Media Kit

electroducer

Table of contents

About Electroducer	**Page 02**
History	**Page 03**
Management	**Page 04**
Medical Committee, awards and partners	**Page 05**
Heart valve disease	**Page 06**
Current standard of care and potential complications	**Page 07**
What is Electroducer Sleeve® for?	**Page 08**
Which are the benefits?	**Page 09**
User testimonials and market potential	**Page 10**
Bibliography	**Page 11**
Press contact	**Page 12**

About Electroducer

Founded in 2018 by Dr. Benjamin Faurie, Electroducer is designing and developing a world-first medical device, Electroducer Sleeve®, specifically to treat heart malfunctions that lead to valve replacement or percutaneous coronary intervention (treatment of the arteries that supply the heart).

This device is derived from a medical technique known as Direct Wire Pacing (DWP®), also developed by the company's founder. This technique was used for the very first time in 2011 to treat the aortic valve. It limits potential complications for the patient during Transcatheter Aortic Valve Implantation (TAVI) by dispensing with the implantation of a temporary pacemaker in the right ventricle of the heart. Instead, the instrument that delivers the valve, the guidewire, is used to stimulate the heart muscle directly. This key step is critical to the success of the procedure. Without the use of this technique, 2 to 6% of patients undergoing the procedure experience potentially fatal complications associated with the implantation of a temporary pacemaker.

Despite its proven benefits, this revolutionary Direct Wire Pacing (DWP®) technique currently has some technical limitations that are hindering widespread adoption. The aim of the Electroducer Sleeve® device is to expand its use. The device helps limit per- and post-operative trauma for the patient by significantly reducing the invasive nature of the procedure and the time required to complete it. For the physician, the technique simplifies the procedure and makes it safer. For the hospital it represents a real cost saving of around 12% compared to the conventional approach.

It is expected that this turnkey device, covered by seven international patents, will be marketed in the US in 2023 and in Europe in 2024. Initially, the Electroducer Sleeve® will be used for TAVI and for more complex coronary procedures to treat the narrowing of the arteries that supply the heart (700,000 procedures a year worldwide). The technology will subsequently also be used in procedures on the mitral and tricuspid valves of the heart, giving a total addressable market of nearly 1.5 million procedures a year by 2025.

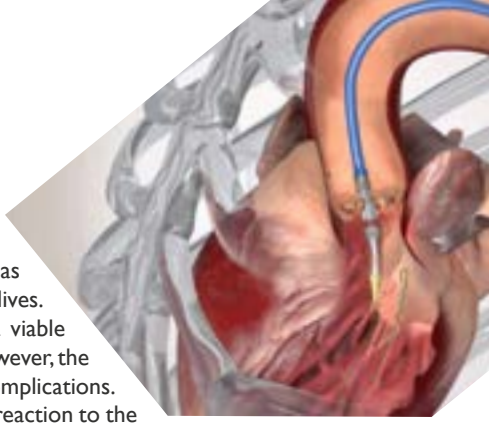
Research and development work is also underway, looking into some other highly promising applications around neuromodulation and the non-pharmacological treatment of hypertension.

Electroducer is based in Grenoble, France and is supported financially by French public sector financing bodies (French public investment bank Bpifrance and the Auvergne-Rhône-Alpes regional authority) and private investors.

2011

Benjamin Faurie, chairman, chief executive officer, and founder of Electroducer

World's first use of the Direct Wire Pacing (DWP®) technique in humans



"At the start of my career as an interventional cardiologist, I was faced early on with the attendant medical reality of aortic valve implantation. This is a minimally invasive procedure invented at the turn of the new millennium that has revolutionized our medical practice and helped save hundreds of thousands lives. For many patients with heart valve disease, cardiac surgery was sadly not a viable treatment option, leaving a large number of them with no hope of recovery. However, the introduction of these kinds of procedures brought with it some unforeseen complications. In fact, 2 to 6% of patients died as a result of the procedure, not because of any reaction to the replacement valve, but due to the trauma caused by implantation of a temporary pacemaker, a key step in the procedure that allows the heart to be stopped when the replacement valve is positioned and implanted.

That was the starting point for Electroducer. I couldn't bear the idea that some patients were dying even when they'd been given the best treatment. Before I found a position as an interventional cardiologist in France, I'd spent several years in Canada, where I was inspired by the very strong culture of innovation. On my return to France, I convinced the hospital where I was working to adopt a new, less invasive and traumatic cardiac stimulation technique that was in use in another medical specialty. From this, we developed Direct Wire Pacing (DWP®). The next step was to persuade the cardiology community of the validity of this new approach. An initial study was conducted in nearly 130 patients, demonstrating the safety and efficacy of the technique. This was followed by a controlled randomized trial, EASY-TAVI, involving 302 patients across ten hospitals in France. The trial demonstrated that the technique was superior to the conventional approach in terms of safety and efficacy. In parallel, I founded Electroducer, to protect the technology and expand its use. As a physician, I became convinced that despite all the benefits that the introduction of a new medical device may bring, the best way to encourage its adoption is to make it fully transparent for both the physician and the hospital. The Electroducer Sleeve® device has achieved this. In addition to the benefits for the patient, it reduces the cost of the procedure without adding any further steps, ensuring a rapid learning curve. Initial feedback is very promising. The results of our pilot study, initiated in September 2020 and involving 60 patients, have exceeded our expectations. I am eager to start marketing Electroducer Sleeve® to bring the benefits of this technology to large numbers of patients."

2015 First patents filed

2016 First study in 113 patients demonstrating the efficacy and safety of the Direct Wire Pacing technique (DWP®)

2018 Electroducer founded, first-round funding of €950K ($1.16M) secured

2018-2019 Prototyping of the Electroducer Sleeve® medical device and successful completion of the first *in vitro* and *in vivo* trials

2019 First comparative study in 302 patients, demonstrating the superiority of the Direct Wire Pacing® technique over the traditional approach

2020 ISO 13485 certification achieved and first-in-man study

2021 Second-round funding of €3 million ($3.67M) raised. Results of the Electroducer Sleeve® pilot study in 60 patients demonstrate the safety and efficacy of the device

2022 Winner of the «Prix du Jury 2022» awarded by the SNITEM
Electroducer Sleeve® pilot study in 60 patients published in EuroIntervention medical review

Managenement

Alban Richard, member of the strategic committee and business development adviser

Alban Richard holds a degree from the École Centrale de Marseille graduate school of engineering, a specialist master's degree in system automation from Aix-Marseille University and a master's in management from HEC Paris business school. He has held various R&D leadership roles in a number of businesses, including Sun Microsystems. In 2008, Alban founded UShareSoft, a software house publishing programmable logic controllers to support start-ups in their digital development. The company was taken over in 2015 by Japanese IT corporation Fujitsu. He is currently CEO and founder of Moonshot Labs, a digital business incubator in Grenoble, France. Alban joined the Electroducer strategic committee in 2018.

Benjamin Faurie, chairman, chief executive officer, and founder

An interventional cardiologist at Cardiovascular Institute of GHM in Grenoble, France, since 2008; Benjamin completed his internship at the Université Laval in Quebec, Canada. He has authored many scientific publications, particularly in the application of new medical techniques and technologies. Dr Faurie is an internationally renowned specialist in the treatment of Chronic Total Occlusion (CTO). In connection to this, and to raise the profile of these medical innovations, he established the specialist 'JIF-CTO' and 'Radialpes' meetings. Benjamin founded Electroducer in 2018 and currently runs the company.

Lucien Goffart, member of the strategic committee and business development adviser

Lucien Goffart holds a master's degree in business and has more than 20 years' experience in interventional cardiology. He has held many key posts with leading manufacturers in the sector and has supported the international sales roll-out of a number of products. He began his career in 1999 with Johnson & Johnson, going on to join Abbott before holding a number of different positions at Volcano between 2004 and 2011. From 2012 to 2014 he held executive roles at Stentys and Mitralgin, then moved to Boston Scientific as the company's business unit manager, France. At the same time, Lucien Goffart was appointed to the boards of several companies in the sector, such as Opsens Medical. Lucien has been a member of the board of Electroducer since September 2019.

Luiza Morin, Regulatory Affairs and Clinical Manager

Pharm D with a master's in quality, Luiza has international experience within the pharmaceutical and medical device industries. She worked in France as Quality Engineer and Clinical Evaluation Manager within global medical devices companies. Luiza is currently Regulatory Affairs and Clinical Manager.

Pauline Armand, Product Manager

Pauline has a Master's degree in management. Her experience concerns start-up accompaniment, innovation projects management and funding, with a focus on the medical field in the last 5 years. Pauline is currently Product Manager.

Electroducer headquarters are located in Grenoble, France, at Moonshot Labs incubator

Medical Committee

Members of the Electroducer medical committee are internationally renowned interventional cardiologists. They all play a part in establishing the clinical strategy and advising the business on the development and marketing of its first medical device, Electroducer Sleeve®.

Pr. Jacques Séguin, member of the Electroducer medical committee

Professor Jacques Séguin holds a PhD in medicine, history of medicine and biochemistry, and teaches cardiac surgery at the University of Paris, France. He has authored more than 200 scientific articles published in international medical journals. Jacques Seguin has founded several medical device companies during his career, including CoreValve, which developed the self-expanding TAVI procedure before being acquired by Medtronic in 2009 for more than $800M (€654M). Professor Séguin also founded renal denervation specialist ReCor, which was taken over by Japanese company Otsuka in 2018. He sits on the boards of directors of several innovative healthcare companies. Jacques joined the Electroducer Medical Committee in 2020.

Dr. Max Amor, member of the Electroducer medical committee

Medical doctor Max Amor began his career in the United States. He subsequently played an active role in the development of nuclear medicine before moving in 1996 to the Clinique Louis Pasteur in Nancy, France, a reference center for interventional cardiology. Dr Amor is also chairman of Incathlab, a specialist provider of videos, e-learning and other online learning tools to promote access to knowledge and new techniques in the field of interventional cardiology. Max has been a member of the Electroducer medical committee since 2018.

Dr. Marie-Claude Morice, member of the Electroducer medical committee

A medical doctor, Marie-Claude Morice trained in interventional cardiology at the Montreal Heart Institute before taking charge of the hemodynamics department of the Centre Cardiologique du Nord in Paris, France. Here, in 1986, she established one of France's first interventional cardiology platforms. Dr. Morice played an active role in the worldwide development of coronary angioplasty and was the principal investigator in the first clinical study conducted around the world to evaluate the active stent, known as RAVEL. The study showed that the active stent drastically reduced the risk of restenosis. Today, 98% of the stents fitted in France are active stents. She has authored many scientific publications, is joint chair of EuroPCR, the world's largest interventional cardiology congress, and is CEO of CERC (European Cardiovascular Research Center). Marie-Claude joined the Electroducer medical committee in 2018. In 2021, she received the prestigious 'Ethica Award' from EuroPCR.

Dr. Philippe Généreux, member of the Electroducer medical committee

Philippe Généreux, MD, is an interventional cardiologist at the Morristown Medical Center in New Jersey, USA. He is very active in clinical research for new therapies and new medical devices. He has many scientific articles to his name, has been the principal investigator in more than 30 clinical trials and has become one of the world's most-cited authors over the last 10 years. Philippe is medical director of SARANAS, a Texas-based medtech company, and has been a member of the Electroducer medical committee since 2018.

Prizes, Awards and Partners

2017
Winner of the French Tech government grant from Bpifrance (the French public investment bank)

2019
Winner of the prestigious I-Lab innovation competition awarded by Bpifrance

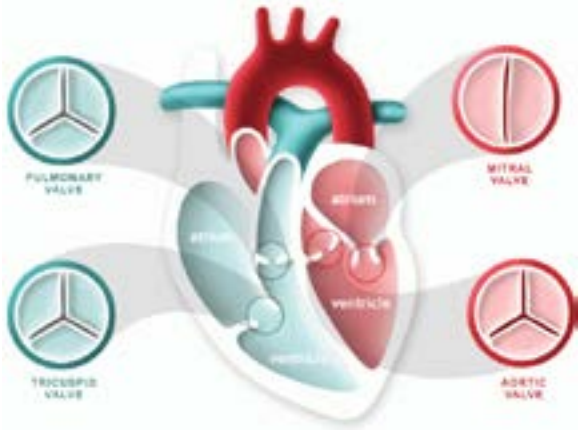
2020
Winner of the TCT Innovation competition (at the TCT global interventional cardiology conference) in San Francisco, USA, and the Innovation Award competition at the ICI Meeting in Tel Aviv, Israel

2022
Winner of the «Prix du Jury 2022» awarded by the SNITEM

Heart Valve Disease

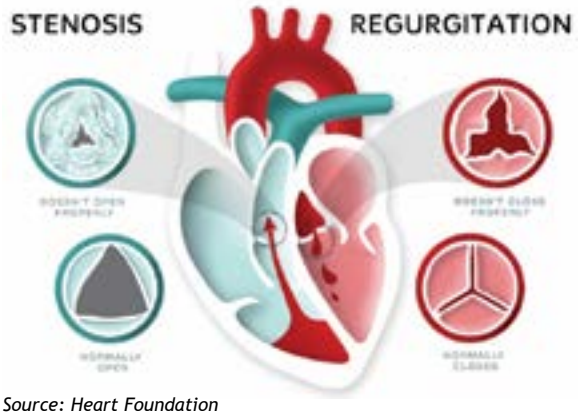
The valves of the heart are located between the four chambers or cavities (left and right ventricles, left and right atria) and ensure that the blood flows properly between the chambers, to supply the body with oxygen. There are four valves:

- Tricuspid: between the right atrium and the right ventricle
- Pulmonary: between the right ventricle and the pulmonary artery
- Mitral: between the left atrium and the left ventricle
- Aortic: between the left ventricle and the aorta



Source: Heart Foundation

Heart valve disease is a group of disorders that can affect any of these valves.
A valve may 'leak', referred to as insufficiency or regurgitation, or it may be obstructed by narrowing (stenosis), causing the heart to malfunction.
In most cases, a malfunctioning valve is directly related to aging. There can be other causes too, such as acute rheumatoid arthritis (a delayed inflammatory complication linked to an upper respiratory infection that was left untreated), a birth defect, or heart failure. It may also be the result of endocarditis (a disease of the inner lining of the chambers of the heart) or a myocardial infarction.



Source: Heart Foundation

Heart valve disease in figures

2% of the adult population and

10% to 15% of the population aged over 75 years suffer from heart valve disease
(source: Fédération Française de Cardiologie)

Since 1990, the number of people worldwide affected by these kinds of diseases has doubled.
(Source : https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.119.043391).

Current Standard of Care: valvuloplasty

Until the start of the 2000s, patients with heart valve disease would undergo open-heart surgery. This procedure consisted of opening up the chest, removing the diseased valve while keeping the heart beating using an external machine that maintains blood flow around the body, and replacing it with an artificial valve. It was highly complex and sadly not appropriate for frail or very elderly patients.

In the early 2000s, Professor Alain Cribier introduced a revolutionary technique for replacing a diseased valve without opening up the patient's chest, using instead a percutaneous approach (passing through the arteries of the human body, generally via a puncture point in the groin). In the space of 10 years this procedure, TAVI (Transcatheter Aortic Valve Implantation), has since become commonplace; the standard treatment for aortic narrowing. TAVI saves the lives of thousands of patients who would previously have had no hope of recovery.

TAVI is a multi-stage procedure performed by an interventional cardiologist, rather than a surgeon. Under local anesthetic, a puncture is made in the femoral artery. From here, the replacement valve can be advanced all the way up to the heart. A guidewire is then inserted into the femoral artery. This will guide the catheter carrying the replacement valve all the way to the diseased valve. Once it is properly in position, a balloon beneath the replacement valve is inflated, deploying the device against the walls of the aorta so that it sits inside the diseased valve. A metal mesh, known as a stent, supports and holds the replacement valve in place. This stage of the procedure is critical. The heart rate is accelerated to 200 beats per minute so as to 'block' it and thereby ensure that the new valve is properly positioned. The technique is performed with stimulation via a temporary pacemaker inserted in the right ventricle. The entire procedure is performed under X-ray monitoring so that the instruments can be seen moving up through the body.

Aortic bioprosthetic valve
(Source: French federation of cardiology)

Valvuloplasty in figures

225 000 valvuloplasty procedures per year in 2021

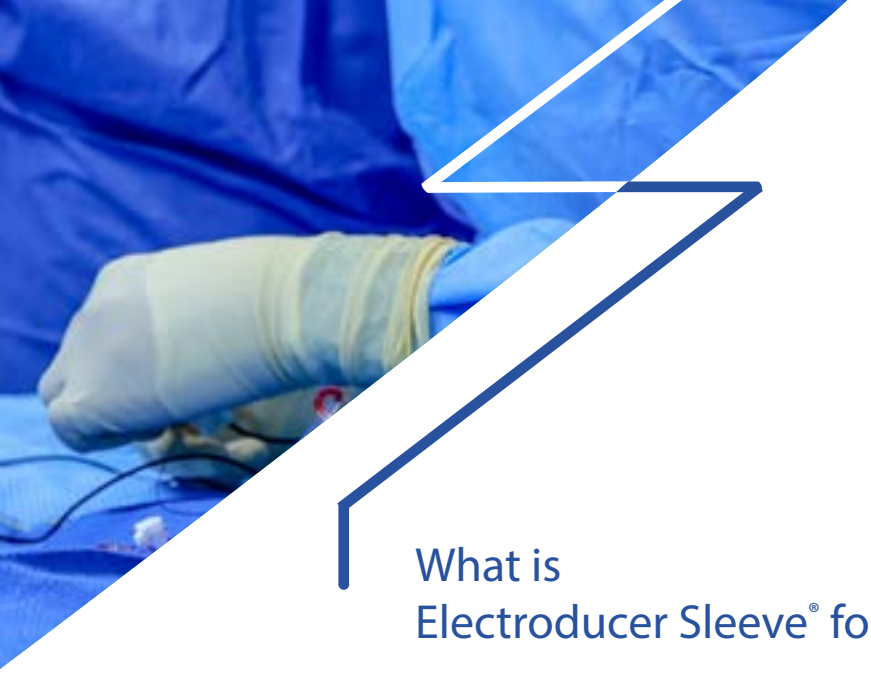
600 000 valvuloplasty procedures per year in 2025

Source: company

Potential Complications

Aortic valve replacement can have repercussions for some patients, leading to serious complications and even death.
In 2 to 6% of cases, fitting a temporary pacemaker to ensure the valve is properly positioned has serious implications:

- Risk of tamponade (build-up of fluid in the pericardial sac around the heart)
- Lack of stability
- Vascular complications resulting from puncture of a blood vessel

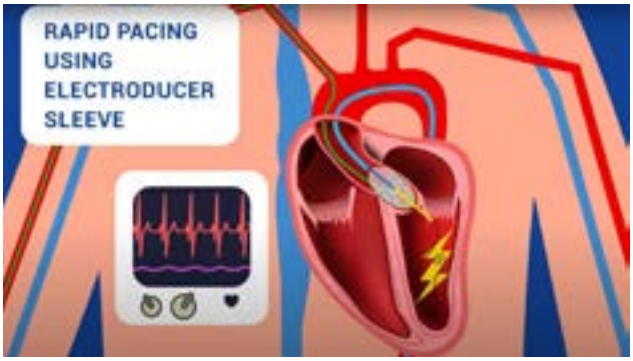


What is Electroducer Sleeve® for?

Electroducer Sleeve® is a non-implantable, sterile medical device that will help to reduce potential complications of valvuloplasty by dispensing with the temporary pacemaker that can lead to death in 2 to 6% of procedures.

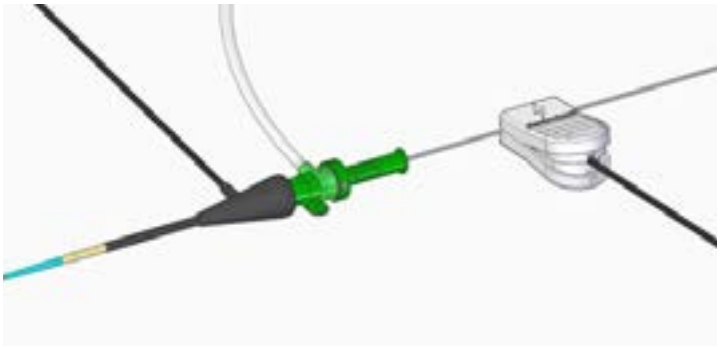
WITHOUT ELECTRODUCER SLEEVE®

WITH ELECTRODUCER SLEEVE®



Click here to watch the product video

The principle of this unique technology is to stimulate the heart using a guidewire that has already been inserted into the patient's body. In practical terms, a very low intensity electric current is generated along the guidewire, safely stimulating the heart with no risk of complications for the patient. The electrical signal is produced by a device located a few centimeters from the puncture point (see illustration below). This medical device will help to standardize and improve the use of Direct Wire Pacing (DWP®), a technique used for the very first time in 2011 by the founder of Electroducer and now tried and tested. The pilot study in 2020 demonstrated that the use of this device is superior to the use of the DWP® technique in terms of benefits; in particular, it is better tolerated by the patient (no pain when the heart is stimulated).



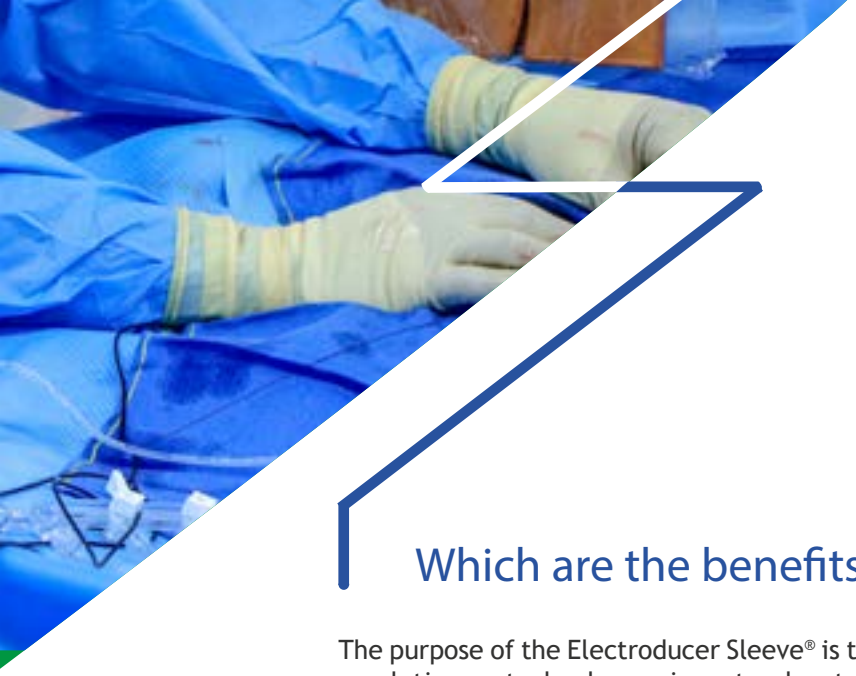
Electroducer Sleeve®

Direct Wire Pacing (DWP®)

Direct Wire Pacing is a medical technique that involves stimulating the heart not via a temporary pacemaker, but rather, using an external pacemaker that generates an electrical signal along the guidewire inserted into the patient's body.

The superiority of this technique over the conventional approach was demonstrated in a study published in the prestigious Journal of the American College of Cardiology in 2019. The study, known as EASY-TAVI, involved 302 patients. Its efficacy and safety were assessed for the first time in 2016, in 113 patients.

However, Direct Wire Pacing currently has some technical limitations that hinder widespread adoption.



Which are the benefits

The purpose of the Electroducer Sleeve® is to simplify, enhance and expand the use of this revolutionary technology using a turnkey technique with demonstrated clinical benefits. Using Electroducer Sleeve® means the procedure is:

- Safer for the patient, significantly reducing per- and post-operative trauma
- More straightforward for the physician and all medical staff
- More cost-effective for the hospital

Over the last five years a number of clinical studies have demonstrated these benefits (see references p. 11)

For the patient

- No pain when the heart is stimulated
- The risk of tamponade, resulting in the death of the patient in 2 to 6% of procedures, is completely eliminated
- Time procedure reduced (-12%[5])
- X-ray exposure reduced (-7%[5])
- Growth in outpatient care (discharge from hospital a few hours after the procedure)

For the physician

- Time procedure reduced (-12%[5])
- X-ray exposure reduced
- One significant step in the procedure is eliminated (no need to fit the catheter that was used in the past to insert the temporary pacemaker into the right ventricle)
- Rapid learning curve
- Intuitive handling (turnkey device based on a current technique, Direct Wire Pacing, compatible with all instruments)

For the hospital

- Decrease in direct costs (no need to use certain instruments[5])
- Reduction in indirect costs (decrease in per- and post-operative trauma for the patient and therefore in complications, reduction in the length of hospital stay and the time required for the procedure, etc.)

Benefits of the Electroducer Sleeve® demonstrated during the COVID-19 crisis

In 2020, Dr. Benjamin Faurie conducted an initial feasibility study of TAVI in three patients on an outpatient basis. The study highlights that undertaking the procedure on an outpatient basis is safe for selected patient profiles and reduces medical personnel exposure to the COVID-19 virus. It also uses fewer hospital resources, meaning they can be allocated to other departments.

User testimonials

Dr. Nicolas Dumonteil,
Pasteur Clinic, Toulouse, France

«A major step towards simplification of interventionnal procedures requiring temporary cardiac pacing.»

Dr. Thierry Lefevre,
Jacques Cartier Hospital, Massy, France

« I'm convinced that within a few years, this device will replace temporary Pacemaker for interventional procedures.»

Pr. Jacques Monségu,
Cardiovascular Institute of GHM, Grenoble, France

« A disruptive and simple device allowing to simplify coronary and structural procedures.»

Application That Extends Beyond Heart Valve Disease

To begin with, the Electroducer Sleeve® will be used for aortic valve replacement and more complex coronary procedures to treat the narrowing of the arteries that supply the heart.

Its application will then be expanded to include other procedures treating narrowing of the mitral and tricuspid valves (TTVR, TMVR).

1.5 million
procedures per year

The potential market for Electroducer Sleeve® is expected to be nearly 1.5 million procedures globally per year by 2025. The company has set itself a target of capturing 8% of this market by this date; around 120,000 procedures per year.

Key points

- A proven medical technique
- A world-first turnkey medical device
- Demonstrable clinical benefits for the patient and the whole healthcare system
- Market launch in the United States planned in 2023 and in Europe in 2024
- A potential market of 120,000 procedures per year by 2025

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