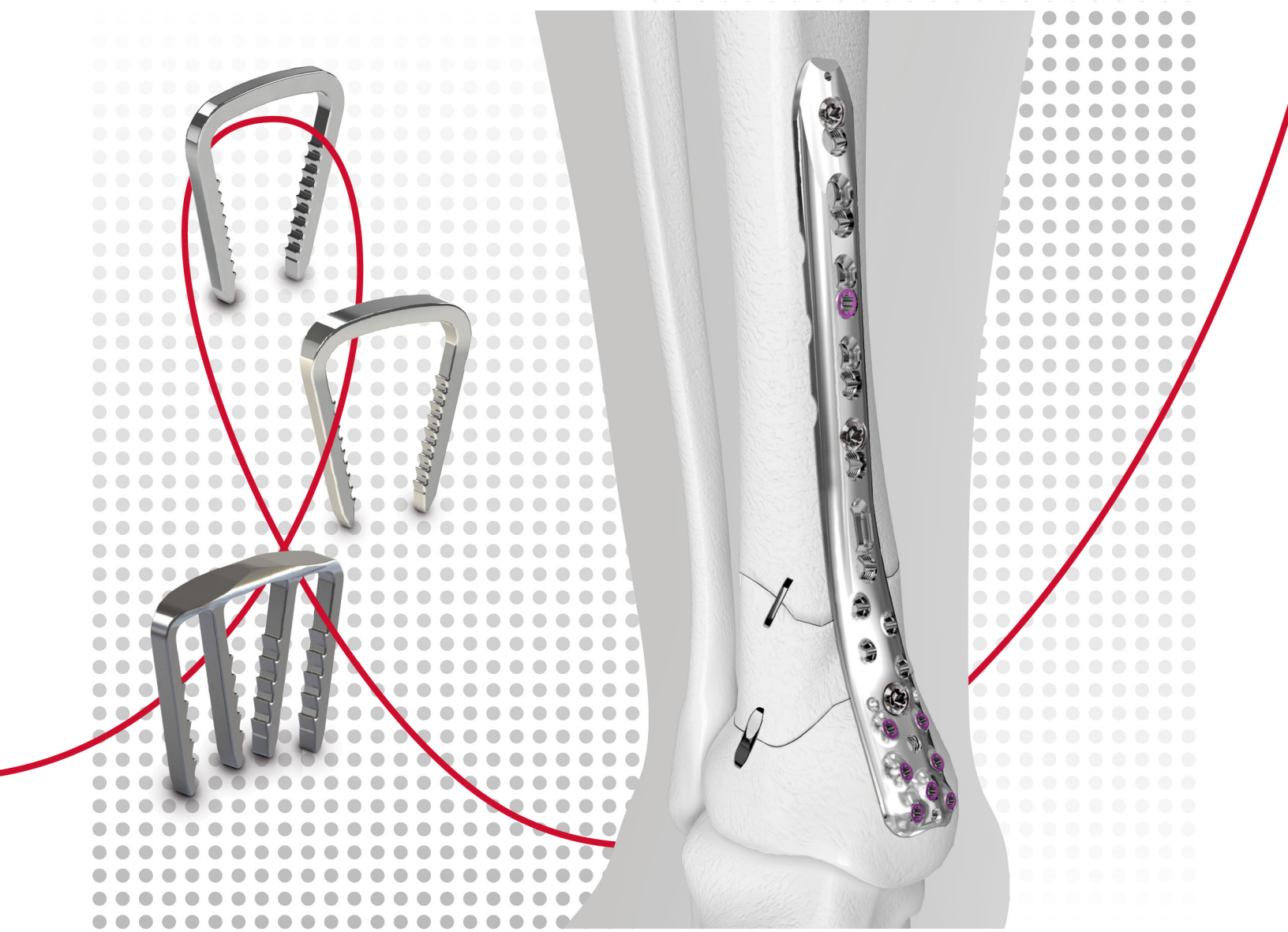
CONTINUOUS COMPRESSION IMPLANTS 101:

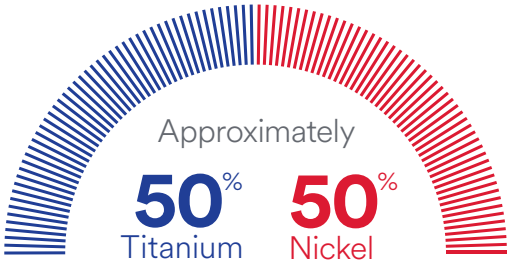
TRAUMA APPLICATIONS

Designed with Nitinol to provide continuous, active compression throughout the healing process



BME SPEED™ IMPLANT
SPEEDTITAN® IMPLANT
BME ELITE® IMPLANT

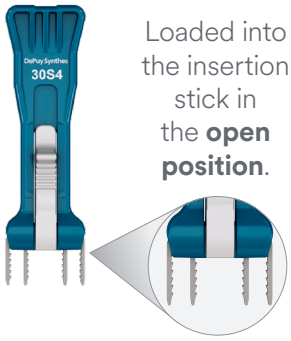
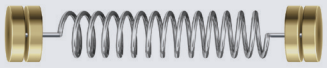
DePuy Synthes
THE ORTHOPAEDICS COMPANY OF Johnson & Johnson



What is Nitinol?

- Shape-memory and super-elastic properties that provide long-term dynamic, continuous compression that keeps bone compressed throughout the healing process[1]
- Corrosion-resistant* and biocompatible material[3]

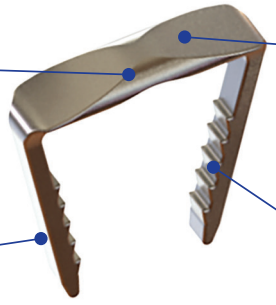
How Does Nitinol Compress? Think of a strong Spring!

Continuous Compression Implant (CCI)	Manufactured in the **closed position**. 	 Loaded into the insertion stick in the **open position**.	Inserted at the fracture site in the **open position**. The CCI tries to return to the **closed position** due to shape memory. 
Spring Comparison	 The **closed position** is similar to an **unstretched spring**.	 The **open position** is similar to a **stretched spring**.	 The CCI exerts a continuous force on the fracture site, bringing bone fragments together to maintain bicortical compression.[1]

Features and Benefits of the Continuous Compression Implant

Bowing bridge provides strength and allows for compression at the near cortex[1]

Implant legs provide compression at the far cortex[1]



Enhanced bridge design combines low profile with high strength[1]

Barbed legs provide secure fixation[4]

*CORROSION: Implanting metals and alloys in the human body subjects them to an aggressive chemical environment of salts, acids, and proteins, which can cause corrosion. Dissimilar metals in contact with each other can accelerate the corrosion process due to the galvanic corrosion effects.[2]

†Bench Test results may not be indicative of clinical performance.

‡Bench Testing conducted on BME SPEED Implants. Bench Test may not be indicative of clinical performance.

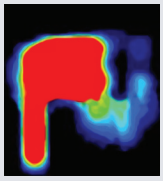
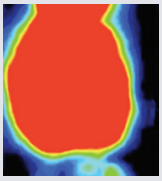
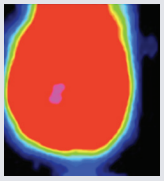
Difference Between a Lag Screw and a CCI in Transverse Fractures

Design Purpose	Pitfalls of Lag Screws in Transverse Fractures	Advantages of Continuous Compression Implants
Maintaining Compression	• Excessive forces cause destruction of threads in the bone[1] • Overall stability is irreversibly lost[1]	• The barbed legs and the bowing bridge work in unison to prevent pull through and maintain near and far cortex compression[1,4] • Facing resorption and repetitive loading, shape memory and super-elasticity allow for recovery and continuity[1]

Pressure Map Showcasing Functional Loading

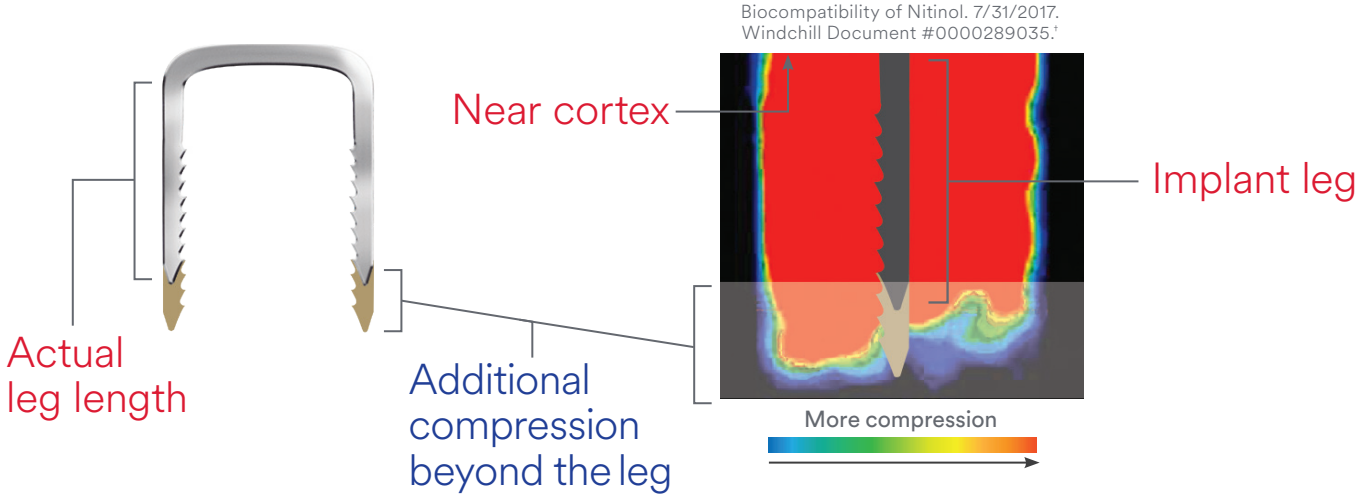
More compression

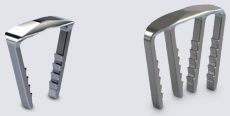
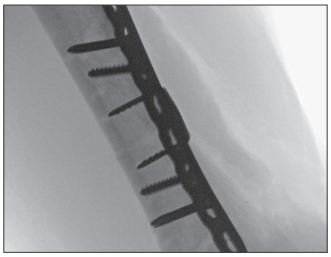
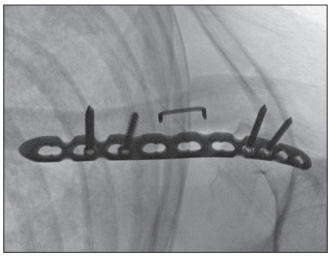
Biocompatibility of Nitinol. 7/31/2017. Windchill Document #0000289035.[1]

Two 4.0 mm Crossing Lag Screws		Two BME ELITE Implants at 90 degrees	
Pre-cycling	Post-cycling	Pre-cycling	Post-cycling
			

Pressure Map Analysis

- The pre-cycling phase of lag screws shows the maximum amount of compression; this is significantly less than the maximum amount of compression provided by BME ELITE® Implants
- Once a load is exerted on the lag screw, all compression is lost, while the CCI maintains compression, as seen in the post-cycling phase
- Screw fixation is less tolerant in situations of peak load; under overload, the bony thread strips and the screw permanently loses its holding power[5]



CCIs	BME ELITE Implant	SPEEDTITAN® Implant	BME SPEED™ Implant
Implants			
Common Anatomical Locations	**Ex: Pelvis, Humerus, Tibia, Fibula**	**Ex: Humerus, Clavicle, Radius, Ulna**	**Ex: Hand and Wrist, Clavicle, Ulna, Foot**
Compression Comparison	**150 N** Summary of Compression Tests Test Report. 11/03/2016. Windchill Document # 0000289170.†	**117 N** Summary of Compression Tests Test Report. 11/03/2016. Windchill Document # 0000289170.†	**81 N** Speed™ Staples: Compression Tests. 6/26/2014. Windchill Document # 0000284034.†
Examples of Application	 **Humerus** (Cadaver simulation)	 **Ulna**§ (Rendered Bone Model)	 **Clavicle** (Cadaver simulation)

†Bench Test results may not be indicative of clinical performance.
§Temporary fixation prior to definitive fixation. CCI must be used in combination with plates.

References: 1. DePuy Synthes Construct Stability in Fatigue Testing. 7/13/2017. Windchill Document #0000285603. **2.** DePuy Synthes For the Personal Attention of the Operating Surgeon and Central Sterile Processing, Suggestions Concerning Orthopaedic Metallic Internal Fixation Devices. 06/2017. Windchill Document #500055668. **3.** DePuy Synthes Biocompatibility of Nitinol. 7/31/2017. Windchill Document #0000289035. **4.** DePuy Synthes Speed Pull-Out Test, TR-02-120-1429. 12/10/2020. Windchill Document #0000284033. **5.** Rüedi TP, Murphy WM. AO Principles of Fracture Management. Stuttgart, New York: Thieme. 2000.

DePuy Synthes
THE ORTHOPAEDICS COMPANY OF Johnson & Johnson

Manufactured by:
Synthes GmbH
Eimattstrasse 3
4436 Oberdorf, Switzerland

Tel: +41 32 720 40 60
Fax: +41 32 720 66 00

Please refer to the instructions for use for a complete list of indications, contraindications, warnings and precautions.

Not all products may currently be available in all markets.

The third-party trademarks used herein are the trademarks of their respective owners.

www.depuysynthes.com

099009-210708 DSUS DV