



# Back to the bone



**OSTEOSARCOMA  
RTU**

Ready-to-use highly injectable calcium-phosphate bone substitute for cementoplasty

**BONE SURGERY  
RTU**

Ready-to-use highly injectable self-hardening calcium-phosphate cement

**BONE SURGERY  
SMARTGRAFT**

Naturally osteoconductive bone graft

**BONE SURGERY  
GRANULES**

Affordable biocompatible calcium-phosphate bone substitute

**THE BIOCERA-VET RANGE**





# CALCIUM-PHOSPHATE BONE SUBSTITUTES: NATURAL COMPOSITION, HIGH POROSITY

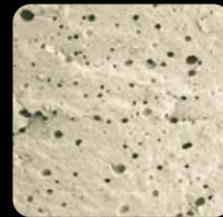
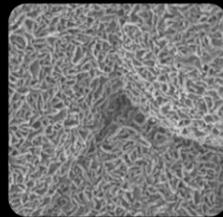
BIOCERA-VET® - A synthetic bone substitute line composed of:

- BIOCERA-VET® RTU - Ready-to-use highly injectable self-hardening calcium-phosphate cement
- BIOCERA-VET® Granules - Affordable biocompatible calcium-phosphate bone substitute

BIOCERA-VET is made from tricalcium phosphate (α-TCP) and ortho-phosphate salts that after crystallization give rise to calcium-deficient apatite. This is chemically close to the components in natural bone. Therefore, BIOCERA-VET becomes well integrated in the mineral components of the bone matrix, resorbed by osteoclasts and

progressively replaced by newly formed bone. BIOCERA-VET has a full range of micro, meso and macropores that makes it highly porous. This supports osteoconduction, facilitates cell colonization and biological fluid penetration, which promotes bone remodeling and formation.

Calcium-deficient apatite crystals, chemically very close to the mineral component in bone<sup>(9)</sup>. Image adapted from INNOTERE GmbH.



High porosity promotes bone cell colonization and biological fluid penetration.

ORTHO-PHOSPHATE SALTS

BIOCERA-VET COMPOSITION

CARRIER LIQUID

TRICALCIUM PHOSPHATE

Back to the bone

# UNIQUE OSTEOINTEGRATION AND BONE FORMATION

Thanks to its unique features, BIOCERA-VET shows excellent osteointegration, which enables the formation of bridges between the bone and the bone substitute.

6 weeks after implantation BIOCERA-VET showed:

- bridges with host bone indicative of excellent osteointegration.
- osteogenesis within, and around the periphery of the bone substitute thanks to its osteoconductive properties.

POSTOPERATIVE X-RAY

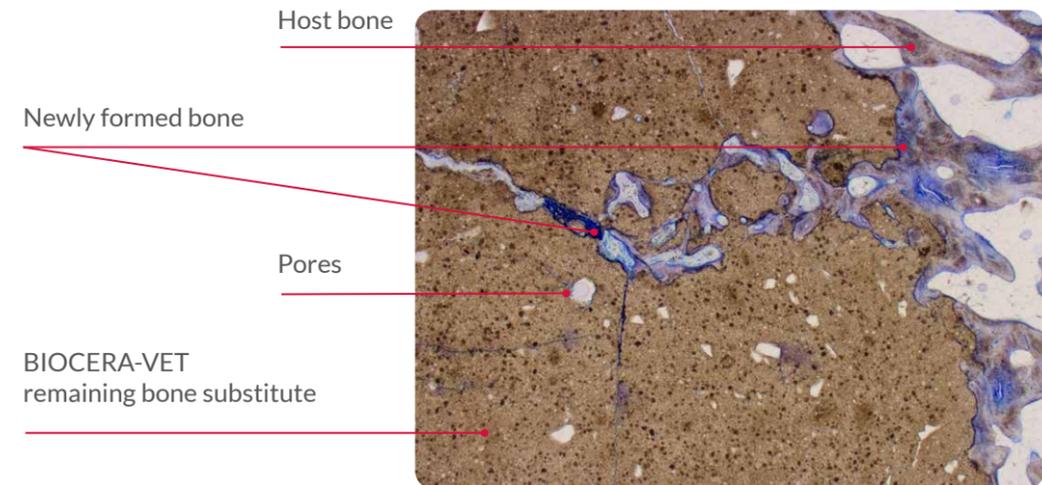


POSTOPERATIVE X-RAY 6 WEEKS



Postoperative and 6-week follow-up radiographs of a tibial tuberosity advancement (TTA) surgery. The tibial osteotomy was filled with BIOCERA-VET\*. Follow-up image at 6 weeks indicates the osteointegration of the bone cement, represented by the smooth transition between the cancellous bone, the new bone formation and BIOCERA-VET. Image courtesy of Prof. Balligand DVM, PhD, Dipl. ECVS, Liège University, Belgium.

Osteointegration



Transverse histological section (Toluidine blue) of BIOCERA-VET RTU Bone Surgery implanted in a sheep femur, 6 months after implantation<sup>(1)</sup>. Image adapted from INNOTERE GmbH.

<sup>(1)</sup>Clinical case performed with BIOCERA-VET Bone Surgery 3cc version



BIOCERA-VET

## BIOCERA-VET SMARTGRAFT NATURALLY OSTEOCONDUCTIVE BONE GRAFT

BIOCERA-VET SMARTGRAFT is made from bovine mineral bone matrix, bioresorbable polymers and collagen fragments.

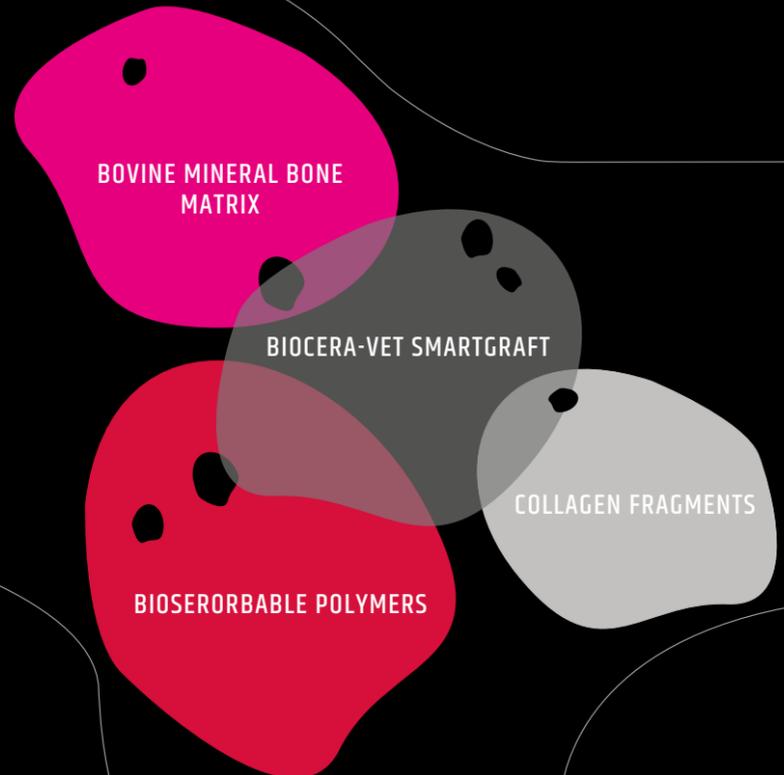


Mineral bone matrix with chemical structure and morphology

BIOCERA-VET SMARTGRAFT is a tissue-engineering technology allowing the patient's cells to grow quickly and efficiently into the bone substitute while the biopolymers degrade, providing perfect integration and osteogenesis.



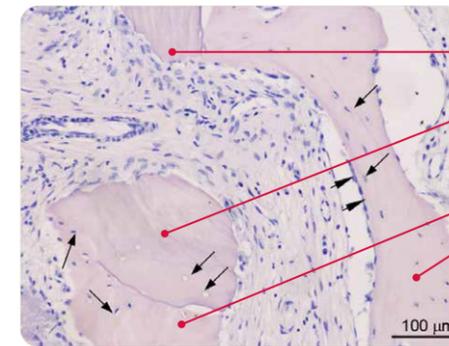
The microstructure of the composite matrix is strongly similar to natural bone in terms of open, interconnected, and mid-sized porosity promoting osteoconductivity.



## FAST OSTEOINTEGRATION AND COMPLETE REMODELING

By supporting cell adhesion, colonization and proliferation, BIOCERA-VET SMARTGRAFT presents fast osteointegration and a complete remodeling. Its high wettability and hydrophilicity are ideal to support the bone formation process.

### FAST OSTEOINTEGRATION



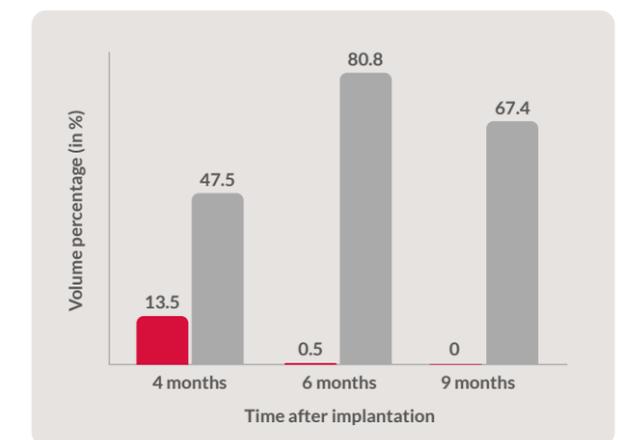
BIOCERA-VET SMARTGRAFT remaining bone substitute

Newly formed bone

Histological section (Haematoxylin & eosine staining) 4 months after implantation of BIOCERA-VET SMARTGRAFT in human maxillary bone<sup>(2)</sup>, adapted from D'Alessandro et al., 2017.

### COMPLETE REMODELING

Histomorphometric analysis showing the volume of new bone, BIOCERA-VET SMARTGRAFT at 4, 6 and 9 months after implantation. Analysis 9 months after implantation showed a complete resorption (from 13.5% at 4 months to 0%) and an increase in bone formation over time<sup>(2)</sup>. Image adapted from D'Alessandro et al., 2017.



■ BIOCERA-VET SMARTGRAFT  
■ New Bone

Back to the bone





**THOUSANDS**  
OF PATIENTS TREATED  
OVER THE LAST 8 YEARS<sup>(3)</sup>

## TESTED ON HUMANS, APPROVED FOR PETS

Orthopedic surgeons have been confidently using the human equivalent of BIOCERA-VET RTU registered and marketed for over 8 years on more than 10,000 patients, ensuring a proven safety track-record<sup>(3)</sup>.

The use of BIOCERA-VET by specialist veterinary surgeons around the globe, in over 150 canine and feline patients<sup>(4)</sup>, demonstrated an excellent safety profile with no adverse effects reported.



## THE HUMAN TREATMENT



### BONE SURGERY

In human orthopedic surgery, synthetic bone substitutes and biografts are used in the majority (50-60%) of procedures requiring grafts, whilst in veterinary orthopedics, autograft remains the default procedure for bone substitution<sup>(5,6)</sup>.

With BIOCERA-VET you now have at your disposal the latest generation of synthetic and natural bone substitute, preventing unnecessary complications, without compromising on efficacy and making your surgery shorter and more enjoyable.

In veterinary orthopedics, the patient deserves the highest standard of care!

**NON-AUTOGRAFTS IN BONE SURGERY**  
**HUMAN 50-60% vs VETERINARIAN 20-30%**



### OSTEOSARCOMA

In human medicine, cementoplasty is commonly used to consolidate bones affected by tumors or bone cysts. With this technique, the bone substitute is injected in the affected bone resulting in bone consolidation and pain relief<sup>(7,8)</sup>.

With BIOCERA-VET, cementoplasty is now available to veterinary surgeons providing a novel, minimally-invasive and cost-effective management option for dogs suffering with osteosarcoma.

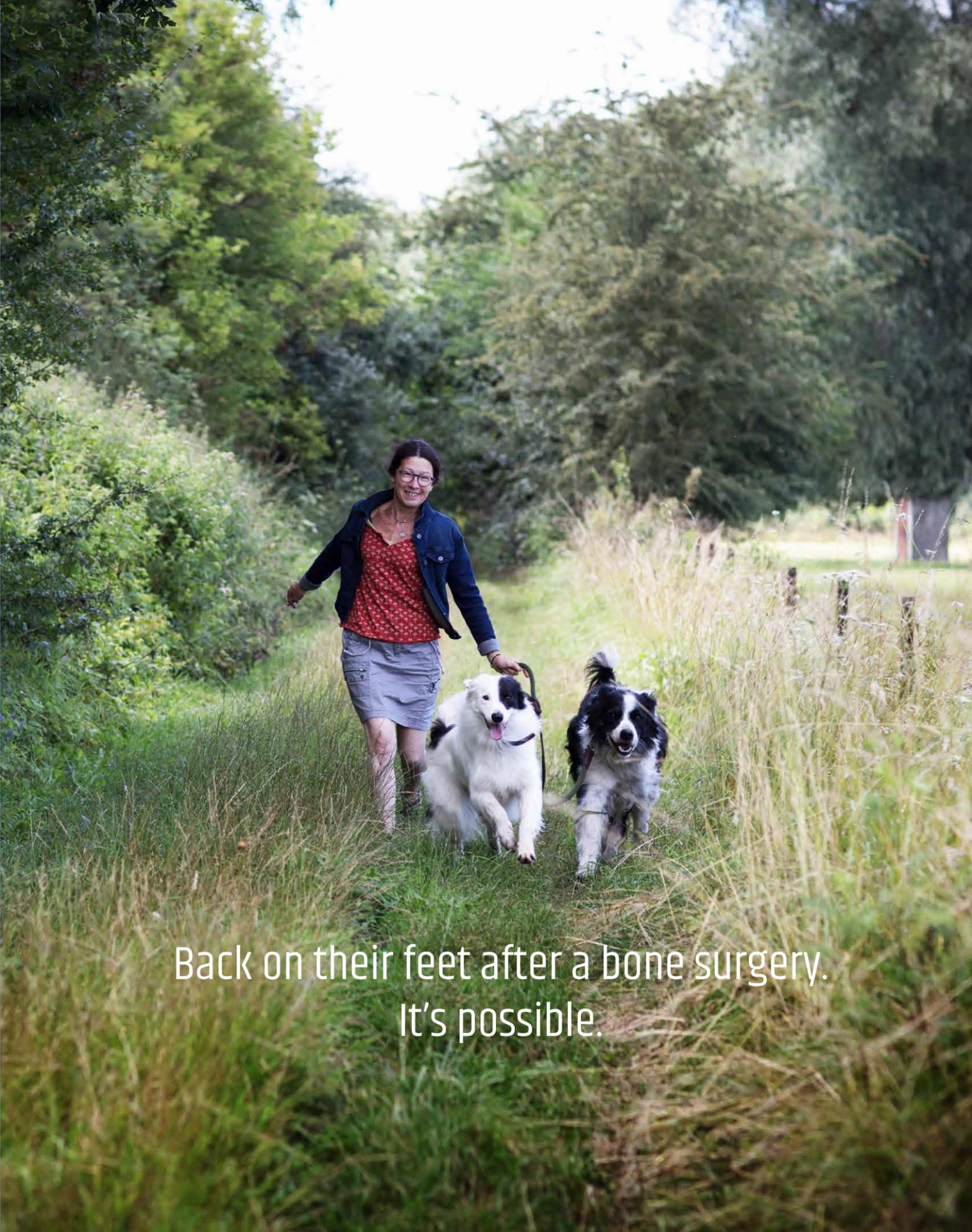


## BIOCERA-VET FOR BONE SURGERY



“BIOCERA-VET promotes bone fusion thanks to its unique characteristics that combine interesting osteoconductive properties and outstanding osteointegration. Compared to autografts, it has a comparable efficacy while reducing the risk of complications and significantly shortening surgery time. In addition to its efficacy and safety, its ergonomics and ease of use make it a promising alternative to autografts.”

G. Ragetly DVM, Dipl. ACVS, Dipl. ECVS  
Director, Specialist in veterinary surgery  
CHV Frégis, France



Back on their feet after a bone surgery.  
It's possible.



Back to the bone



## AS-GOOD-AS AUTOGRAFTS

In a recent study<sup>(9)</sup> the efficacy of BIOCERA-VET\* has been assessed for carpal and tarsal arthrodesis, and compared to similar cases treated with bone autograft.

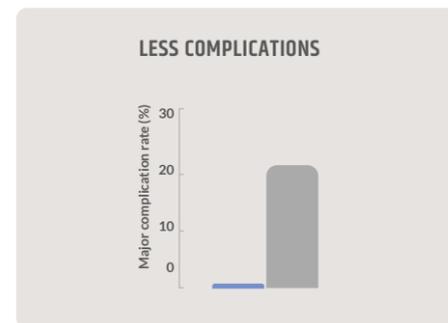
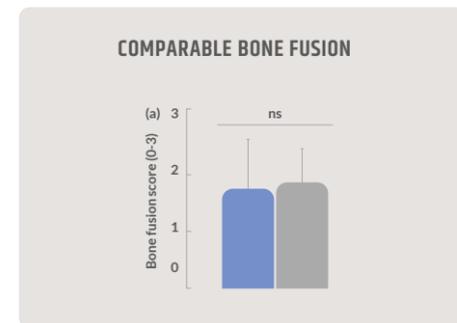
- Independent and blinded radiological analysis by specialist veterinary orthopedic surgeons
- BIOCERA-VET (n=27) vs. autologous bone graft (n=16); both groups followed the standard surgical procedure

Comparative analysis at 8 weeks post-implantation showed:

- bone fusion with BIOCERA-VET similar to that induced by autograft
- no complications with BIOCERA-VET compared to a 22.2% complication rate with autografts

**BIOCERA-VET BONE SURGERY** COMPARABLE EFFICACY IN BONE FUSION AND LESS COMPLICATIONS **VS AUTOGRAFTS**

## ARTHRODESIS BIOCERA-VET VS AUTOGRAFTS - RADIOLOGICAL ANALYSIS<sup>(a)</sup>



■ BIOCERA-VET n=27   ■ Autograft n=16

BIOCERA-VET - Comparative analysis report for arthrodesis. February 2022 Data-on-file. Study performed in collaboration with 11 veterinary orthopedic surgeons in Belgium and France<sup>(10)</sup>.

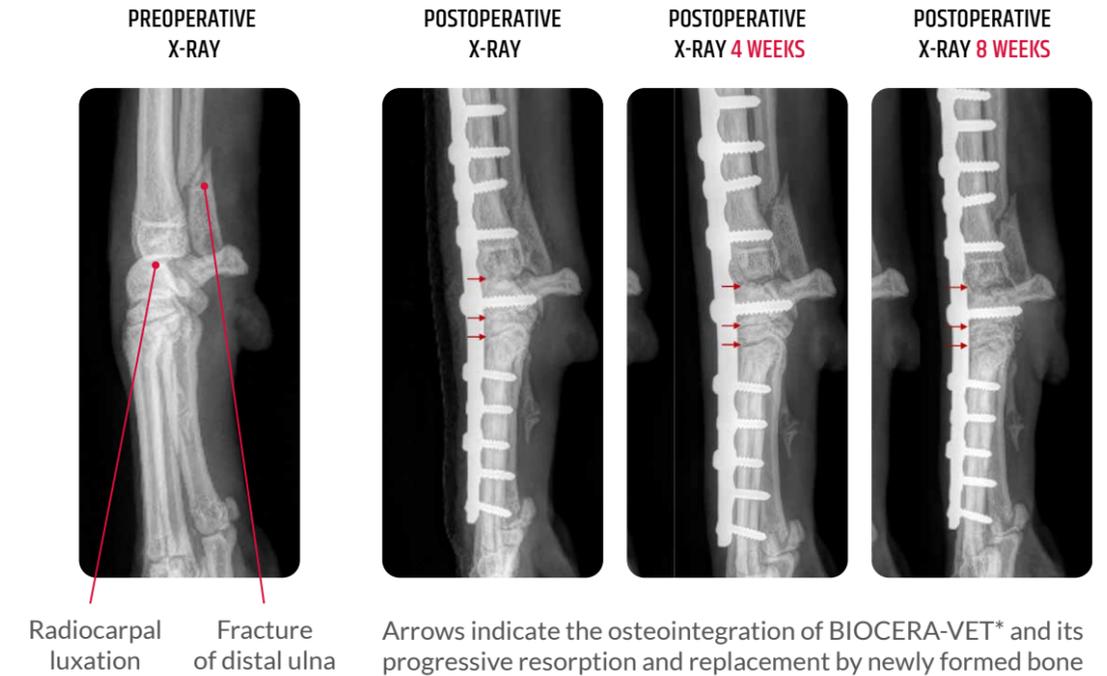
(a) Independent radiological analysis following bone fusion score, as described by Michael et al., 2003 Ree et al. 2016.



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\*Clinical case performed with BIOCERA-VET Bone Surgery 3cc version

## ARTHRODESIS TREATED WITH BIOCERA-VET



Radiocarpal luxation and fracture of distal ulna, treated by pancarpal arthrodesis.

The arrows indicate the presence of BIOCERA-VET at the level of the radiocarpal, intercarpal and carpometacarpal joints. At the 4-week follow-up, one can observe a transition from the radiopaque bone substitute visible in the immediate postoperative image, towards a less radiopaque new bone formation. At 8 weeks, the consolidated joint has progressively remodeled and shows a reduced quantity of BIOCERA-VET as it is replaced by new bone.

Arthrodesis of the carpal joint using BIOCERA-VET\* in a 3-year-old Sighthound dog. May 2020. Images by courtesy of G. Ragetly DVM, Dipl. ACVS, Dipl. ECVS - Director, Specialist in veterinary surgery - CHV Frégis, France



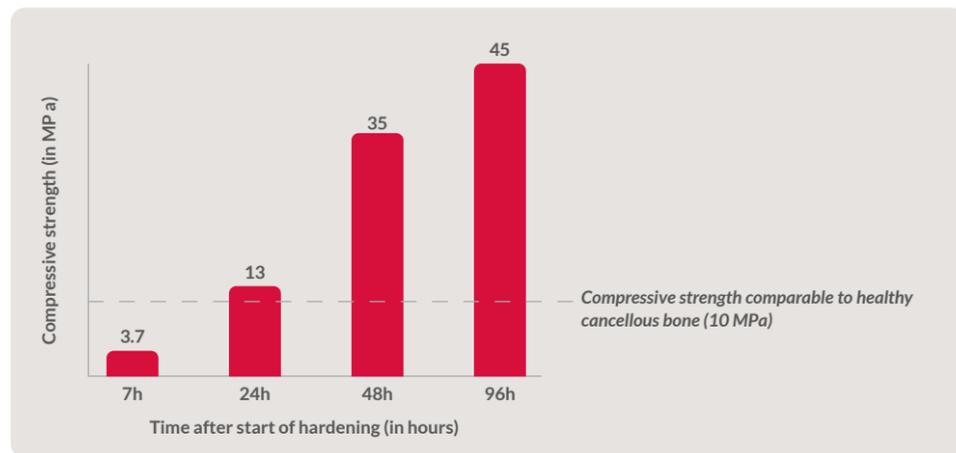


## STRONGER

Critical factors for a successful bone grafting and defect repair are mechanical resistance and stability.

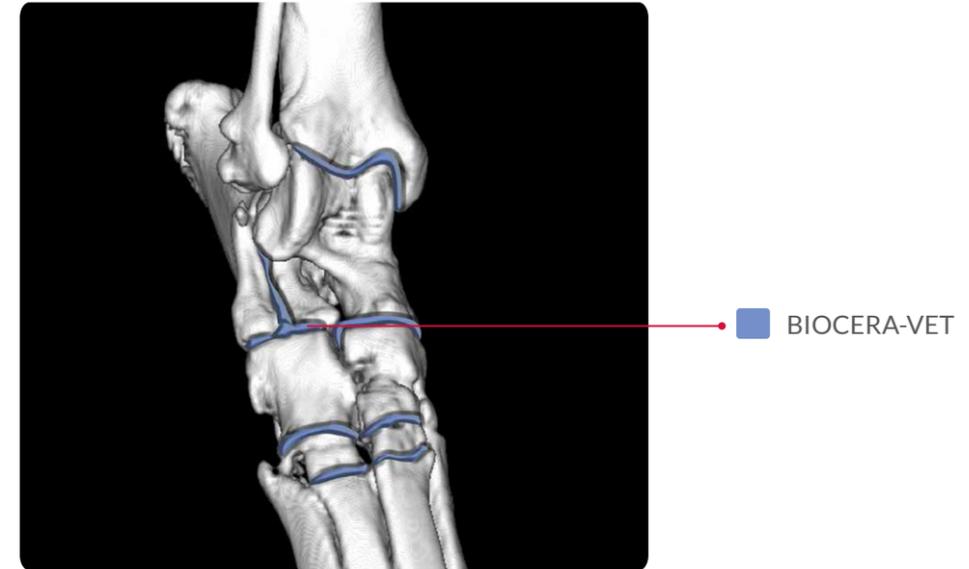
BIOCERA-VET RTU is self-setting and fast-hardening (within 15 minutes), reaching compressive strength comparable to cancellous bone 16 to 24 hours after injection. The ultimate compressive strength is three to four times higher than healthy cancellous bone, reaching about 45 MPa 96 hours after injection.

This high mechanical resistance contributes to the structural stability and improves biomechanics, whilst maintaining its porosity and bone remodeling properties.



Compressive strength during the hardening process of BIOCERA-VET RTU, adapted from Heinemann et al. Acta Biomaterialia 2013<sup>(10)</sup>.

## FILLING-THE-GAP



CT-scan of canine tarsal arthrodesis representing the filling with BIOCERA-VET.

BIOCERA-VET is a paste, making it possible to fill bone and articular gaps. In this way the bone substitute makes close contact with the adjacent bone, providing mechanical resistance and promoting new bone formation.



DVM B. Flasse,  
Beumont Veterinary Centre, Belgium

“BIOCERA-VET is a wonderful product, very easy to prepare and faster in filling in compared to other products available on the veterinary market. Its integration at the bone gap level (including radiological appearance on postoperative and follow-up views) is faster than a «classical» autologous autograft.”

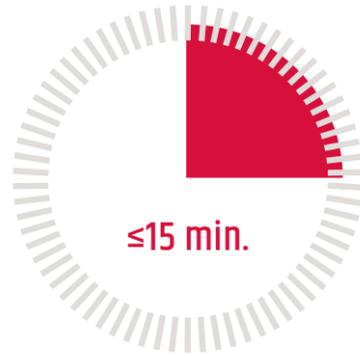




**BIOCERA-VET**

## EASIER

The products of the BIOCERA-VET line (RTU, Granules, SMARTGRAFT) meet the needs of modern orthopedic surgery thanks to their simple and intuitive use.

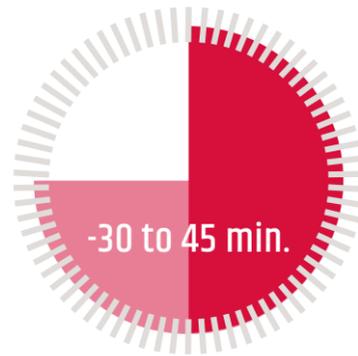


AFTER APPLICATION FAST-HARDENING ≤ 15 MIN.

BIOCERA-VET RTU does not require any specific preparation and presents a long workability and fast-hardening properties (≤ 15 min) once placed in the bone defect.

BIOCERA-VET Granules and SMARTGRAFT can be used alone or as complement of allogeneic and/or autologous materials and applied directly to the surgical site.

By avoiding the autograft harvesting, surgery time is reduced of 30 to 45 minutes. Surgeries become easier and faster when harvesting autologous bone grafts is not needed. Better results are achieved when the bone defect is well and completely filled<sup>(11,12)</sup>.



REDUCED SURGERY TIME BY 30 TO 45 MINUTES



Dr. Yves Samoy  
DVM, PhD, Dipl. ECVSMR

“BIOCERA-VET BONE SURGERY RTU is easy to inject into the bone defect with or even without a cannula. The haste of mixing the product and placing it, is now out of the picture. This allows to have the product at hand and using it multiple times during the surgery.”



Back to the bone

## BIOCERA-VET BONE SURGERY RTU

Ready-to-use highly injectable self-hardening calcium-phosphate cement

**UNIQUE  
IN VETERINARY  
ORTHOPEDICS**

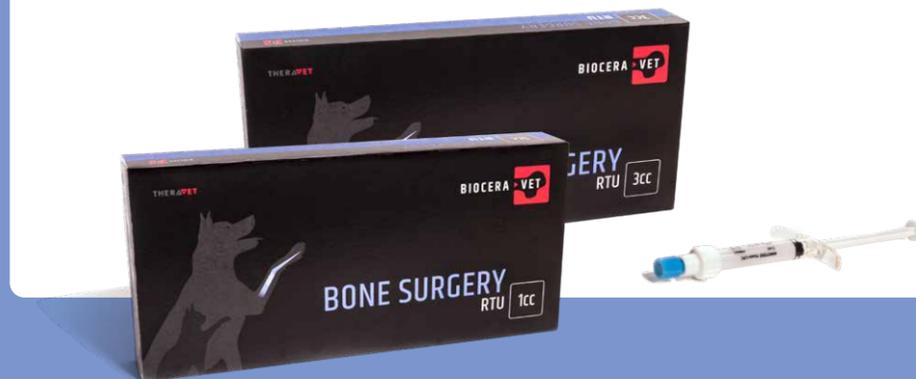
- ▶ High clinical performance
- ▶ Safe, no complications
- ▶ Ready-to-use, highly injectable, fast-hardening
- ▶ Well suited for minimally invasive & complex surgeries
- ▶ Time & cost-saving
- ▶ Clinically proven alternative to autograft

### INDICATIONS

- ▶ Arthrodesis
- ▶ Fracture
- ▶ Corrective osteotomy
- ▶ TTA (Tibial Tuberosity Advancement)
- ▶ All indications requiring bone grafting



BONE SURGERY  
1cc  
3cc



BIOCERA-VET BONE SURGERY RTU is available through [www.bioceravet.com](http://www.bioceravet.com)



## BIOCERA-VET GRANULES

Affordable biocompatible calcium-phosphate bone substitute

**AFFORDABLE  
&  
BIOCOMPATIBLE**

- ▶ Safe & affordable
- ▶ Optimal osteoconduction
- ▶ Complementary to auto- and allograft procedures

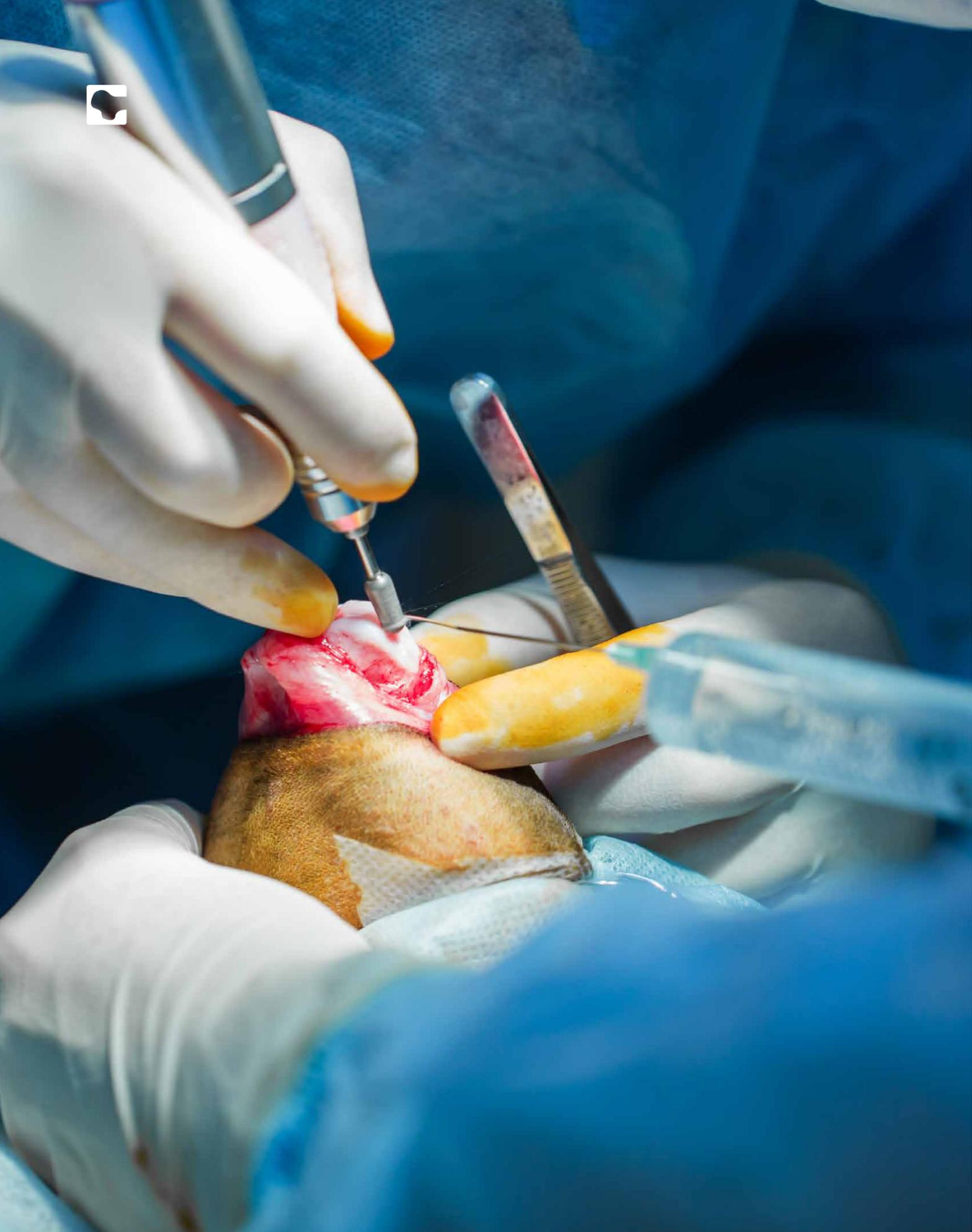
- INDICATIONS**
- ▶ Arthrodesis
  - ▶ Fracture
  - ▶ Corrective osteotomy
  - ▶ TTA (Tibial Tuberosity Advancement)
  - ▶ All indications requiring bone grafting



**BONE SURGERY**  
5 x 1cc  
3 x 3cc  
3 x 5cc  
(500-710 µm)



BIOCERA-VET Granules is available through [www.bioceravet.com](http://www.bioceravet.com)



## BIOCERA-VET SMARTGRAFT

Naturally osteoconductive bone graft

**COST-EFFECTIVE  
BIOGRAFT**

- ▶ High clinical & functional performance
- ▶ Safe, low complication rate
- ▶ From product-to-product sustained quality
- ▶ Most cost-effective alternative to allografts

**INDICATIONS**

- ▶ Arthrodesis
- ▶ Fracture
- ▶ Corrective osteotomy
- ▶ TTA (Tibial Tuberosity Advancement)
- ▶ All indications requiring bone grafting



**BONE SURGERY**  
UltraFine (0.25-1mm) - 1cc & 3.5cc  
Fine (1-2mm) - 2.5cc & 5cc



BIOCERA-VET Smartgraft is available through [www.thera.vet](http://www.thera.vet)



“With BIOCERA-VET, the technique of cementoplasty comes to the disposal of veterinary surgeons. Treatment of carefully selected patients suffering from osteosarcoma with BIOCERA-VET improves quality of life and significantly reduces lameness and pain through a minimally-invasive and cost-effective technique. It provides a new option in the palliative care of osteosarcoma as an alternative to amputation, which is highly appreciated by pet owners.”

DVM O. Gauthier  
Professor of Veterinary Surgery,  
College of Veterinary Medicine ONIRIS Nantes, France



Live more comfortably with bone cancer.  
It's possible.





**BIOCERA-VET**

## THE NEW GENERATION FOR PALLIATIVE CARE OF DOGS WITH OSTEOSARCOMA

**Osteosarcoma, a sad diagnosis for pet owners and vets.**

Osteosarcoma is the most common bone cancer in dogs, with about 40,000 cases annually in Europe and the United States. It accounts for about 90% of all canine bone cancers. If left untreated, the average survival time of a dog with osteosarcoma is usually no more than 4-5 months.

In the case of appendicular osteosarcoma in dogs, amputation of the primary tumor remains the mainstay of treatment. However, amputation is not always feasible due to the weight of the dog, the presence of other osteoarticular or neurological diseases and/or the owners' refusal. Other treatment options are potentially more invasive, expensive and not always effective.

Cementoplasty with BIOCERA-VET provides a palliative alternative, improving the quality of life of the animal suffering from osteosarcoma. The minimally invasive percutaneous injection of BIOCERA-VET into the bone that has been weakened by a tumor, reduces the risk of pathologic fracture, relieves pain and improves patient's comfort and quality of life.

BIOCERA-VET offers the veterinarian:

- minimally-invasive procedure
- short procedure time
- rapid post-operative recovery
- reduced analgesic treatment post-op
- limited costs (compared to amputation)

Navy, a 3-year-old, male Newfoundland. Treatment by cementoplasty using BIOCERA-VET\* led to a significant reduction in pain and lameness for 8 months post-operatively.



Back to the bone



DVM O. Gauthier  
Professor Veterinary Surgery at College of Veterinary Medicine  
ONIRIS Nantes, France

"The cementoplasty procedure with BIOCERA-VET is an interesting alternative to amputation because it allows, through a low-traumatic surgical procedure, an improvement in the animal's welfare, an improvement in lameness and significant pain relief"

PREOPERATIVE X-RAY



Osteosarcoma right tibia

POSTOPERATIVE X-RAY



Cementoplasty with BIOCERA-VET\* (radiopaque)

POSTOPERATIVE X-RAY  
3 MONTHS



New bone formation

POSTOPERATIVE X-RAY  
6 MONTHS



Bone remodeling around the cement. No pathological fracture.

Images by courtesy of Prof Olivier Gauthier, University of Nantes, France (Oniris)

\*Clinical case performed with BIOCERA-VET Osteosarcoma 8cc version



## BIOCERA-VET

**BIOCERA-VET Osteosarcoma is perfectly suited to cementoplasty providing:**

- mechanical strength comparable to cancellous bone within 24 hours, and complete hardening within 96 hours
- ease of injection and long workability
- monitoring of percutaneous injection by fluoroscopy and assessment of postoperative radiographs thanks to its radiopacity

**Patient eligibility criteria for the use of BIOCERA-VET Osteosarcoma:**

- tumor preferably located in an appendicular bone
- well-circumscribed tumor with preserved surrounding cortical bone

**Practical use of BIOCERA-VET Osteosarcoma:**

- minimally-invasive procedure
- limited post-operative care
- reduced analgesic treatment after cementoplasty

(1) Data on file Preclinical implantation study on paste-CPC in sheep, INNOTERE GmbH - (2) Adapted from D'Alessandro et al. International Journal of Pharmaceutics 2017 (3) Data on file - Innotere 2022 - (4) Data on file BelgiumFrance/Netherlands, Italy and United States 2019-2022, >150 cases of use of BIOCERA-VET in cats & dogs gathered from prospective multicentric non-controlled clinical trials and compassionate use. - (5) Medistrat Market Research Orthopedic surgeons n=339 in BE, FR, GE, UK & USA - (6) <https://www.fortunebusinessinsights.com/bone-graft-substitutes-market-103106> & Bone Grafts and Substitutes 2011-2020 Global Data - (7) Katsanos, T. Sabharwal, and A. Adam, "Percutaneous cementoplasty," Semin. Intervent. Radiol., vol. 27, no. 2, pp. 137-147, 2010 - (8) Thesis Lena BLANCHOT "Traitement palliatif de l'osteosarcome appendiculaire par cimentoplastie chez les chiens de grande race et de race géante : étude clinique et fonctionnelle" to obtain diploma of Docteur Vétérinaire at the Ecole nationale vétérinaire, agroalimentaire et l'alimentation Oniris Nantes, 2020 - (9) Adapted from Heinemann et al., Acta Biomaterialia 2013 - (10) BIOCERA-VET - Comparative analysis report for arthrodesis indication. Feb 2022 Data-on-file. Collaborating 11 orthopedic veterinary surgeons in Belgium and France - (11) case Ragetly G. - (11) St John TA, Vaccaro AR, Sah AP, Schaefer M, Berta SC, Albert TA, Hilibrand A. Physical and monetary costs associated with autogenous bone graft harvesting. Am J Or-thop. Jan 32(1):18-23, 2003 - (12) DeVries WJ, Runyon CL, Martinez SA, Ireland WP. Effect of volume variations on osteogenic capabilities of autogenous cancellous bone graft in dogs. Am J Vet Res. Oct 57(10):1501-1505, 1996.



Back to the bone

## BIOCERA-VET OSTEOSARCOMA RTU

Ready-to-use highly injectable calcium-phosphate bone substitute for cementoplasty

**NEW  
IN OSTEOSARCOMA  
MANAGEMENT**

- ▶ Improved quality of life and immediate pain relief
- ▶ Reduced risk of pathological fracture
- ▶ Minimally-invasive
- ▶ Rapid recovery & limited post-operative care
- ▶ Cost-effective

### INDICATIONS

- ▶ Cementoplasty (osteosarcoma, other bone tumors or any intra-osseous bone strengthening procedure)
- ▶ Large bone gaps filling



**OSTEOSARCOMA**  
12cc  
2 x 12cc



BIOCERA-VET OSTEOSARCOMA RTU is available through [www.bioceravet.com](http://www.bioceravet.com)

# TheraVET

TheraVet® is a vet company headquartered in Belgium with a US subsidiary. Its mission is to develop innovative, safe and effective treatments to improve the well-being and quality of life of companion animals suffering from osteoarticular diseases. By developing unique solutions, our commitment is to improve the level of care allowing companion animals to live healthier. In order to fully meet the needs of veterinarians, TheraVet's goal is to provide local – safe & effective treatments with a superior functional design. TheraVet is listed on Euronext Growth® Brussels and Paris.

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