

Out of joint: Japan must nurture markets for innovative technologies



Derrick Buddles

Japan wants to develop its medtech industry. So how well does it support the technologies in which it already has a stake? If one were to look into the field of joint navigation for an answer, they would find that the response is "Not very well," writes Derrick Buddles, member of the Orthopedic Products' Committee of the American Medical Devices and Diagnostics Manufacturers' Association (AMDD)

Japan is active in the development of joint navigation technology but it lacks a key ingredient for success – a vibrant market for the product,

The country has a proud history of creating and developing technologies to the point of capturing the leadership of entire industries. More recently, the government has been keen to develop healthcare-related industries, producing national strategies every five years or so and supporting research to encourage domestic companies.

However, given the country's expertise in materials and manufacturing and the quality of its healthcare services, there is a large gap between the vigorous medtech industry that might have developed in Japan and the anaemic reality of today. There may be a number of reasons why the domestic industry has fallen short of its potential, but the unwillingness of the authorities to reimburse and thereby create a market for joint navigation may be instructive. Says Prof Nobuhiko Sugano of Osaka University's Department of Orthopaedic Medical Engineering, a prominent joint navigation developer in Japan: "The lack of reimbursement is holding back hospitals from using joint navigation and this means patients are missing out on the benefits, and the technology is not progressing in Japan as fast as it should."

Joint navigation is used by surgeons to assist in hip and knee replacement surgery. The process begins with the creation of an accurate computer model of the patient's joint bones which guides the surgeon in the selection and optimal positioning of the components.

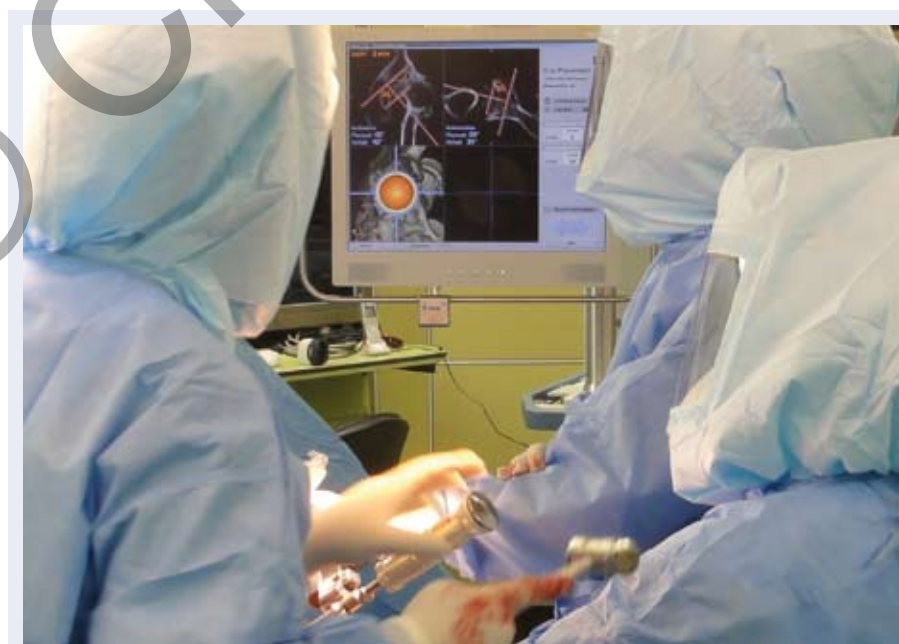
Although this technology is in the early stages of development it is taking off in the US, which has an installed base of 931 joint navigation systems. This compares

with around 100 units in Japan. Because joint navigation usage is not reimbursed in Japan, patients usually pay a so-called "Koudo Senshin Iryou" or "highly advanced medicine" fee out of their own pockets. The amount varies between US\$1,200-2,500, but can be a lot more. This is not the case with other forms of navigation or imaging and is a big hurdle for Japanese patients, accustomed to a universal public healthcare system which reimburses most healthcare-related expenses.

This failure to create a market for

joint navigation not only holds back the patient and other benefits that flow from better joint function and longer lasting implants: it limits the future role of Japanese developers who are playing an important role in pushing joint navigation technology forward.

So while the need to support R&D is well established here, there is also a need to better understand the role that markets play in enabling companies to develop new technologies beyond the laboratory and into products that patients need.



Joint navigation is used to generate an accurate computer model of a patient's joint bones, guiding the surgeon in the selection of component sizes, the precise shape of bone to be cut away and the optimal positioning of implants. These steps lead to three key benefits: optimal range-of-motion of the new joint, improving joint function; lower complication rates; and lower rates of dislocation and mechanical problems, which can shorten implant longevity leading to difficult and expensive revision surgery. Prof Sugano feels "all young surgeons should use joint navigation because of the accuracy of component placement that is achieved." He goes on to explain: "Recent studies have shown high levels of malpositioning of components even by experienced surgeons, which is a leading cause of artificial joint failure."