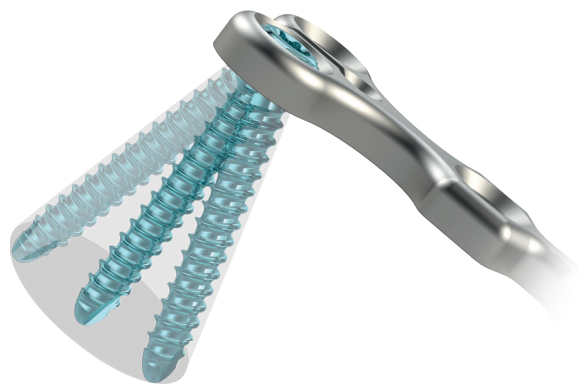




MultiAx System
Titanium Plates
Silver Polymers



Dates and images

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CARMELO System

The New Intrauma Carmelo System is intended for Intra and Extra-articular Condylar fractures, Periprosthetic fractures, as well as Maxillofacial, Pelvis and Acetabular ones. The Screws provide the ability to create fixed angles while also the freedom to choose angulations up to 15° in each direction around the central axis of plate conical threaded holes.

The Plates are made by Titanium and are Silver Coated to prevent bacterial colonization and infection in open fractures.

The Carmelo system provides 2 series of internal fixators:

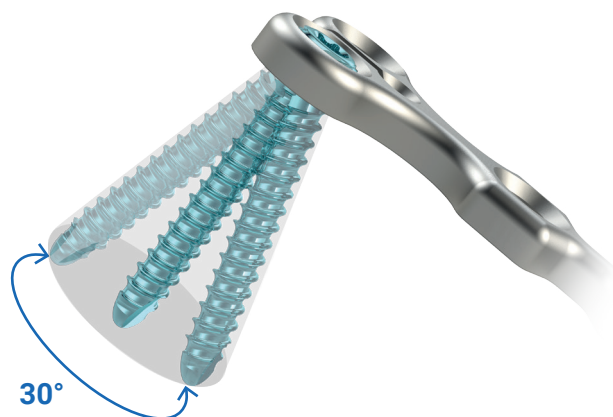
1.7 series (Micro), developed for small dogs up to 5 Kg and cats, accommodates Ø 1.7 mm Multi-ax screws into conical threaded holes and Ø 1.5 mm Reduced Head Cortical screws into compression holes on the plates.

This plate Series has small holes that fit Ø 1.0 mm K-wires for temporary stabilization and dedicated Micro plate benders that allows to contour the implant on 3 different planes.

2.5 Series (Mini), developed for small dogs and cats from 5 to 15 Kg, accommodates Ø 2.5 mm Multi-ax screws into conical threaded holes and Ø 2.0 mm or Ø 2.7 mm Reduced Head Cortical screws into compression holes on the plates. This plate Series has small holes that fit Ø 1.2 mm K-wires for temporary stabilization and dedicated Mini plate benders that allows to contour the implant on 3 different planes.

The implant

- **Plate** – made by Titanium, with threaded conical and compression holes
- **Multi-ax Screw** – made by Titanium with threaded rounded head that allows an orientation in every direction in a conical area of 15°

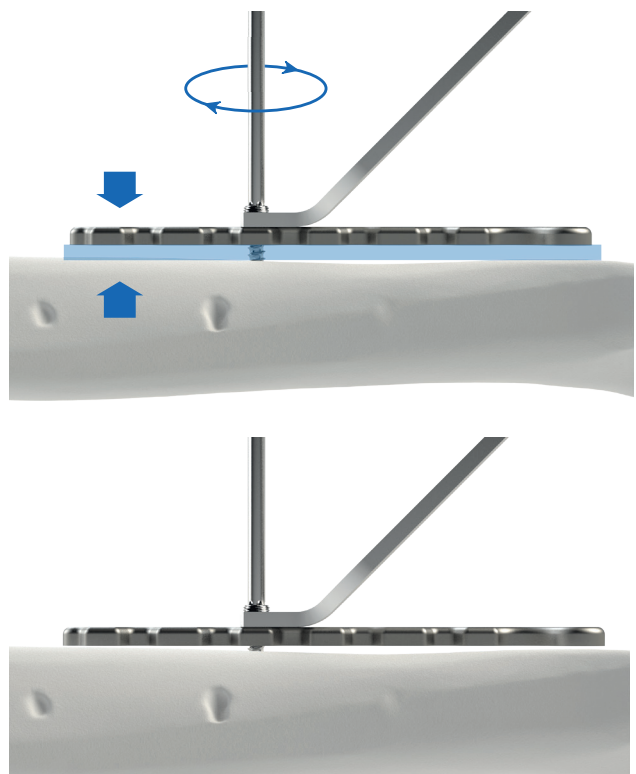


The instruments

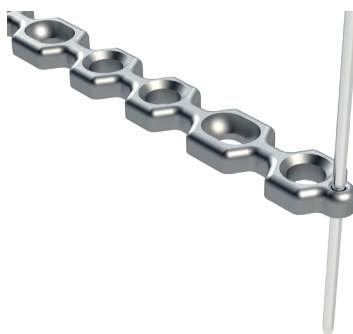
- **Drill Guide** allows insertion of screws with an angle of $\pm 15^\circ$ in every direction; screws should be angled in a conical area for a total of 30° .



- **Compression Fork** should be used to move close plate and bone before complete screws insertion.



Temporary stabilization is assured by insertion of K-Wires in dedicated holes on plates.

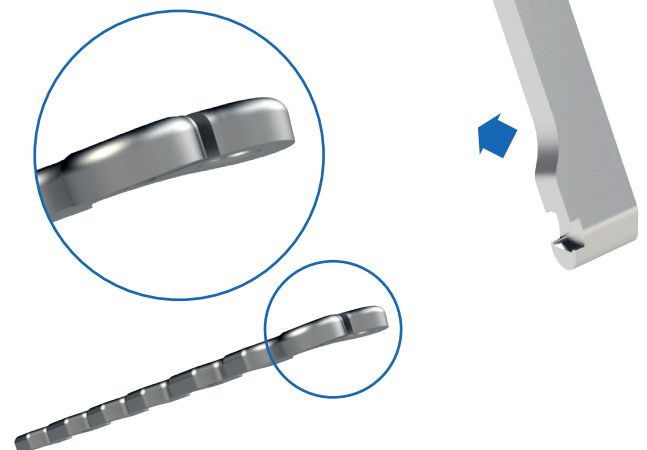
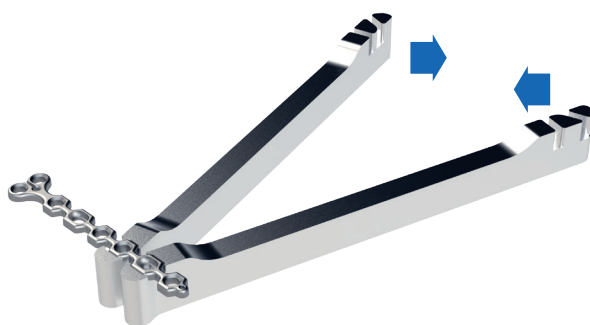
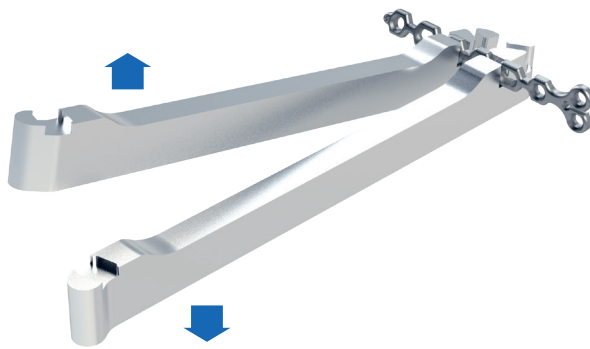
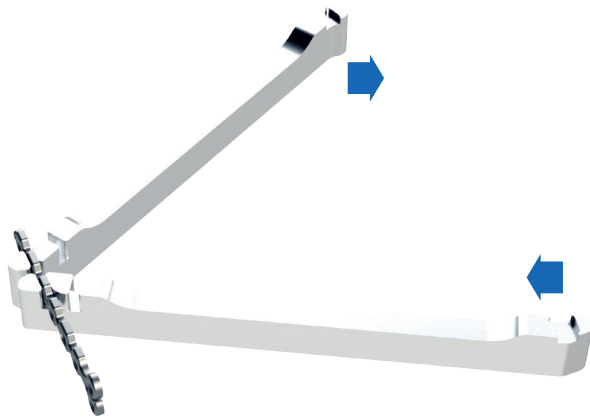




The instruments

Dedicated **Plate Benders** allow, with a single instrument, to contour plates in 3 different planes.

The same **Plate Benders** allow also the contouring of the two winglets on T plates.



To evaluate some mechanical aspects of Carmelo-MultiAx System, several tests were conducted in collaboration with the biomechanics engineering department of the **Politecnico di Torino, Italy** on 2021.

The Interdepartmental Center **Polito^{BIO}Med Lab** aims to group the main skills of Politecnico in engineering and biomedical sciences to investigate the interaction between the biological world and the artificial systems, from nano-scale to macro-scale.

In all tests conducted, straight 8-hole plates (VPP2104) and Ø 2,5 mm MultiAx screws (VPV2524, L. 24 mm) were used.

Test I: 4-Locking Break Out Strength

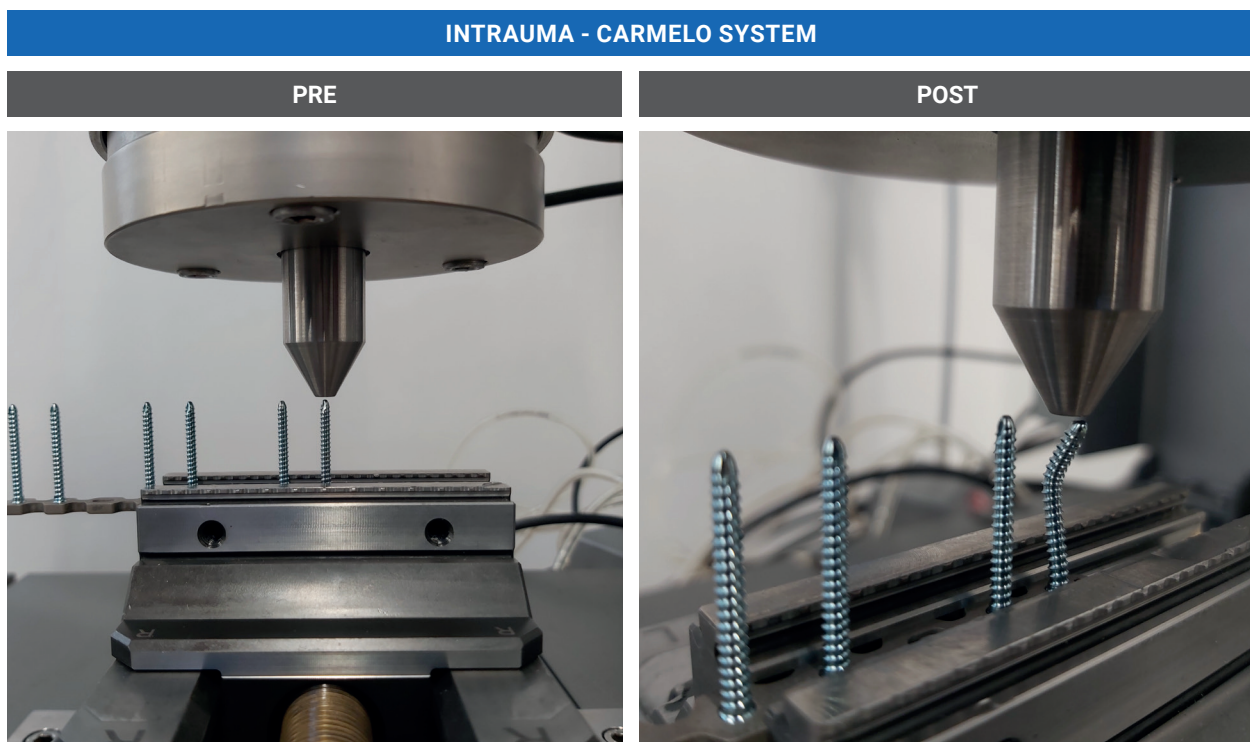
Summary - The test has been conducted by inserting a screw on the plate in an orthogonal position, with a closure of **0.8 ± 0.05 Nm** and **1 ± 0.05 Nm**.

The load has been applied to the screw in an axial direction until its breaking. The purpose of the test was to evaluate only the axial tightness of the locking mechanism between the screw and the plate.

The test results of this campaign are reported and compared below:

	Intrauma Ø 2.5 mm	
	0,8 [Nm]	1 [Nm]
T1 - Force [N]	2206	2262
T2 - Force [N]	2392	2051
T3 - Force [N]	2232	2285
T4 - Force [N]	2302	2296
T5 - Force [N]	2288	2296
T6 - Force [N]	2289	2439
Average [N]	2285	2271

Nota Bene: In all Carmelo tested screws, the final value was recorded following a screw failure and not a screw-plate failure, as showed in the following image.



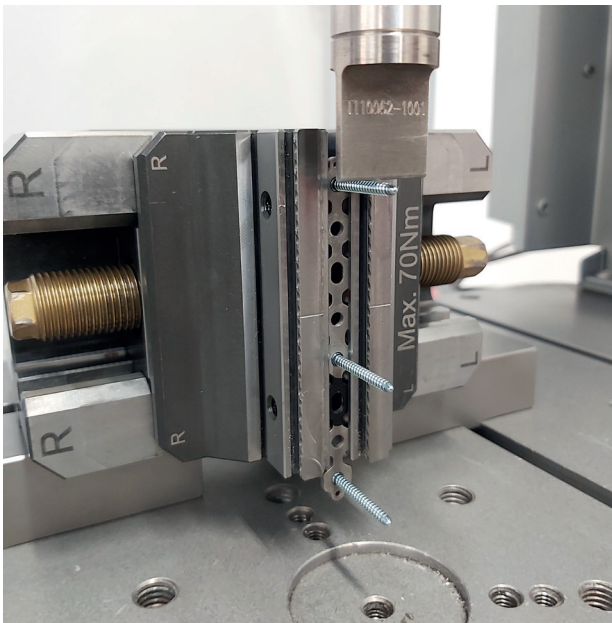
Test II: Locking Screw Angle Stability

Summary - The test has been conducted by inserting a screw on the plate in an orthogonal position, with a closure of 0.8 ± 0.05 Nm and 1 ± 0.05 Nm.

An increasing load has been applied to the screw, parallel to the axis of the plate and positioned at 15 mm from the axis of the plate.

INTRAUMA - CARMELO SYSTEM

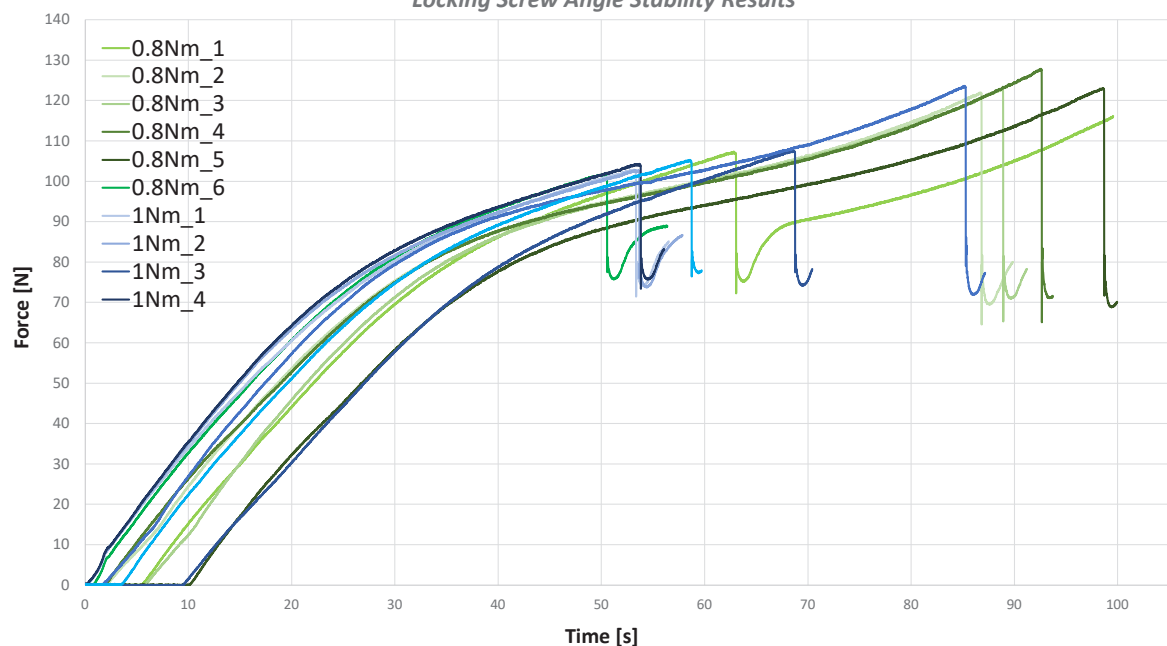
PRE



POST



Locking Screw Angle Stability Results



1.7 Series - Product Ranges



VPP1800

T Plate - Length: 27.4 mm - Thickness: 1.54 mm - Holes: 4+1 cortical hole



VPP1801

T Plate - Length: 39.4 mm - Thickness: 1.54 mm - Holes: 6+1 cortical hole



VPP1802

Straight Plate - Length: 34.9 mm - Thickness: 1.54 mm - Holes: 4+1 cortical hole



VPP1803

Straight Plate - Length: 43.8 mm - Thickness: 1.54 mm - Holes: 4+2 cortical holes



1.7 Series - Product Ranges



VPP1804

Straight Plate - Length: 53.8 mm - Thickness: 1.54 mm - Holes: 6+2 cortical holes



VPP1805

Straight Plate - Length: 59.7 mm - Thickness: 1.54 mm - Holes: 9+1 cortical hole




VPP1806

Micro Cuttable Plate - Length: 132.5 mm - Thickness: 1.54 mm - Holes: 28

Material
Titanium

Scale 1:1


MultiAx Screws

■ Ø 1.7 mm 

Ref.	L. mm
VPV1706	6
VPV1707	7
VPV1708	8
VPV1709	9
VPV1710	10
VPV1712	12
VPV1714	14
VPV1716	16
VPV1718	18
VPV1720	20

Material
Titanium

Cortical Screws

■ Ø 1.5 mm 

Ref.	L. mm
VPV1506	6
VPV1507	7
VPV1508	8
VPV1509	9
VPV1510	10
VPV1512	12
VPV1514	14
VPV1516	16

Material
Titanium

1.7 Series - Ordering information

Supports

Ref.	Description	L. mm	THK mm	Holes
VPP1800	T Plate	27.4	1.54	4+1
VPP1801	T Plate	39.4	1.54	6+1
VPP1802	Straight Plate	34.9	1.54	4+1
VPP1803	Straight Plate	43.8	1.54	4+2
VPP1804	Straight Plate	53.8	1.54	6+2
VPP1805	Straight Plate	59.7	1.54	9+1
VPP1806	Micro Cuttable Plate	132.5	1.54	28

Instrumentation



VPS125 - Carmelo Micro Plate Bender



VPS183 - Carmelo Micro MultiAx Drill Guide



VPS187 - HL7 Hexalobular Screwdriver



VPS187D - HL7 Hexalobular Screwdriver - Screwholder



VS194 - Ø1.5 Cortical Screw Drill Guide



VS195 - Drill Bit Ø1.2 mm



VS410 - K-Wire Ø1.0 mm L. 100 mm



VS13 - Micro Series Depth Gauge

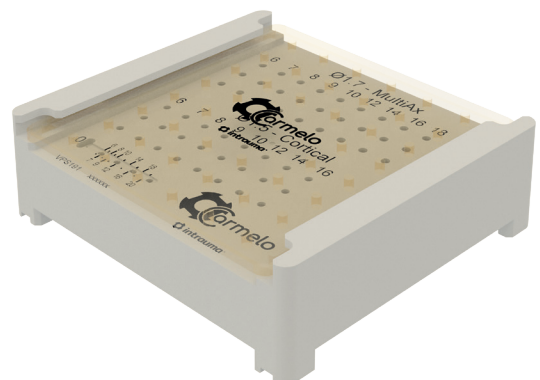


VS188 - Micro Series Screwdriver HL5

VS188A - Rod / VS188B - Handle



VS188D - Micro Series Screwdriver HL5 - Screwholder



VPS191 - Ø1.5C - 1.7M Screw Case

2.5 Series - Product Ranges



VPP2001

T Plate - Length: 42.8 mm - Thickness: 2.54 mm - Holes: 4+1 cortical hole



VPP2002

T Plate - Length: 52.3 mm - Thickness: 2.54 mm - Holes: 5+1 cortical hole



VPP2003

T Plate - Length: 72.8 mm - Thickness: 2.54 mm - Holes: 5+2 cortical holes



VPP2101

Straight Plate - Length: 53.5 mm - Thickness: 2.54 mm - Holes: 4+1 cortical hole



VPP2102

Straight Plate - Length: 52.3 mm - Thickness: 2.54 mm - Holes: 4+1 cortical hole



VPP2103

Straight Plate - Length: 71.9 mm - Thickness: 2.54 mm - Holes: 6+2 cortical holes

2.5 Series - Product Ranges



VPP2104

Straight Plate - Length: 81 mm - Thickness: 2.54 mm - Holes: 6+2 cortical holes



VPP2105

Straight Plate - Length: 100 mm - Thickness: 2.54 mm - Holes: 8+2 cortical holes

Material
Titanium

Scale 1:1




VPP2106

Mini Cuttable Plate - Length: 206 mm - Thickness: 2.54 mm - Holes: 28

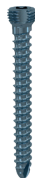
Material
Titanium

Scale 1:1.5

MultiAx Screws

■ Ø 2.5 mm 

Ref.	L. mm
VPV2508	8
VPV2509	9
VPV2510	10
VPV2512	12
VPV2514	14
VPV2516	16
VPV2518	18
VPV2520	20
VPV2522	22
VPV2524	24
VPV2526	26



Material
Titanium

Cortical Screws


■ Ø 2.7 mm 

Ref.	L. mm
VPV2708	8
VPV2709	9
VPV2710	10
VPV2712	12
VPV2714	14
VPV2716	16
VPV2718	18
VPV2720	20
VPV2722	22
VPV2724	24
VPV2726	26



Material
Titanium

Cortical Screws

■ Ø 2.0 mm 

Ref.	L. mm
VPV2808	8
VPV2810	10
VPV2812	12
VPV2814	14
VPV2816	16
VPV2818	18
VPV2820	20
VPV2822	22
VPV2824	24
VPV2826	26



Material
Titanium

Supports

Ref.	Description	L. mm	THK mm	Holes
VPP2001	T Plate	42.8	2.54	4+1
VPP2002	T Plate	52.3	2.54	5+1
VPP2003	T Plate	72.8	2.54	5+2
VPP2101	Straight Plate	53.5	2.54	4+1
VPP2102	Straight Plate	52.3	2.54	4+1
VPP2103	Straight Plate	71.9	2.54	6+2
VPP2104	Straight Plate	81	2.54	6+2
VPP2105	Straight Plate	100	2.54	8+2
VPP2106	Mini Cuttable Plate	206	2.54	28

Instrumentation



VPS225 - Carmelo Mini Plate Bender



VPS283 - Carmelo Mini MultiAx Drill Guide



S24 - Hex Screwdriver 2 mm



VPS24HL - HL8 Hexalobular Screwdriver



VS218 - Ø2.0 - 2.7 Cortical Screw Drill Guide



VS219 - Drill Bit Ø1.5 mm



VS220 - Drill Bit Ø2.0 mm



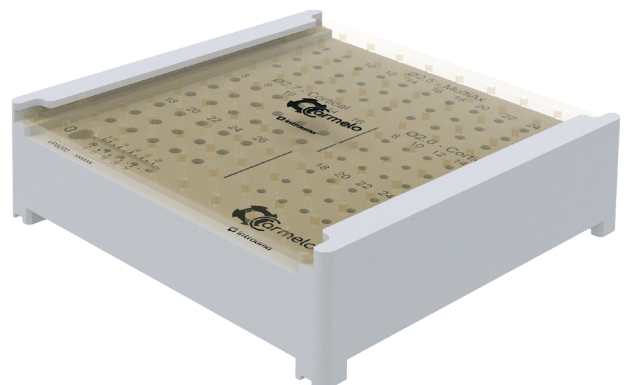
VS23 - Mini Series Depth Gauge



VPS290 - Compression Fork



VS411 - K-Wire Ø1.2 mm L. 100 mm



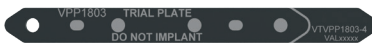
VPS200 - Ø2.0C - 2.7C - 2.5M Screw Case



1.7 Series - Trial plates

Trial plates

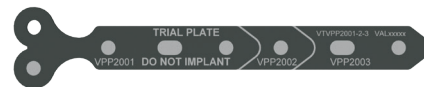
Ref.	Description
VTVPP1800-1	T Trial Plate
VTVPP1802-5	Straight Trial Plate
VTVPP1803-4	Straight Trial Plate



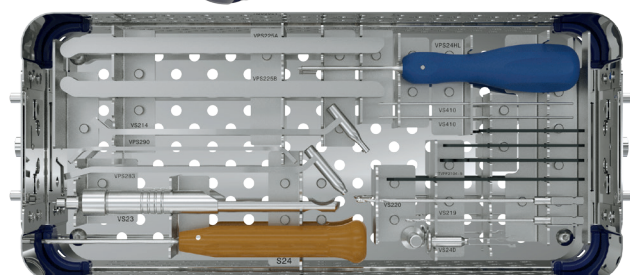
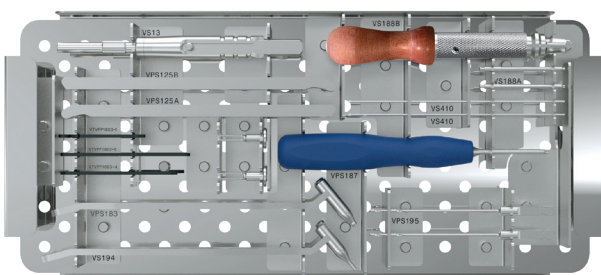
2.5 Series - Trial plates

Trial plates

Ref.	Description
VTVPP2001-2-3	T Trial Plate
VTVPP2101	Straight Trial Plate
VTVPP2102-3	Straight Trial Plate
VTVPP2104-5	Straight Trial Plate



1.7 - 2.5 Series - Instruments Box



VPS202 - 1,7 / 2,5 Series Carmelo Instruments Box



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