Vitrectomy-Instrumentation-System MS 7 *

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Summary. An instrumentation-system (MS 7) for open-sky- as well as for pars-plana-vitrectomy is described. The intraocular canula is equipped with a special rotating cutting device. Suction is generated by a suction-pump in the power supply unit. Intraocular illumination is obtained by a detachable light pipe on the vitrectomy-canula or—for the bimanual technique—by a special hand-piece with infusion and fiber optic illumination. The infusion-canula in the hand-piece can be replaced by a micro-scissor with infusion-channel. Despite the motor the whole system can be easy cleaned and sterilized.


Vitreous contains a three-dimensional meshwork of protein fibers with hyaluronic acid and water lying between them. When removing normal as well as pathologically changed vitreous these protein structures have to be cut. One possibility to do this is to suck vitreous at a sponge and to cut it with a scissor (Kasner, 1968). This procedure requires a large corneal incision and removal of the lens to get an approach to the vitreous cavity. Not liquefied vitreous only can be sucked through a canula when special cutting devices are built in the tip of this canula. The first suction-and cutting canula which has been used clinically was published by Machemer (1972). Now a pars-plana-approach—leaving the anterior segment untouched—was possible.

Since then pars-plana-vitrectomy has developed to a rather complex and sophisticated procedure by means of the technical effort. Not only the problem of removing the vitreous by a reliable suction-and-cutting device but also replacing of the sucked off volume had to be solved. Additionally improvement of illumination and observation was necessary. Finally the cutting of vitreous strands or membranes of varying strength required the development of different instruments to apply interchangable techniques during a vitrectomy.

The vitrectomy-instrumentation-system MS 7 consists of the vitrectomy instrument (vitreophage), several auxiliary devices, e.g. for the bimanual technique, and the power-supply-unit. The three main functions (suction, cutting and in-
fusion) can be started and stopped at the “vitreophage” by the surgeon himself, the adjustment has to be done by an assistant at the power-supply-unit. In the following the instrumentation-system and the single functions shall be described.

**Cutting Mechanism**

The “vitreophage MS 7” has a rotating cutting system with conical bearing of the cutting edges. In order to get only a linear contact of these edges with the bearing they have a special shape. Thus a reliable cutting function could be obtained. The suction hole in the tip of the canula never is closed completely therefore the suction is nearly continuous (Fig. 1).

The spring-loaded cutting mechanism is driven by a micromotor which is built in the handpiece. The rate of rotation can be changed continuously between 3 and 20/sec by modifying the current for the motor. Power-supply for the motor, adjusting device for the rate of rotation and amperemeter are built in the power-supply-unit. The handpiece contains the motor and a completely sealed on—off switch (Fig. 2).

The motor is enclosed in a tight case from which it can be removed easily for it is not sterilisable. In this case also the spring-load for the cutting mechanism is built in. Turning the motor-housing also the canula, which is linked in, turns. Thus the hole in the tip of the canula can be brought in each direction without changing the position of the surgeon's hand.