL
3.25 mmD	● 3.25 mmD	•	2130	2131	2133	2135	•
3.75 mmD	● 3.75 mmD	1988	1989	2120	1990	1991	1992
5.0 mmD	● 5.0 mmD	1993	1994	2121	1995	1996	•



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Zimmer Biomet Dental  
Global Headquarters  
4555 Riverside Drive  
Palm Beach Gardens, FL 33410  
Tel: +1-561-776-6700  
Fax: +1-561-776-1272

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