

For Multi-Vector Distraction, Single-Vector Distraction or Bone Transport

Titanium Multi-Vector Distractor Modular System

Surgical Technique



 Image intensifier control

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

Processing, Reprocessing, Care and Maintenance

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

<http://emea.depuyssynthes.com/hcp/reprocessing-care-maintenance>

For general information about reprocessing, care and maintenance of DePuy Synthes reusable devices, instrument trays and cases, as well as processing of DePuy Synthes non-sterile implants, please consult the Important Information leaflet (SE_023827) or refer to:

<http://emea.depuyssynthes.com/hcp/reprocessing-care-maintenance>

Table of Contents

Multi-Vector Distraction	Introduction	2
	The AO Principles of Fracture Management	4
	Preoperative Considerations	5
	Configuring the Distractor	6
	Surgical Technique	9
	Postoperative Considerations	14
	Consolidation Phase	18
	Distractor Removal	19

Single-Vector Distraction	Introduction	20
	Preoperative Considerations	22
	Configuring the Distractor	23
	Surgical Technique	24
	Postoperative Considerations	29
	Consolidation Phase and Distractor Removal	30

Bone Transport Distraction	Introduction	31
	Configuring the Distractor	32

Product Information	Implants	33
	Instruments	35
	Set List	37

Multi-Vector Distraction

Introduction

The Titanium Multi-Vector Distractor can be used to perform multi-vector distraction, single-vector distraction and bone transport. The device can be modified for specific applications.

- Independent lengthening of the mandible ramus and body
- Three-dimensional manipulation of the external distraction mechanism for postoperative vector adjustment
- Requires only a single osteotomy and four pin sites
- Pin clamps are color coded on the left and right assemblies.
- Components are titanium alloy and stainless steel
- Available in right and left assemblies

Distractor arms*

- Independently attach to body
- Eight interchangeable arm lengths (15 mm–85 mm in 10 mm increments)

Pin holding clamp for body

- Color-coded blue for identification
- Accepts 2.0 mm Kirschner Wire

Pin holding clamp hexagonal screw

Linear activation locking screw

Activation nut

One full rotation = 0.5 mm of linear movement

Distractor arm attachment screw

Distractor body

Titanium alloy and stainless steel

Transverse adjustment inset screw

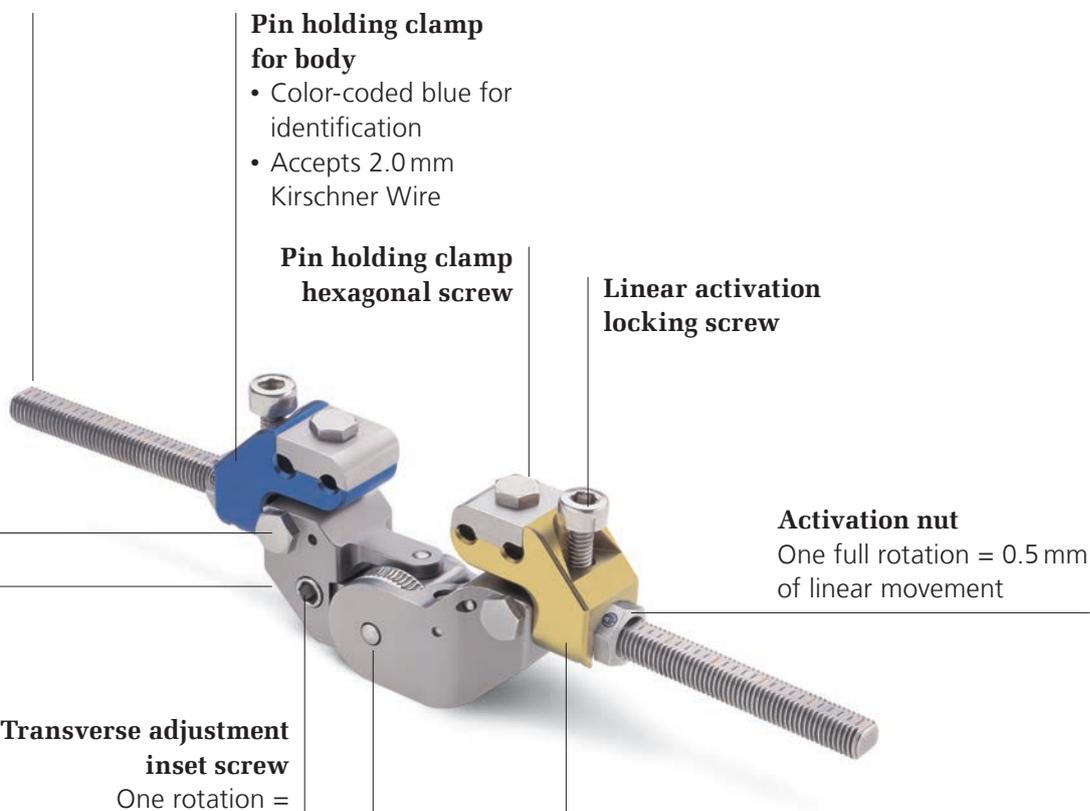
One rotation = 4° of movement

Angular adjustment inset screw

One rotation = 6° of movement (located on underside of the distractor body, see photo below)

Pin holding clamp for ramus

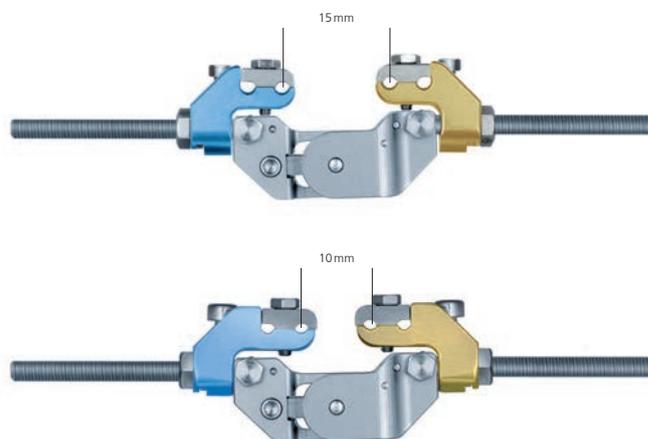
- Color-coded gold for identification
- Accepts 2.0 mm Kirschner Wire



* Distractor assembly with 35 mm arms shown (included preassembled in the Titanium Multi-Vector Distractor Set)

Additional option: Limited bone stock

- Limited bone stock pin holding clamps shorten the distance between the two inner pins from 15 mm to 10 mm
- Pin clamps are color-coded for body and ramus differentiation, consistent with the standard configuration



Intended Use, Indications, and Contraindications can be found in the corresponding system Instructions for Use.

The AO Principles of Fracture Management

Mission

The AO's mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

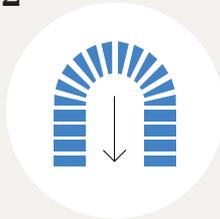
AO Principles^{1,2}

1



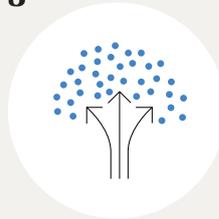
Fracture reduction and fixation to restore anatomical relationships.

2



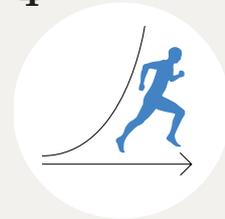
Fracture fixation providing absolute or relative stability, as required by the "personality" of the fracture, the patient, and the injury.

3



Preservation of the blood supply to soft-tissues and bone by gentle reduction techniques and careful handling.

4



Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.

¹ Müller ME, M Allgöwer, R Schneider, H Willenegger. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg, New York: Springer. 1991

² Buckley RE, Moran CG, Apivatthakakul T. AO Principles of Fracture Management: 3rd ed. Vol. 1: Principles, Vol. 2: Specific fractures. Thieme; 2017.

Multi-Vector Distraction

Preoperative Considerations

Determine the anatomic goal by conducting an evaluation of the craniofacial pathology and asymmetry through clinical exam, CT scan, cephalogram and panoramic x-ray. A team approach (including an orthodontist) is recommended.

Considerations include:

- Vertical dimension of the ramus
- Transverse position of the ramus
- Anteroposterior dimension of the body
- Occlusal plane
- Dentoalveolar occlusion

Treatment planning

- With the preoperative considerations in mind, and based on the patient's deficiencies, a distractor construct can be chosen for the clinical treatment goals.



Preoperative



During distraction

Multi-Vector Distractor

Configuring the Distractor

The multi-vector distractor is preassembled with 35 mm arms. Based on the treatment plan, different arm lengths and pin holding clamps may be desired. The arms and pin holding clamps may be changed preoperatively or intraoperatively to accommodate the treatment plan.

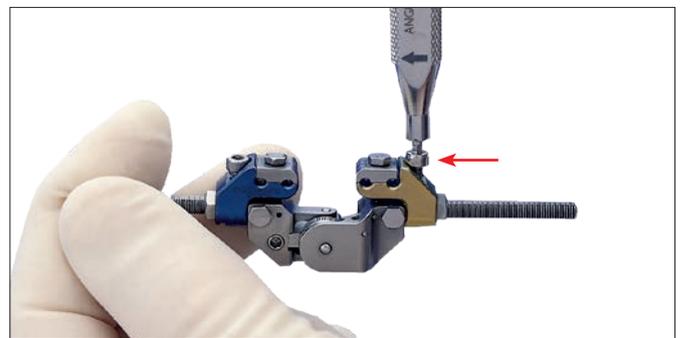
Changing distractor arm length and pin holding clamp

1. Loosen locking screw

Instrument

387.423 Angular Adjustment Instrument

After choosing the appropriate arm length, loosen the linear activation locking screw using the angular adjustment instrument.

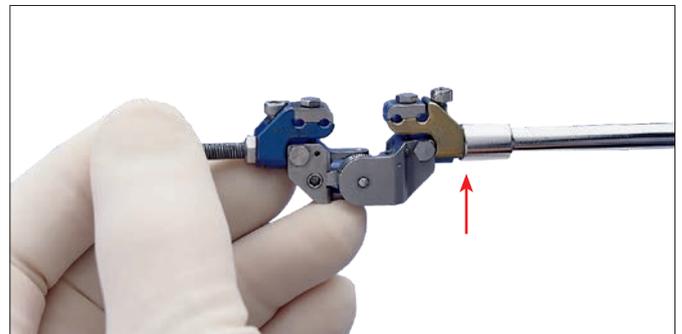


2. Remove pin holding clamp

Instrument

387.422 Linear Activation Instrument

Remove the pin holding clamp by placing the linear activation instrument over the arm and turning the activation nut at the base of the pin holding clamp in a counterclockwise direction.



3. Remove distractor arm

Instrument

387.424 Pin Clamp/Arm Fastener

Using the pin clamp/arm fastener, unscrew and remove the distractor arm attachment screw from the distractor body, then remove the arm from the slot.



4. Attach new distractor arm

Insert the desired length arm into the distractor body slot and reinsert the distractor arm attachment screw.

5. Replace pin holding clamp

Insert the activation nut into the slot on the appropriate pin holding clamp. Pass the new distractor arm through the pin holding clamp to engage the activation nut as shown. Use the linear activation instrument to engage the activation nut. Turn the linear activation instrument clockwise to advance the pin holding clamp toward the distractor body. (See requirements for other configurations on the following page.)

Note: When reassembling the device, make sure the product number on the distractor body is facing the patient.

Important:

■ Blue = Body

The blue pin clamp always attaches to the arm that lengthens the mandibular body.

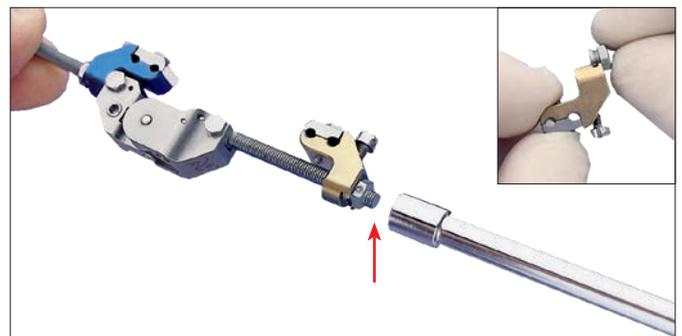
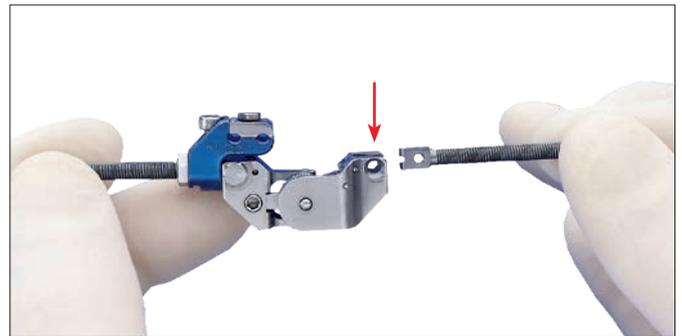
■ Gold = Ramus

The gold pin clamp always attaches to the arm that lengthens the ramus.

Technique tip: Invert the pin holding clamp when reinserting the activation nut to ensure the nut remains in the slot while the distractor arm is being inserted.

6. Repeat

Repeat steps on the opposite side of the distractor if necessary.



Activation nut

Additional option: Limited bone stock

Limited bone stock pin holding clamps reduce the distance between the inner pins from 15 mm to 10 mm.

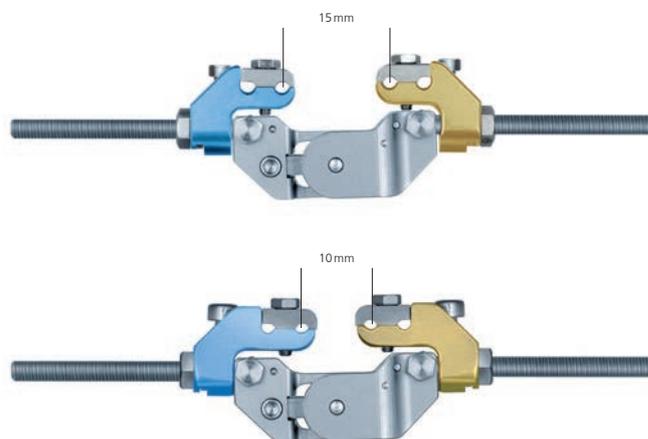
The following items are required for this procedure.

The quantities listed are those needed to assemble one distractor. For bilateral procedures, double the quantities.

- 1 limited bone stock pin holding clamp, body*
- 1 limited bone stock pin holding clamp, ramus*
- 2 activation nuts
- 1 multi-vector distractor body*

- 2 distractor arms

(Choose the appropriate length, from 15 mm to 85 mm†)



* Also available

† 35 mm and 65 mm to 85 mm lengths are also available

Multi-Vector Distraction Surgical Technique

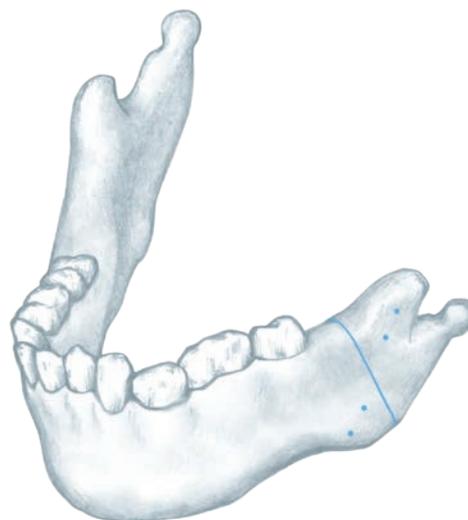
1. Make intraoral incision

Make an intraoral incision along the line of the mandible, exposing the buccal surface. Subperiosteal exposure is recommended. Reevaluate the bony anatomy and confirm that the arm lengths are suitable. If necessary, the distractor arms may be exchanged for other lengths. (Refer title “Changing distractor arm length and pin holding clamp”.)

2. Mark site

Mark the approximate site of the osteotomy and pin placement on the bone. Confirm that adequate and suitable bone stock is available for placing both sets of pins.

Technique tip: If finding adequate bone stock is difficult, the pin position or device angulation may be adjusted to accommodate the patient’s anatomy, or the limited bone stock pin holding clamps may be used.



3. Make transbuccal incision

To minimize the resulting scar made by the pins, pinch the skin and soft tissue between the area where the two pairs of pins will be placed.

The skin should also be retracted superiorly so the pins penetrate the skin in the submandibular fold, allowing the scar to fall in a relatively inconspicuous site. Make a small transbuccal incision superior to the planned osteotomy site and bluntly dissect the soft tissue.

4. Insert first pair of pins

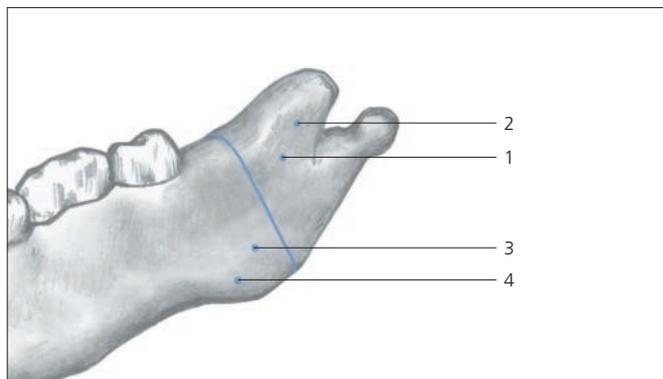
Instruments

387.421	Wire Guide/Tissue Protector
391.990*	Plate and Rod Cutter

Pins are inserted into the ramus first. Using the wire guide/tissue protector, insert the self-drilling pin closest to the planned osteotomy, taking care to avoid the tooth roots. Pins should be inserted biocortically. (See optional accessory technique on the following page.)

Cut the pin using the plate and rod cutter to prevent it from interfering with the placement of the second pin. Next, insert the pin farthest from the planned osteotomy.

Caution: Pins can loosen during the course of treatment if placed in poor quality bone.



* Also available

Optional accessory technique

Instruments

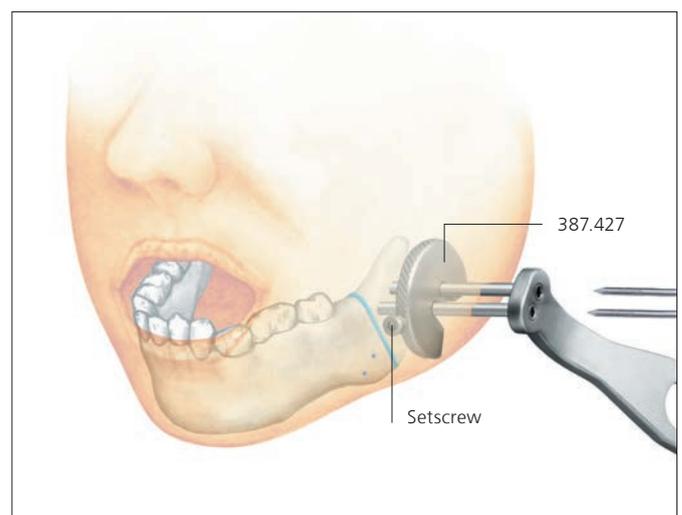
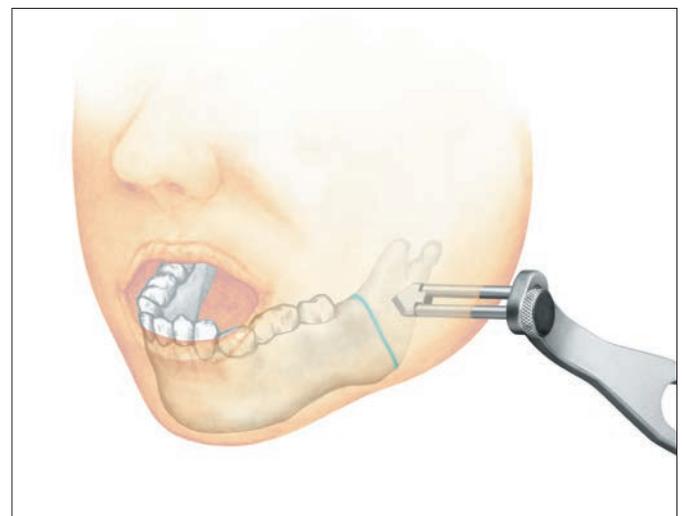
387.423	Angular Adjustment Instrument
387.425	Thumb Screw
387.426	Obturator
387.427	Cheek Retractor Ring

If assistance is needed for navigation through the stab incision, the wire guide/tissue protector can be assembled with the thumb screw and obturator. Once the wire guide/tissue protector is through the stab incision, the obturator should be removed. Hold the obturator intraorally while turning the thumb screw counterclockwise to disengage it from the obturator. The obturator can then be removed from the oral cavity.

After the wire guide/tissue protector is through the stab incision, the cheek retractor ring can be used for soft tissue management. Use a suitable pair of forceps to introduce the cheek retractor ring into the intraoral cavity and ensure that the setscrew is pointed toward the opening of the mouth.

Align the holes in the cheek retractor ring with the barrels of the wire guide/tissue protector. Slide the cheek retractor ring onto the wire guide/tissue protector. Tighten the setscrew using the angular adjustment instrument.

To remove, loosen the setscrew using the angular adjustment instrument and pull the wire guide/tissue protector back through the stab incision and off the pins. Using forceps, grasp and lift the cheek retractor ring from the barrels of the wire guide/tissue protector intraorally and remove from the oral cavity.



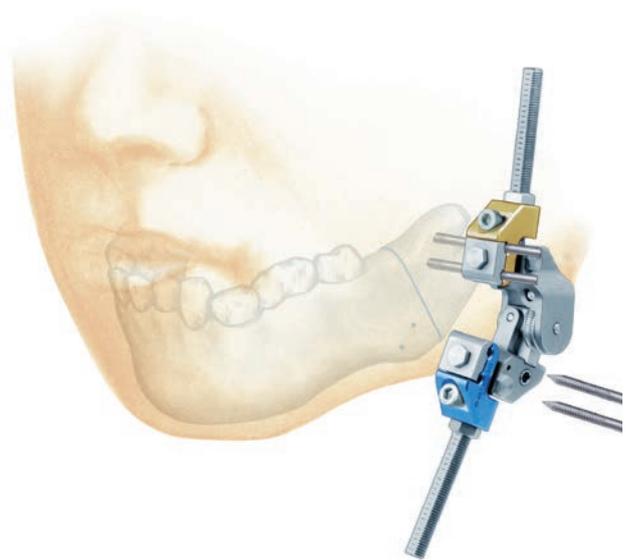
5. Insert second pair of pins

Instrument

387.421 Wire Guide/Tissue Protector

387.424 Pin Clamp/Arm Fastener

Place the distractor assembly over the proximal pins and secure loosely by rotating the pin holding clamp hexagonal screw with the pin clamp/arm fastener. On the distal side of the planned osteotomy, mark the site for the second pair of pins by using the blue pin holding clamp as a guide. Remove the distractor assembly and, using the wire guide/tissue protector, insert the second pair of pins, again taking care to avoid the tooth roots.



6. Perform buccal osteotomy

Using a reciprocating saw, perform the osteotomy on the buccal side of the mandible, extending into the superior and inferior cortices.

7. Final placement

Instrument

387.424 Pin Clamp/Arm Fastener

Before placing the distractor assembly on the pins, note that the part number on the distractor body must face the patient's cheek, the blue pin holding clamp must fit on the pins in the mandibular body and the gold pin holding clamp must fit on the pins in the ramus. Place the distractor assembly on the pins and tighten the pin holding clamp hexagonal screws with the pin clamp/arm fastener.



Complete the osteotomy on the lingual aspect of the mandible, taking care to preserve the inferior alveolar nerve. An osteotome may be used to facilitate the fracture.

Important: The distractor should be placed on the pins so that it is approximately a finger width from the face to reduce injury to the soft tissue.

8. Perform final adjustments

Instruments

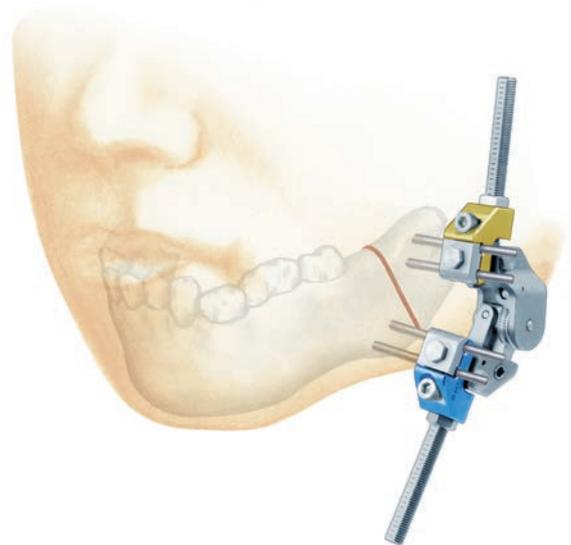
387.422	Linear Activation Instrument
387.423	Angular Adjustment Instrument
392.180	Protective Caps

Adjust the device as necessary to ensure a comfortable fit. The distractor assembly position should enable activation of both the ramus and body portions of the device. Cut the pins to length and apply protective caps.

Note: The protective caps may require cutting for proper fit.

Using the linear activation instrument, activate one pin holding clamp to confirm mobility. Return the device to its original position.

Technique tip: Using the angular adjustment instrument, turn the linear activation locking screw on the pin holding clamps clockwise until a slight resistance is felt. This will prevent unintended activation during the latency phase.



Postoperative Considerations

Mandibular Lengthening

Suggested distraction protocol

Instrument

387.422 Linear Activation Instrument

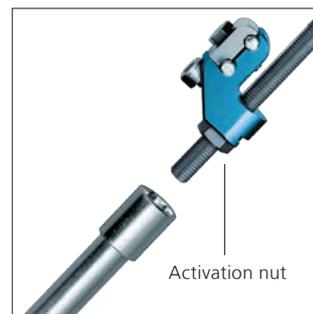
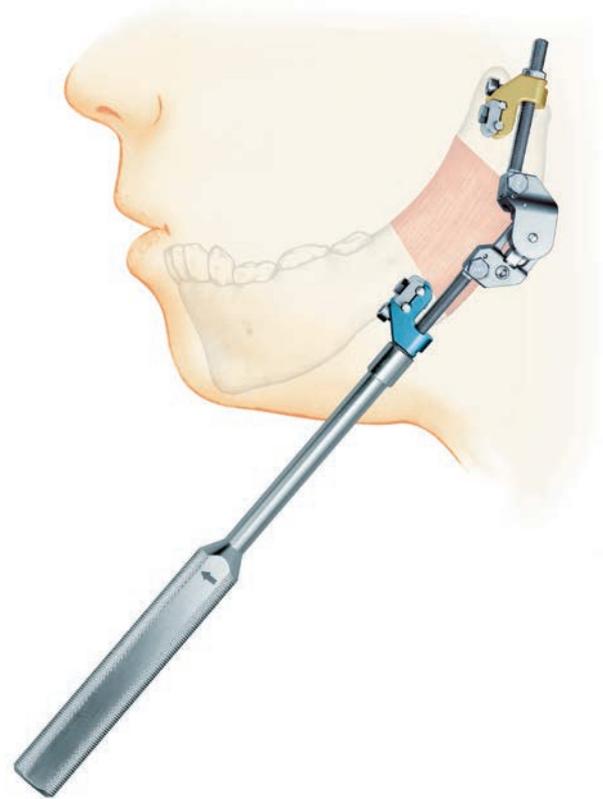
Distraction should begin four to six days after device placement. To lengthen, place the linear activation instrument over the distractor arm, engaging the activation nut, and rotate counterclockwise (in the direction of the arrow marked on the instrument). Each complete rotation equals 0.5 mm of linear movement.

Notes:

- A minimum of 1.0 mm of linear movement per day is recommended to reduce the risk of premature consolidation.
- The linear activation instrument's hexagonal socket fits over the pin holding clamp's hexagonal activation nut for linear activation.

Technique tips:

- If the linear activation locking screws on the pin holding clamps were tightened during the latency phase, they will need to be loosened prior to linear activation.
- Patients should be advised to maintain good oral hygiene.
- Care should be taken to protect the distractor(s) during treatment to prevent them from being damaged and disrupting treatment.



Document progress

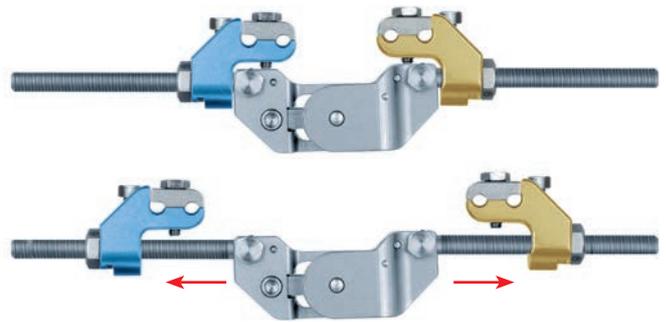
Distraction progress should be observed by documenting changes in the relationships of the anterior maxillary and mandibular occlusion and the position or level of the occlusal plane, oral commissure and chin point.

A **Patient Care Guide** is included in the system to help record and monitor device activation.

Angular and transverse adjustments

After sufficient bony regeneration of at least 10 mm has been created, angular and transverse adjustments may begin.

Important: Linear movement must initiate the distraction process and must continue during secondary angular and transverse movements to provide sufficient bony regeneration and to avoid creating a hinge point at which premature consolidation could occur.



Angular Adjustments

Instrument

387.423 Angular Adjustment Instrument

Use the angular adjustment instrument for angular adjustments. Turn the inset screw marked "A" on the underside of the distractor body. Turning the inset screw clockwise (in the direction of the arrow on the angular adjustment instrument) decreases the angle between the ramus and body and contracts the superior border of the regenerate bone.

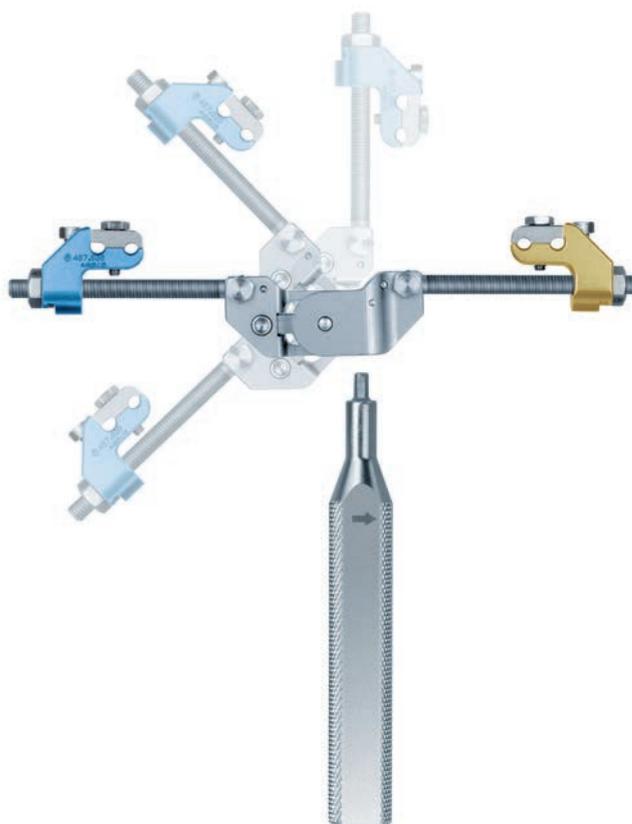
Turning the inset screw counterclockwise increases the angle between the ramus and body and contracts the inferior border of the regenerate bone.

The device may be angled up to 90° in either direction. One rotation equals 6° of angulation.

Important: When angular adjustments are made, linear distraction may not be gained and may actually be lost.

Additional option: Limited bone stock

Angular adjustments can be made using the same technique as described above.



Transverse Adjustments

Instrument

387.423 Angular Adjustment Instrument

Use the angular adjustment instrument to make transverse adjustments. Turn the inset screw marked "T" on the side of the distractor body. Turning the inset screw clockwise (in the direction of the arrow on the angular adjustment instrument) rotates the distractor varus (toward patient) and contracts the lingual portion of the regeneration.

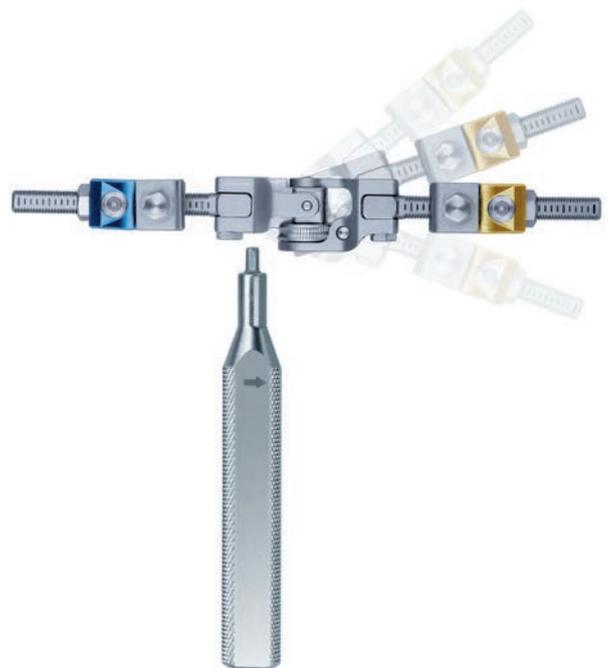
Turning the inset screw counterclockwise rotates the distractor valgus (away from patient) and contracts the buccal portion of the regeneration.

The device may be adjusted up to 32° varus (toward patient) and up to 16° valgus (away from patient). One rotation equals 4° of transverse movement.

Important: When transverse adjustments are made, linear distraction may not be gained and may actually be lost.

Additional option: Limited bone stock

Transverse adjustments can be made using the same technique as described above.



Multi-Vector Distraction

Consolidation Phase

After the desired goals have been achieved, the new bone must be given time to consolidate. The consolidation phase should be at least twice the distraction period. The average consolidation period is between eight and ten weeks.

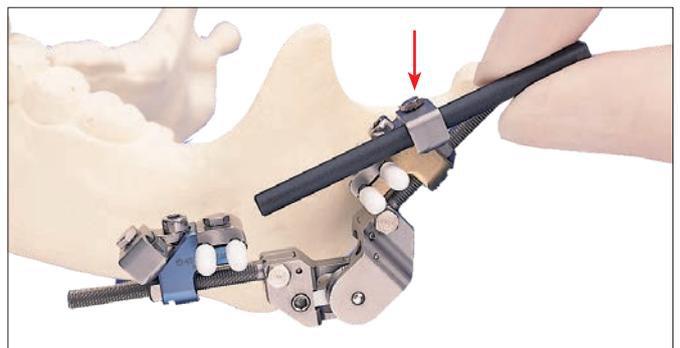
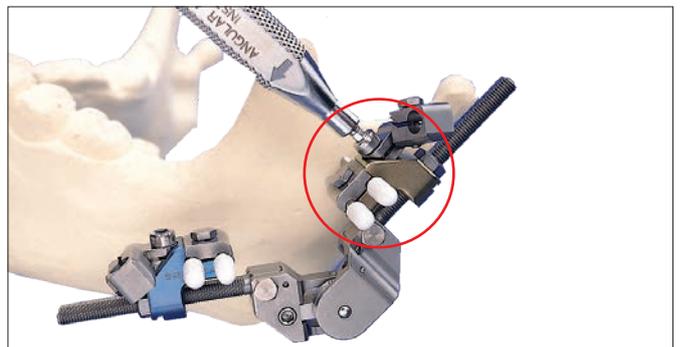
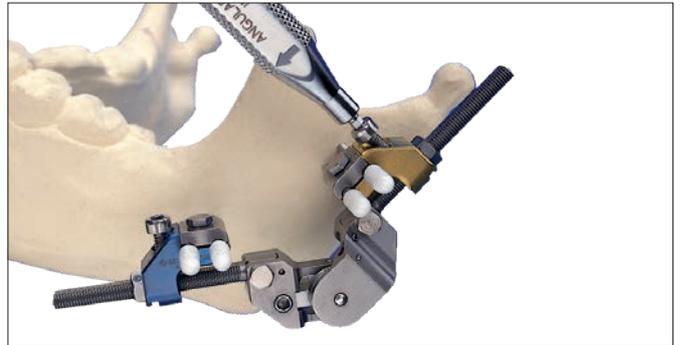
The distractor body and arms may be removed and replaced with the lightweight consolidation rod construct at the start of the consolidation phase.

Assemble consolidation rod construct

Instruments

387.423	Angular Adjustment Instrument
387.424	Pin Clamp/Arm Fastener
395.575	Clamp, for Carbon Fiber Rods
395.600 or 395.610	4.0 mm Carbon Fiber Rod, 60 mm or 80 mm

- 1.**
Remove the linear activation locking screw from the pin holding clamp.
- 2.**
Insert the linear activation locking screw into the clamp for carbon fiber rods.
- 3.**
Reinsert the linear activation locking screw and rod clamp into the notch on the pin holding clamp and tighten.
- 4.**
Repeat these steps for the opposite pin holding clamp.
- 5.**
Adjust the position of the rod clamps and insert a 4.0 mm carbon fiber rod through both rod clamps. Tighten the clamp to the rod.
- 6.**
Ensure that both rod clamps are in place. Tighten each linear activation locking screw to secure the rod clamps to the pin holding clamps. The consolidation rod construct now provides rigid fixation for the bony regenerate. The distractor body and arms may be removed.



Multi-Vector Distraction

Distractor Removal

Remove distractor body and arms

Instrument

387.422 Linear Activation Instrument

387.424 Pin Clamp/Arm Fastener

1.
Remove the distractor arm attachment screws from the distractor body. Disengage the distractor body from the arms and remove.

2.
Using the linear activation instrument, disengage the arms from the pin holding clamps by turning the instrument counterclockwise until the arm threads through the pin holding clamp.

Note: If distractor arms interfere with each other while disengaging, thread one arm clockwise until there is clearance for the other arm to be completely disengaged from the pin holding clamp.

Postconsolidation considerations

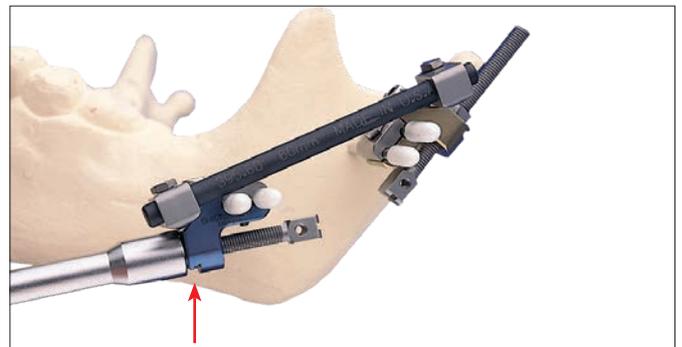
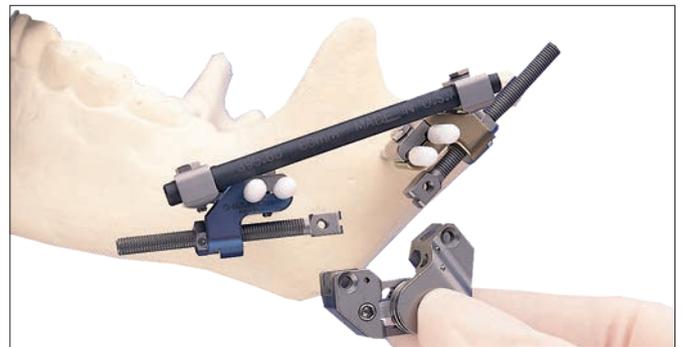
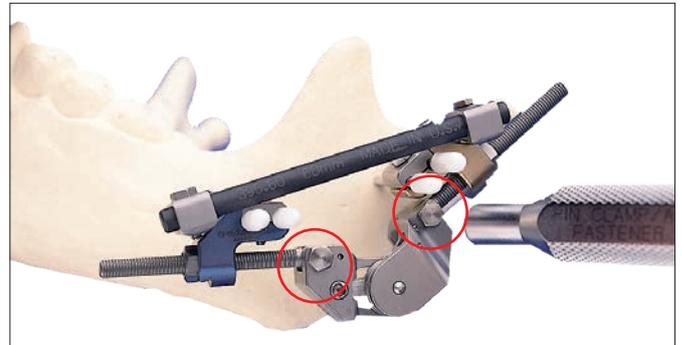
A cortical outline should be visualized in the regenerate bone on radiographs, or confirmed manually by palpation on the posterior border of the mandible.

Remove consolidation rod construct

Instrument

387.424 Pin Clamp/Arm Fastener

- 1.**
Remove the protective caps from the pins.
- 2.**
Loosen the hexagonal screws on the pin holding clamps.
- 3.**
Slide the consolidation rod construct off of the pins.
- 4.**
Remove the pins from the bone using forceps.



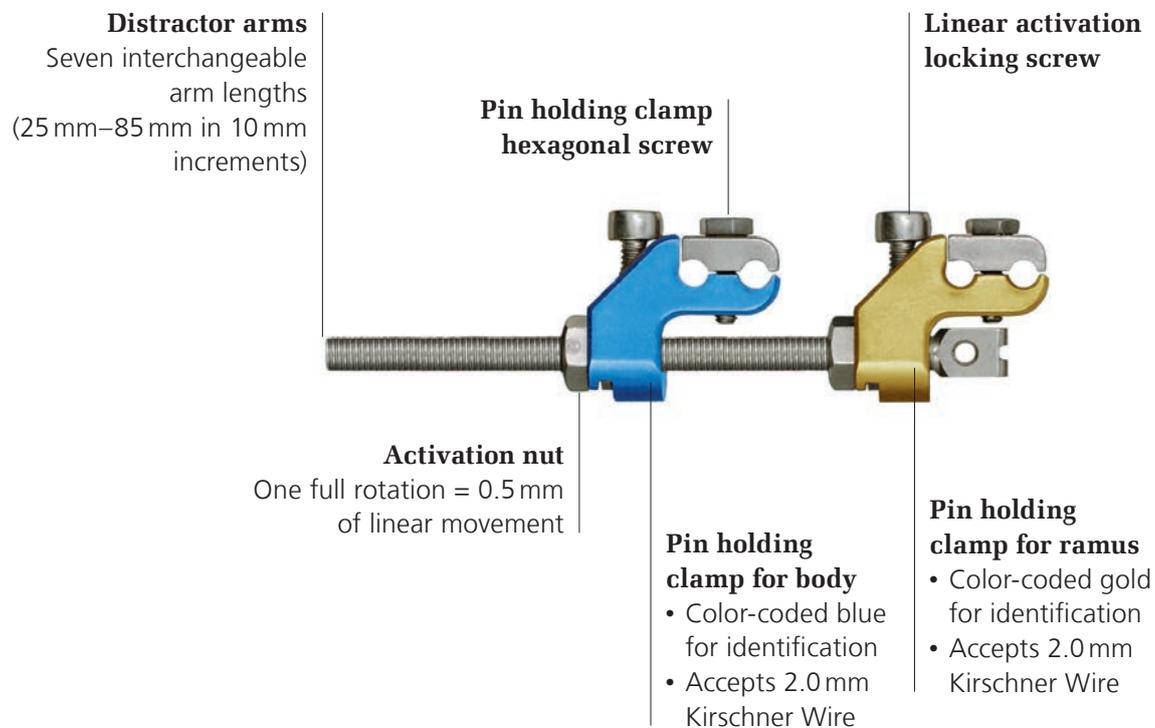
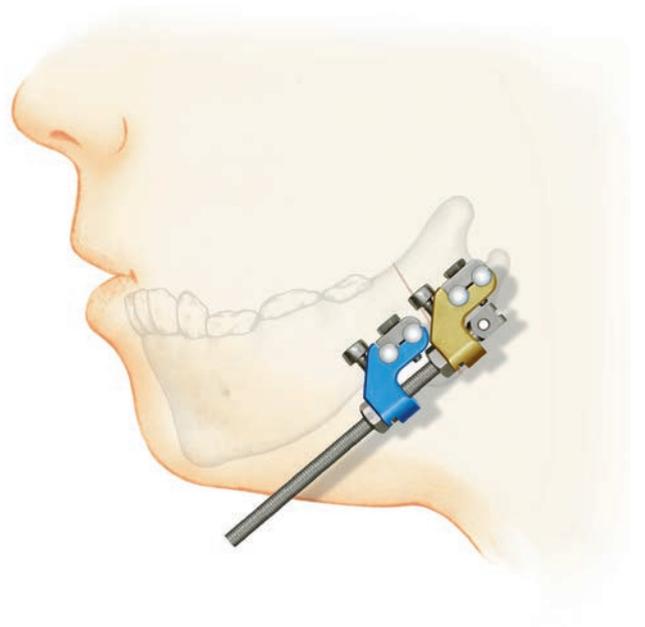
Consolidation rod construct

Single-Vector Distraction

Introduction

The Titanium Multi-Vector Distractor can be used for single-vector distraction.

- Requires one distractor arm, two pin holding clamps and two activation nuts (per distraction site)
- Overall range of distraction length varies depending on arm length chosen (see chart on following page)

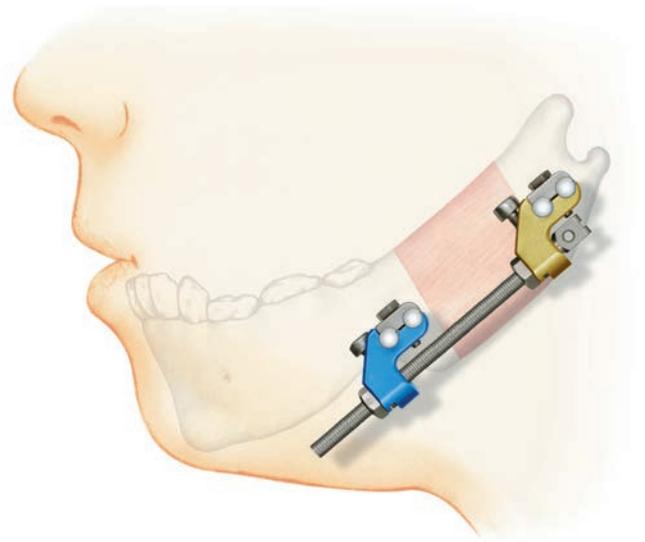


Single-Vector Distraction Capability**

Distraction Achieved	10 mm	20 mm	30 mm	40 mm	50 mm	60 mm	70 mm
Distractor Arms (arm length)	487.934 (25 mm)	487.935 (35 mm)	487.971 (45 mm)	487.973 (55 mm)	487.976 (65 mm)	487.977 (75 mm)	487.978 (85 mm)

Note: When using the limited bone stock pin holding clamps, less distraction can be achieved than listed above.

** All above configurations assembled with ramus and body pin holding clamps.



Preoperative Considerations

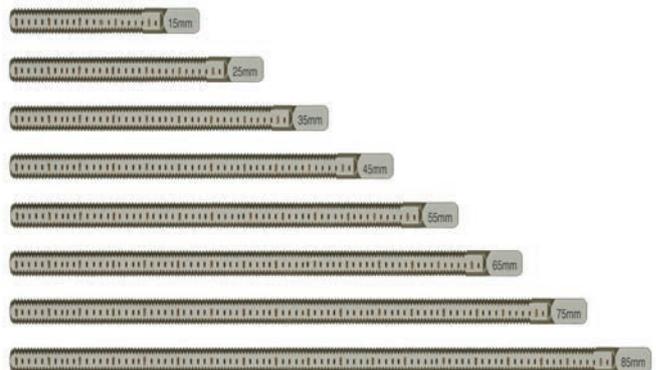
Determine the anatomic goal by conducting an evaluation of the craniofacial pathology and asymmetry through clinical exam, CT scan, cephalogram and panoramic x-ray. A team approach (including an orthodontist) is recommended.

Considerations include:

- Vertical dimension of the ramus
- Anteroposterior dimension of the body
- Occlusal plane
- Dentoalveolar occlusion

Treatment planning

- With the preoperative considerations in mind, and based on the patient's deficiencies, a distractor construct can be chosen for the clinical treatment goals.
- Determine the required length of distraction, then choose the appropriate length distractor arm (see chart on previous page).



Single-Vector Distraction

Configuring the Distractor

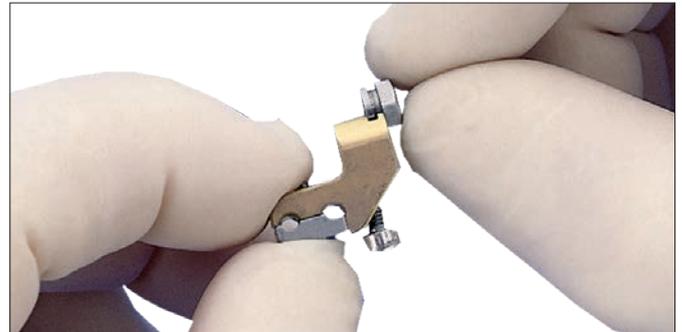
For Ramus or Body Lengthening

1. Assemble first pin holding clamp

Instrument

387.422	Linear Activation Instrument
387.423	Angular Adjustment Instrument

Insert the activation nut into the slot on the gold pin holding clamp (ramus). Pass the distractor arm through the pin holding clamp to engage the activation nut as shown. Use the linear activation instrument to engage the activation nut. Turn the linear activation instrument clockwise to advance the pin holding clamp until it is positioned at the proximal end of the distractor arm. Secure the pin holding clamp to the arm by tightening the linear activation locking screw with the angular adjustment instrument.



2. Assemble second pin holding clamp

Place the blue pin holding clamp (body), with the activation nut on the distractor arm, using the same technique noted above. Turn the linear activation instrument clockwise until the pin holding clamp is in the desired position for pin placement.



Single-Vector Distraction

Surgical Technique

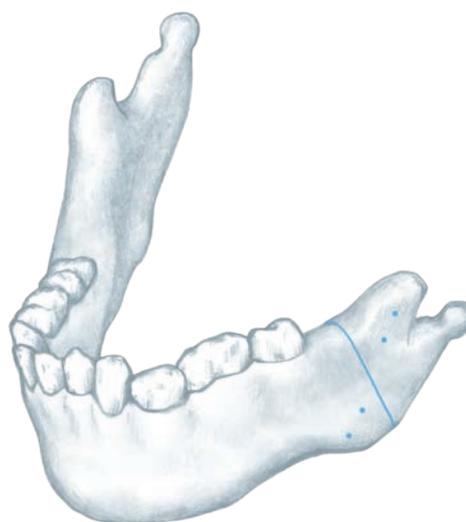
1. Make intraoral incision

Make an intraoral incision along the line of the mandible, exposing the buccal surface. Subperiosteal exposure is recommended. Reevaluate the bony anatomy and confirm that the arm length is suitable.

2. Mark site

Mark the approximate site of the osteotomy and pin placement on the bone. Confirm that adequate and suitable bone stock is available for placing both sets of pins.

Technique tip: If finding adequate bone stock is difficult, the pin placement or position of the pin clamps relative to each other on the distractor arm may be adjusted to accommodate the patient's anatomy. Alternatively, the universal pin holding clamps may be used.



3. Make transbuccal incision

To minimize the resulting scar made by the pins, pinch the skin and soft tissue between the area where the two pairs of pins will be placed.

The skin should also be retracted superiorly so the pins penetrate the skin in the submandibular fold, allowing the scar to fall in a relatively inconspicuous site. Make a small transbuccal incision superior to the planned osteotomy site and bluntly dissect the soft tissue.

4. Insert first pair of pins

Instrument

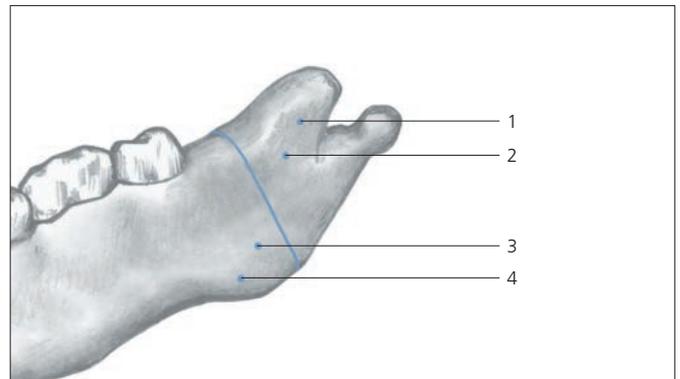
387.421	Wire Guide/Tissue Protector
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391.990*	Plate and Rod Cutter
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Pins are inserted into the ramus first. Using the wire guide/tissue protector, insert the self-drilling pin closest to the planned osteotomy, taking care to avoid the tooth roots. Pins should be inserted biocortically. (See optional accessory technique on the following page).

Cut the pin using the plate and rod cutter to prevent it from interfering with the placement of the second pin. Next, insert the pin farthest from the planned osteotomy.

Caution: Pins can loosen during the course of treatment if placed in poor quality bone.



* Also available

Optional accessory technique

Instruments

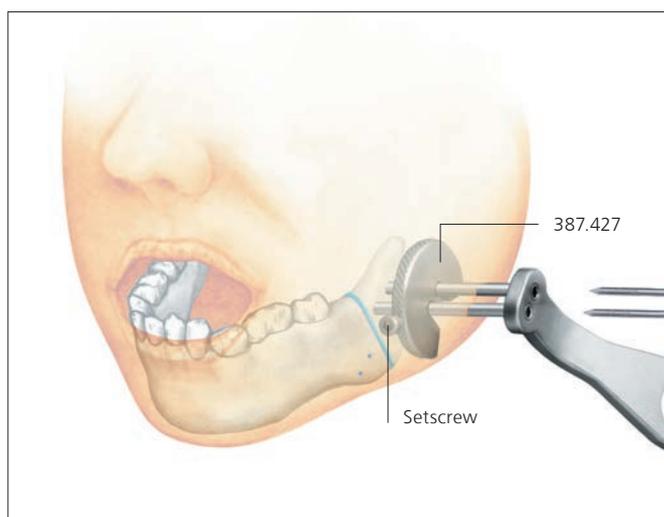
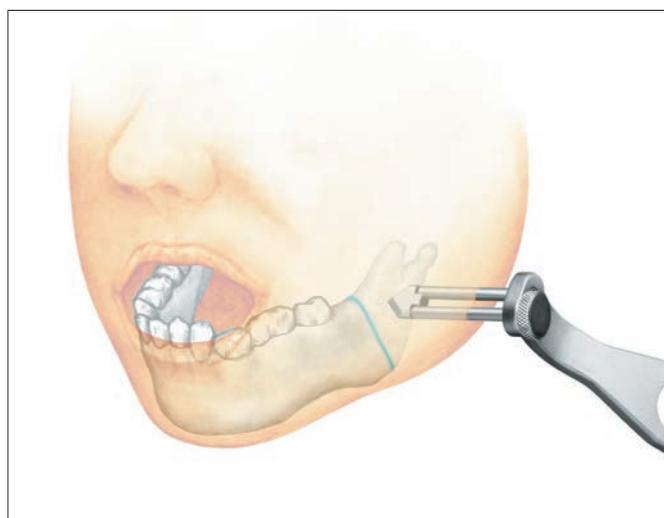
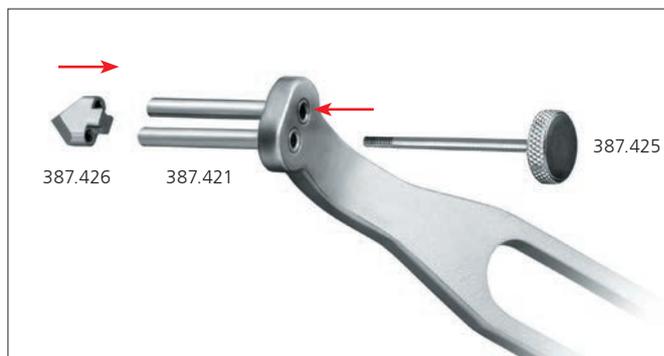
387.423	Angular Adjustment Instrument
387.425	Thumb Screw
387.426	Obturator
387.427	Cheek Retractor Ring

If assistance is needed for navigation through the stab incision, the wire guide/tissue protector can be assembled with the thumb screw and obturator. Once the wire guide/tissue protector is through the stab incision, the obturator should be removed. Hold the obturator intraorally while turning the thumb screw counterclockwise to disengage it from the obturator. The obturator can then be removed from the oral cavity.

After the wire guide/tissue protector is through the stab incision, the cheek retractor ring can be used for soft tissue management. Use a suitable pair of forceps to introduce the cheek retractor ring into the intraoral cavity and ensure that the setscrew is pointed toward the opening of the mouth.

Align the holes in the cheek retractor ring with the barrels of the wire guide/tissue protector. Slide the cheek retractor ring onto the wire guide/ tissue protector. Tighten the setscrew using the angular adjustment instrument.

To remove, loosen the setscrew using the angular adjustment instrument and pull the wire guide/tissue protector back through the stab incision and off the pins. Using forceps, grasp and lift the cheek retractor ring from the barrels of the wire guide/tissue protector intraorally and remove from the oral cavity.

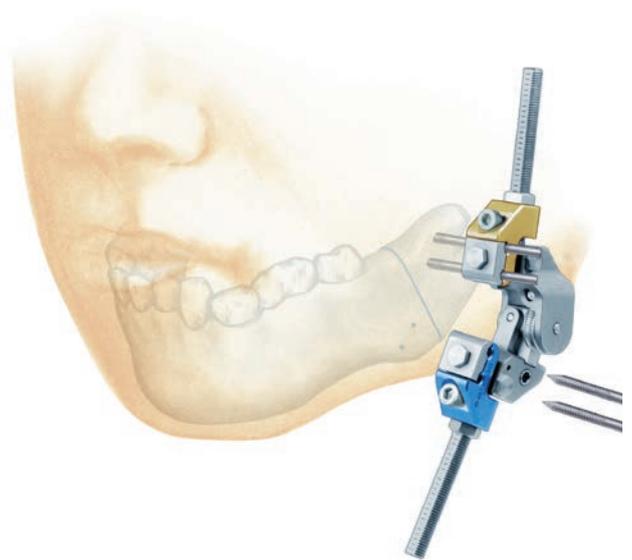


5. Insert second pair of pins

Instrument

387.421	Wire Guide/Tissue Protector
387.424	Pin Clamp/Arm Fastener

Place the distractor assembly over the proximal pins and secure loosely by rotating the pin holding clamp hexagonal screw with the pin clamp/arm fastener. On the distal side of the planned osteotomy, mark the site for the second pair of pins by using the blue pin holding clamp as a guide. Remove the distractor assembly and, using the wire guide/tissue protector, insert the second pair of pins, again taking care to avoid the tooth roots.



6. Perform buccal osteotomy

Using a reciprocating saw, perform the osteotomy on the buccal side of the mandible, extending into the superior and inferior cortices.

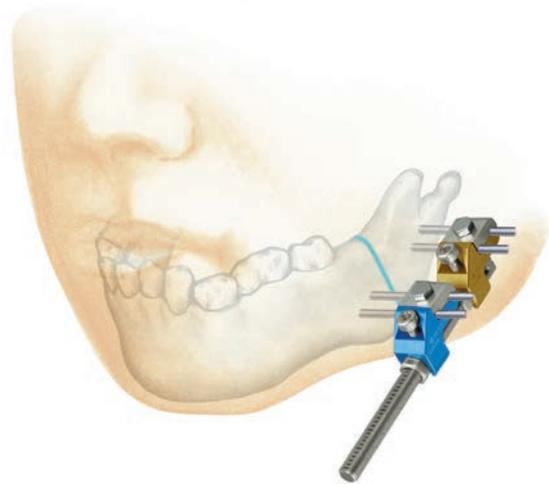
7. Final placement

Instrument

387.424	Pin Clamp/Arm Fastener
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Place the distractor assembly on the pins and tighten the pin holding clamp hexagonal screws with the pin clamp/ arm fastener. Complete the osteotomy on the lingual aspect of the mandible, taking care to preserve the inferior alveolar nerve. An osteotome may be used to facilitate the fracture.

Important: The distractor should be placed on the pins so that it is approximately a finger width from the face to reduce injury to the soft tissue.



8. Perform final adjustments

Instruments

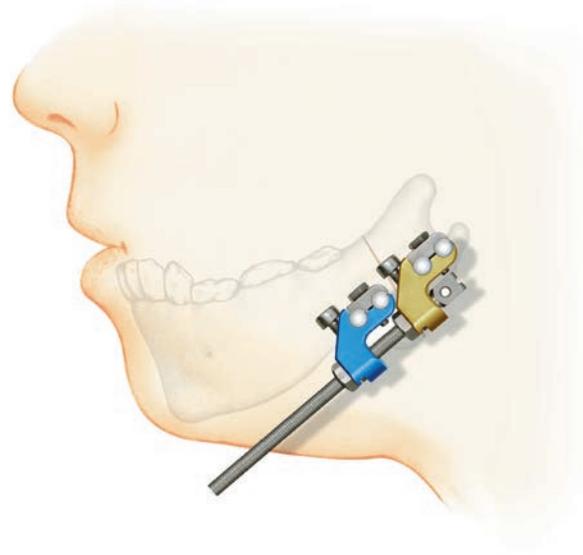
387.422	Linear Activation Instrument
387.423	Angular Adjustment Instrument
392.180	Protective Caps

Adjust the device as necessary to ensure a comfortable fit. The distractor position should enable activation with the linear activation instrument. Cut the pins to length and apply protective caps.

Note: Protective caps may require cutting for proper fit.

Using the linear activation instrument, activate the blue pin holding clamp to confirm mobility. Return the device to its original position.

Technique tip: Using the angular adjustment instrument, turn the linear activation locking screw on the pin holding clamps clockwise until a slight resistance is felt. This will prevent unintended activation during the latency phase.



Mandibular Lengthening

Suggested distraction protocol

Instrument

387.422	Linear Activation Instrument
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Distraction should begin four to six days after device placement. To lengthen, place the linear activation instrument over the distractor arm, engaging the activation nut, and rotate counterclockwise (in the direction of the arrow marked on the instrument). Each complete rotation equals 0.5 mm of linear movement.

Notes: A minimum of 1.0 mm of linear movement per day is recommended to prevent premature consolidation.

The linear activation instrument's hexagonal socket fits over the pin holding clamp's hexagonal nut for linear activation.

Technique tips: If the linear activation locking screws on the pin holding clamps were tightened during the latency phase, they will need to be loosened prior to linear activation.

Patients should be advised to maintain good oral hygiene.

Care should be taken to protect the distractor(s) during treatment to prevent them from being damaged and disrupting treatment.

Document progress

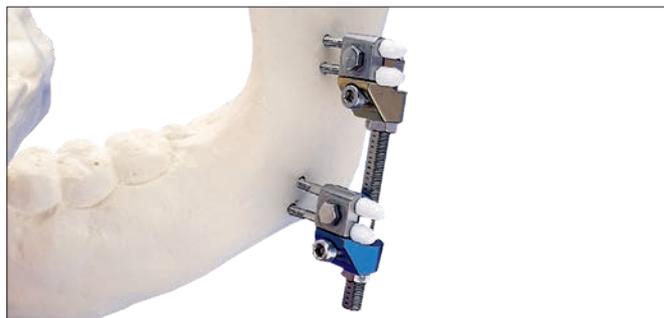
Distraction progress should be observed by documenting changes in the relationships of the anterior maxillary and mandibular occlusion and the position or level of the occlusal plane, oral commissure and chin point.

A **Patient Care Guide** is included in the system to help record and monitor device activation.

Consolidation Phase and Distractor Removal

After the desired goals have been achieved, the new bone must be given time to consolidate. The consolidation phase should be at least twice the distraction period. The average consolidation period is between eight and ten weeks.

To ensure that the construct provides rigid fixation for the bony regenerate, tighten the linear activation locking screw on each pin holding clamp using the angular adjustment instrument.



Postconsolidation considerations

A cortical outline should be visualized in the regenerate on radiographs or confirmed manually by palpation on the posterior border of the mandible.

Remove distractor

Instrument

387.424	Pin Clamp/Arm Fastener
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- 1.**
Remove the protective caps from the pins.
- 2.**
Loosen the hexagonal screws on the pin holding clamps.
- 3.**
Slide the pin holding clamps off of the pins.
- 4.**
Remove the pins from the bone using forceps.

Bone Transport Distraction

Introduction

Overview

- Transfers a segment of bone across a defect site
- Can be utilized as an alternative to free flaps and bone grafts when reconstructing mandibular defects
- To be used in conjunction with a locking reconstruction plate

Bone Transport with Multi-Vector Distraction

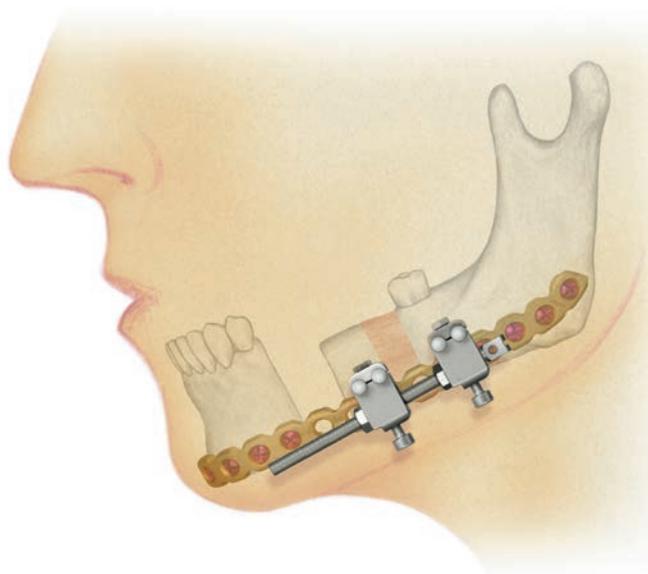
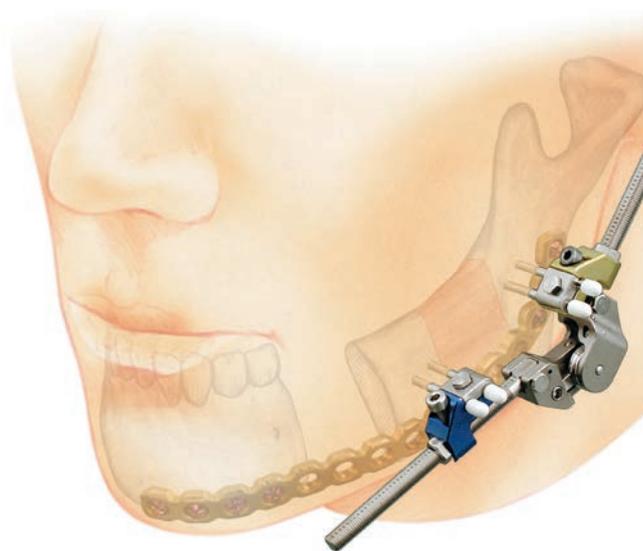
- Use the preassembled construct to perform bone transport. Arm lengths can be changed if needed.
- Used in conjunction with a locking reconstruction plate
- The blue pin holding clamp will be activated to advance the bone segment across the defect

Vector adjustments

Angular and transverse adjustments can be made to guide the bone segment in the desired direction. Intra-oral and extraoral palpation of the bone segment and locking reconstruction plate can be utilized to ensure the desired path and end result are achieved.

Bone Transport with Single-Vector Distraction

- Requires one distractor arm, two universal pin clamps, two activation nuts, and four pins per distraction site
- To be used in conjunction with a locking reconstruction plate
- Overall range of distraction length varies depending on arm length chosen (see chart on the title "Preoperative considerations")



Bone Transport Distraction

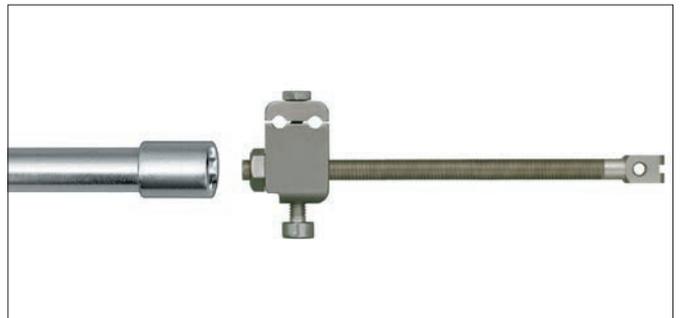
Configuring the Distractor

1. Assemble first pin holding clamp

Instrument

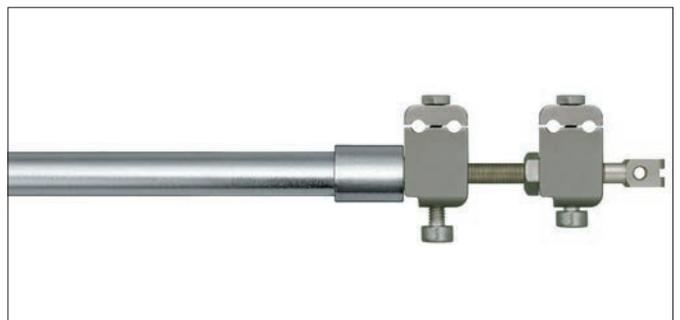
387.422	Linear Activation Instrument
387.423	Angular Adjustment Instrument

Insert the activation nut into the slot on the universal pin holding clamp. Pass the distractor arm through the universal pin holding clamp to engage the activation nut as shown. Use the linear activation instrument to engage the activation nut. Turn the linear activation instrument clockwise to advance the pin holding clamp until it is positioned at the proximal end of the distractor arm. Secure the pin holding clamp to the arm by tightening the linear activation locking screw with the angular adjustment instrument.



2. Assemble second pin holding clamp

Place the second universal pin holding clamp with activation nut on the distractor arm, using the same technique noted above. This clamp will be used as the transport vehicle. Turn the linear activation instrument clockwise until the universal pin holding clamp is in the desired position for transport.



Implants

292.790*	2.0 mm Kirschner Wire with Thread, 15 mm thread, trocar point, 150 mm	
292.801	2.0 mm Kirschner Wire with Calibration, with 15 mm thread, trocar point, 150 mm	
487.931*	Titanium Multi-Vector Distractor Body	
487.933– 487.978†	Titanium Multi-Vector Distractor Arms, 15 mm–85 mm	
487.937	Activation Nut, for Multi-Vector Distractor	
487.938	Titanium Multi-Vector Distractor Pin Holding Clamp, ramus	

* Also available

† Please refer to set list for more detail

487.939 Titanium Multi-Vector Distractor Pin Holding Clamp, body



487.940* Titanium Multi-Vector Distractor Pin Holding Clamp, universal



487.941* Titanium Multi-Vector Distractor Pin Holding Clamp, body, limited bone stock



487.942* Titanium Multi-Vector Distractor Pin Holding Clamp, ramus, limited bone stock



487.966 Titanium Multi-Vector Distractor Assembly, 35 mm, right



487.967 Titanium Multi-Vector Distractor Assembly, 35 mm, left



* Also available

Instruments

387.421 Wire Guide/Tissue Protector



387.422 Linear Activation Instrument



387.423 Angular Adjustment Instrument



387.424 Pin Clamp/Arm Fastener



387.425 Thumb Screw, for Wire Guide/Tissue Protector



387.426 Obturator, for Wire Guide/Tissue Protector



387.427 Cheek Retractor Ring, for Wire Guide/
Tissue Protector



391.990* Plate and Rod Cutter



392.180 Protective Caps, for 1.8 mm and 2.0 mm
Kirschner Wires



395.575 Titanium Multi-Vector Distractor Clamp,
for carbon fiber rods



395.600 or 395.610 4.0 mm Carbon Fiber Rods,
60 mm or 80 mm



Also available in 100 mm to 200 mm
lengths in 20 mm increments

* Also available

Set List

Titanium Multi-Vector Distractor Set (115.671)

Module

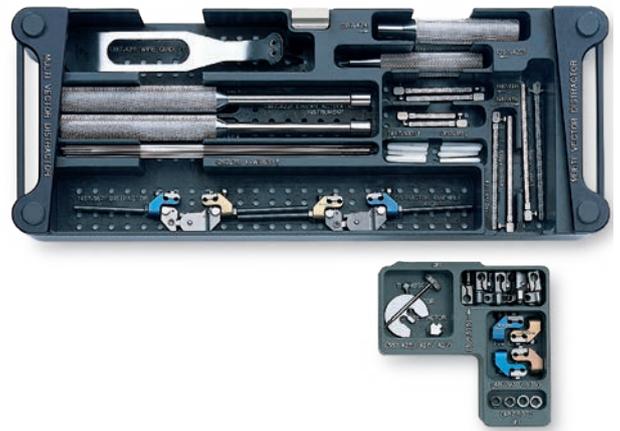
304.706	Titanium Multi-Vector Distractor Module
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Instruments

387.421	Wire Guide/Tissue Protector
387.422	Linear Activation Instrument, 2 ea.
387.423	Angular Adjustment Instrument, 2 ea.
387.424	Pin Clamp/Arm Fastener, 2 ea.
387.425	Thumb Screw, for Wire Guide/ Tissue Protector
387.426	Obturator, for Wire Guide/Tissue Protector
387.427	Cheek Retractor Ring, for Wire Guide/ Tissue Protector
392.180	Protective Caps, for 1.8 mm and 2.0 mm Kirschner Wires, 2 pkgs. of 10
395.575	Titanium Multi-Vector Distractor Clamp, for carbon fiber rods, 8 ea.
395.600	4.0 mm Carbon Fiber Rod, 60 mm, 2 ea.
395.610	4.0 mm Carbon Fiber Rod, 80 mm, 4 ea.

Implants

292.801	2.0 mm Kirschner Wire with Calibration, with 15 mm thread, trocar point, 150 mm, 1 pkg. of 10 Titanium Multi-Vector Distractor Arms, 4 ea.
487.933	15 mm
487.934	25 mm
487.971	45 mm
487.973	55 mm
487.937	Activation Nut, for Multi-Vector Distractor, 4 ea.
487.938	Titanium Multi-Vector Distractor Pin Holding Clamp, ramus, 2 ea.
487.939	Titanium Multi-Vector Distractor Pin Holding Clamp, body, 2 ea.
487.966	Titanium Multi-Vector Distractor Assembly, 35 mm, right, 2 ea.
487.967	Titanium Multi-Vector Distractor Assembly, 35 mm, left, 2 ea.



Assembly subcomponents are available separately.
Note: For additional information, please refer to package insert.

Also Available

292.650	2.0 mm Threaded Guide Wire, 230 mm long
292.790	2.0 mm Kirschner Wire with Thread, 15 mm thread, trocar point, 150 mm
391.990	Plate and Rod Cutter
394.990	Protective Caps for 4.0mm Carbon Fiber Rods (10/pkg)
	4.0 mm Carbon Fiber Rods
395.620	100 mm length
395.630	120 mm length
395.640	140 mm length
395.650	160 mm length
395.660	180 mm length
395.670	200 mm length
395.302	Combination Wrench
487.931	Titanium Multi-Vector Distractor Body
	Titanium Multi-Vector Distractor Arms
487.935	35 mm
487.976	65 mm
487.977	75 mm
487.978	85 mm
487.940	Titanium Multi-Vector Distractor Pin Holding Clamp, universal
487.941	Titanium Multi-Vector Distractor Pin Holding Clamp, body, limited bone stock
487.942	Titanium Multi-Vector Distractor Pin Holding Clamp, ramus, limited bone stock

