MACHINING IN ORTHOPAEDICS

Medical products and technologies are contributing more and more to human health, and are promoting mobility and vitality well into old age. Increasing demand and high standards imposed on the quality of medical products characterize the development of a sector which is growing in spite of the economic crisis. Sustained progress in medical engineering regularly places new demands on the machines which are used to manufacture the high-accuracy products.

50 years ago, the idea of implants and artificial joints in surgery was still revolutionary; today it is a fixed part of everyday medicine. Complex fractures are corrected with bone screws and plates, and these days worn hip joints are easy to replace. However, products of appropriate high quality are required for such surgical measures. These not only necessitate the use of superior materials which are usually difficult to machine, but also place the highest demands on precision, surface quality and dimensional accuracy of the medical products.

The example of artificial joints shows that efficient machining can only be carried out on high-performance milling machines. Superior materials such as titanium and chromium-cobalt and also special materials such as zirco-

nium, ceramics and special plastics are reason enough for using modern manufacturing methods such as HSC milling. A similar argument applies to implants, which in traumatology are often only inserted temporarily and removed once the bone has healed. In this case, the highest demands are placed on the surface finish so that the implant does not adhere to the bone.

Experience in CNC technology

Milling technology is one of the elementary machining processes in medical engineering. Above all, full 5-axis machining has proved to be an efficient manufacturing method for implants and other medical engineering components. 5 axis machining center produces even complex parts with efficient flexibility. The same applies to machines with their linear drives for high-dynamic working. And the high-speed horizontal centers also produce medical components and implants in extremely fast times.

High-precision 5-axis milling

HSC milling has a special place in the field of milling technology. Like conventional milling, this is also a chip removal machining process, but high-speed milling is characterized by five to ten times higher cutting and spindle speeds. These high

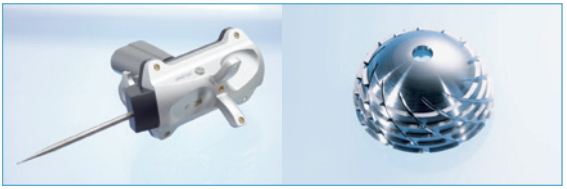
speeds give rise to significantly higher tool stability, which enables precision tools with diameters of less than 0.5 mm to be used.

With this technology for example, medical product manufacturers can generate excellent surface finishes without re-machining, or produce fine filigree structures with high dimensional accuracy. The fast cutting speed also has a positive effect on tool life.

Such characteristics are very important in medical engineering. The increasing demand for medical products and equipment has become a significant economic and competitive factor. Producers must satisfy a continuously increasing demand for quality and, at the same time, make their production processes faster and more flexible. The evaluation of new manufacturing methods such as HSC milling is therefore a crucial subject in medical engineering.

HSC machines fulfill medical engineering requirements and tremendously improve current day-to-day production. They achieve surface qualities of Ra < 0.2 µm; with ultrasonic technology, this value can even be reduced to 0.1 µm. In ultrasonic machining, so-called US chip removal, an additional oscillating motion (up to 30 kHz) is superimposed upon the tool rotation in an axial direction. This enormously reduces the process forces on the workpiece so that both material and tool are conserved compared with other machining processes. This enables the machines to achieve a high quality standard and to operate efficiently thanks to

their remarkable dynamic response. Linear motors with an acceleration of more than 2g and spindle speeds of up to 42,000 rpm ensure that the speed required for manufacturing high-quality medical components can be achieved.



Progress brings growth

The integrated automation solutions from CAD to finished parts with Siemens or Heidenhain controllers also provide competitive advantages, as these enable productivity to be further increased.

Partner

Machine tools, which are production assets that make up the foundation of an industry, are used to manufacture high precision products and components in a diverse range of industries including automobiles, aerospace, construction machinery, electrical appliances, information devices, medical equipment etc. They are continuously evolving to become complex and highly advanced to meet the market demand.

With the alliance between Mori Seiki and Deckel Maho Gildemeister, the range of products with a single source of service and support has significantly increased, enabling to offer the most extensive machine line up in the machine tool industry.

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