If bone cells that are found in a joint beneath a cartilage layer are damaged by trauma, i.e. an injury, they can die. This might lead to release of a bone and cartilage piece from the joint surface, which leaves behind a trough-like recess. This disease entity is called osteochondrosis dissecans, occurs primarily in the knee joint and leads to pain. A promising and proven therapy is transplantation of autologous cartilage-bone tissue, which is also applied in purely cartilage injuries in joints. These injuries also heal spontaneously; however, only fibrous cartilage grows, which is considered less loadable and often restricts the practice of sports or work activities. Because of this, a loadable type of cartilage, so-called hyaline cartilage, is transplanted instead of fibrous cartilage. This is taken from less loaded areas, for example, on the periphery of joint surfaces.

With the Soft Delivery System (SDS™) from Sulzer Medica, cartilage defects in joints (thus so far in the knee, ankle joint and hip) can be treated. Autologous cartilage-bone plugs are transplanted, in which the cartilage during removal and transfer is treated very gently, thanks to the special design of the extractor.

**INSTRUMENTATION FOR TRANSPLANTATION**

The soft delivery system (SDS™) was developed by Professor Roland P. Jakob from Freiburg Cantonal Hospital (Switzerland) in cooperation with Sulzer Medica as a tool for so-called osteochondral transplantation, one of the possible therapies for treatment of cartilage defects (cf. box). Professor Jakob has been treating patients since 1995 with this technique, and during this time SDS™ was developed to the present generation of the instrumentation. The objective was for the instruments to exert the least possible force on the cartilage in all steps of the operation, so that injuries can be avoided. The extractor therefore received a special design. In addition to the extractor, SDS™ also consists of a bone plug and an instrument for automatic depth adjustment (Fig. 1*). This guarantees that the reconstructed joint surface is regular and all plugs are evenly loaded. Because of this, essentially physiological force transfer between the joint surface and its counterpart is again possi-
ble. The hollow reamer is used to predrill the cartilage-bone plug before it is pulled out by the extractor. In the step-by-step surgical technique, the hole in the defect is first prepared with a specified tool size. The transplant is then taken with the next larger tool and inserted into the prepared hole. The special design of the extractor permits gentle treatment of the cartilage-bone plug: the extractor can be swung out slightly lengthwise during introduction of a plunger (Fig. 2a), so that the force required to pull out the plug is strongly reduced in comparison with the conventional closed cannulas.

**CHANCES OF HEALING ARE VERY GOOD**

After treatment of cartilage defects with the osteochondral transplantation, 90–95% of patients are pain-free. Even at the site where the cartilage-bone plug was removed, pathological changes of the tissue occur very rarely. With reference to data collection from the first 40 cases of Professor Jakob with more than one year of follow-up, most of the patients said that the treated knee joint had regained most of its overall function.

**OSTEOCHONDRAL TRANSPLANTATION**

If a cartilage fragment of more than 1 cm diameter must be replaced, the so-called osteochondral transplantation can be used. Defective cartilage and bone material is then punched out or drilled out and replaced by autologous hyaline cartilage in the form of a cartilage-bone plug. These have greater diameter than the implantation sites at the defective cartilage; the press-fit produced by this permits rapid growing-in of the transplant. The plaster-like structure at the location of the defect leaves gaps because of the round shapes of the plug. These make up about 20–30% of the surface and are filled within a half-year with fibrous cartilage and connective tissue. Osteochondral transplantation is a technically demanding operation that was introduced about 15 years ago in Japan.

The cartilage-bone plugs are taken, for example, from the peripheral of the femoral trochlea (joint pivot of the femur) and arranged plaster-like at the site of the defect, so that they cover as much area as possible.

**FOR MORE DETAILS**

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