During the winter 1984, I received a call from Hans Wallsten, a Swedish engineer, retired in Switzerland, who had recently started a company (Medinvent) to develop new tools based on the concept of the 'Chinese glove': the longitudinal traction on the glove reduces the diameter of an expandable cylindric mesh, allowing a stronger prehension of the finger, permitting the progressive reduction of fractures (Fig. 1). Releasing the traction enlarges the diameter of the cylindric mesh, releasing then the radial forces. Based on this concept, a self-expandable intravascular coil was manufactured, first with metal wires, then with a polyester fabric. It could be bare, or covered by a silicone or polyurethane lining. S. Gogolewski, a creative polyurethan specialist was associated to the program. Deployment tools, based on the Swiss know-how in fine engineering, were designed and manufactured to permit a percutaneous introduction and the correct deployment of the coil.

My role in this project was: first, to test the feasibility of the technique on glass tube (Fig. 2); second, to evaluate on animal models feasibility and safety of either metallic or synthetic bare or polyurethan-covered expandable coils. The first results were quite satisfactory: ease to implant in large vessels, in a retrograde or anterograde fashion, perfect stability of the coil when deployed in the descending aorta, without major histological changes in the aortic wall, nice and progressive growth of an endothelial cells lining from both extremities, covering progressively the whole metallic or polyester mesh with a shining, living cell layer, persistence of the patency of the small collateral ostia when covered by the bare mesh (Fig. 3). Long-term evaluation of polyurethane-covered mesh implanted in the aorta to treat experimental aneurysms was also carried out (Fig. 4).

After a year of extensive animal studies, the final name of the prosthesis was adopted: not anymore a coil but a stent (after Hans Wallsten’s name?) and a variety of clinical trials designed. In the cardiovascular field, the placement, via a femoral approach, of a covered stent was the ideal non-invasive approach for urgent treatment of acute ruptured aneurysm or acute aortic dissection. The very first case was performed at Henri Mondor’s Hospital, during the spring 1986. Extravascular applications were also started, in urology and GI tract (bile duct, oesophagus) with immediately very promising results. The real market of the new device was, however, the atherosclerotic vessels. I could not see any contraindication for the large vessels stenting: either after a balloon angioplasty, to avoid restenosis or as the sole treatment, to permit a very progressive and atraumatic dilatation.

However, I was quite sceptical and concerned about the implantation of such devices in small diameter vessels like the coronary arteries. There were, in my mind, two problems: acute occlusion of the coronary artery by early thrombosis on the foreign material, late progressive narrowing of the lumen size by intrastent tissue ingrowth. Nevertheless, the first clinical implantation were made in Lausanne, by a young active interventional cardiologist, U. Sigwald, and in Toulouse by a vascular radiologist, Rousseau.

The evaluation of the very first vascular implants was reported, together with the results of the other pilot studies, at the annual meeting of the European Society of Artificial Organs I organized in Avignon, in September 1986 (Fig. 5). It actually confirmed my initial concerns about stenting in small diameter vessels! I had not thought that pharmacological manipulation of the platelet function could turn a catastrophic evolution into an acceptable clinical result! (Table 1).

Every cardiac surgeon knows today the fantastic enthusiasm of the interventional cardiologists in stenting, spreading throughout the world, despite the clear evidence that multiple and repeated stenting in coronary disease does not
Fig. 2. The very first prototype of the stent, being deployed in a glass tube.

Fig. 3. Persistent patency of the tiny intercostal artery ostia covered by a bare metallic stent in a dog model (unpublished personal data, 1984).

Fig. 4. Non-invasive treatment of an experimental aortic aneurysm by a covered stent (dog model, unpublished personal data, 1984).

In Association with the Organising Committee of the E.S.A.O. 1986, Avignon Meeting, we have the pleasure of cordially inviting you to a Special Scientific Session entitled

**INTRAVASCULAR STENTING**

*to be held at*

*9 am to 10 am Friday 19th September 1986 in the*

**GRAND CELLIER BENOIT XII**

Palais des Papes, Avignon

This new technology, pioneered in Europe and currently in clinical trial has already stimulated enormous interest worldwide. Speakers will present their results on animal and clinical experience with coronary and peripheral vessel implants.

This work has never been previously published, so we look forward to sharing a stimulating session in your company.

Fig. 5. Program of the very first meeting on stenting. An 'enormous interest' worldwide was already predicted!
provide revascularization as durable and as complete as does coronary surgery. The concept of a less than perfect, a temporary repair is now, surprisingly widely accepted, a concept surgeons are nevertheless not intellectually ready to accept! As the business of coronary stenting is growing exponentially, surgeons are getting pessimistic about the future for their speciality. They actually should not: if restenosis is, maybe, temporarily controlled by DES, a more prolonged and precise surveillance still shows the real risks of foreign material in tiny vessels: a permanent embolization into the distal vascular bed of micro-emboli transforms a large coronary bed into a narrow one, the normal myocardium into a diffusely sclerosed muscle.

Reminding the real history of the stent business in quite pertinent, at a time where a new technology is appearing: the percutaneous approach in the treatment of valve diseases. Aortic valve stenosis and mitral regurgitation are going to be 'treated' by these techniques. A very innovative technology is progressing rapidly, with very innovative tools, which, soon, will permit, non-invasively, an acceptable functional improvement of the patient. The anatomical result will probably not be as perfect as after a surgical repair and .... a big scar! Nevertheless, because it is non-invasive, most patients will ask for it.

Then, don’t be as afraid as I was 20 years by producing a less than ideal repair and don’t let as I did 20 years ago the cardiologists take over a technique which should have stayed in our hands.

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Table 1
First internal report on the stenting procedures in a multi-disciplinary pilot study in 1987 (n cases)

<table>
<thead>
<tr>
<th>Vascular</th>
<th></th>
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<tbody>
<tr>
<td>Coronary</td>
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<tr>
<td>Peripheral iliac</td>
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<tr>
<td>SFA</td>
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<tr>
<td>Others</td>
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<td>Total peripheral</td>
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<tr>
<td>Non-vascular</td>
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<td>Total non-vascular</td>
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<tr>
<td>Total patients</td>
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</tr>
</tbody>
</table>

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