

MEDOS VAD SYSTEM



*Ventricular Assist Device
for infants, children and adults*

MEDOS VAD VENTRICLE



The MEDOS VAD ventricle is the result of the unique combination of computer-aided design, flow-simulations and extensive in vitro / in vivo tests:

- ▶ Transparency of the whole pump
- ▶ Excellent wash out
- ▶ Fluidodynamically optimized 3-leaflet Polyurethane valves
- ▶ Biocompatible surfaces
- ▶ Pump sizing concept
 - Ensures the applicability for individual patient requirements
 - Volume reduction of 10 % for the RVAD-Ventricle to avoid a volume displacement into the pulmonary circuit

Stroke Volume (ml)	Cardiac Output at 100 BPM
LVAD (80)	8,0
RVAD (72)	7,2
LVAD (60)	6,0
RVAD (54)	5,4
LVAD (25)	2,5
RVAD (22,5)	2,25
LVAD (10)	1,0
RVAD (9)	0,9



MEDOS VAD DRIVING SYSTEM



The MEDOS Driving System, which was specially developed for the MEDOS Ventricle, is exemplary for functionality and userfriendliness.

Functionality

- ▶ A mobile driver for all ventricle sizes from 9 cc to 80 cc
- ▶ Designed for left-, right and biventricular operation
- ▶ Operation by main - and wall supply or internal compressor and battery
- ▶ A comprehensive safety and alarm system protects the user against malfunction and faults



Userfriendliness

- ▶ Simple user guidance by touch screen monitor
- ▶ Multilingual dialogue system
- ▶ Simplified operation by self explaining monitor screens
- ▶ A rapid setting in period, therefore optimal usage of all system possibilities
- ▶ Optional ECG-Trigging with different modi: 1:1, 1:2 and 1:3



MEDOS VAD CANNULAE



- ▶ All venous cannulae have a malleable distal section which allows an optimal adaption to the anatomical circumstances

Connection	Diameter
1/4"	14Fr./18Fr./24Fr.
3/8"	24Fr./32Fr./36Fr.
1/2"	36Fr./40Fr./50Fr.

- ▶ The distal part of the arterial cannulae consists of a flexible graft, which length can be shortened individually. The graft coating minimizes puncture channel bleeding

Connection	Diameter
1/4"	4 mm / 6 mm
3/8"	6 mm / 8 mm
1/2"	10 mm / 13 mm

- ▶ Additional cannulae types
 - Venous transmitral cannula, 50 Fr. with a 1/2" Connector
 - 15 mm Apex cannula with a preshaped distal part (135°)
 - Further cannulae - types available on individual request



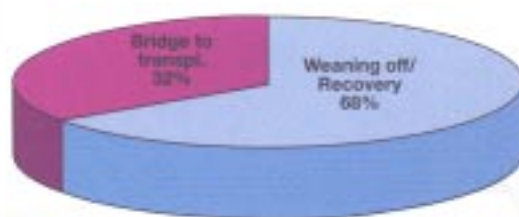
MEDOS VAD-SYSTEM - the Leading System for Cardiac Assist

► Used in 66 Centres

Due to the excellent results and the efficiency the MEDOS VAD shows an annually increasing application-rate of approx. 45%.

► Indications

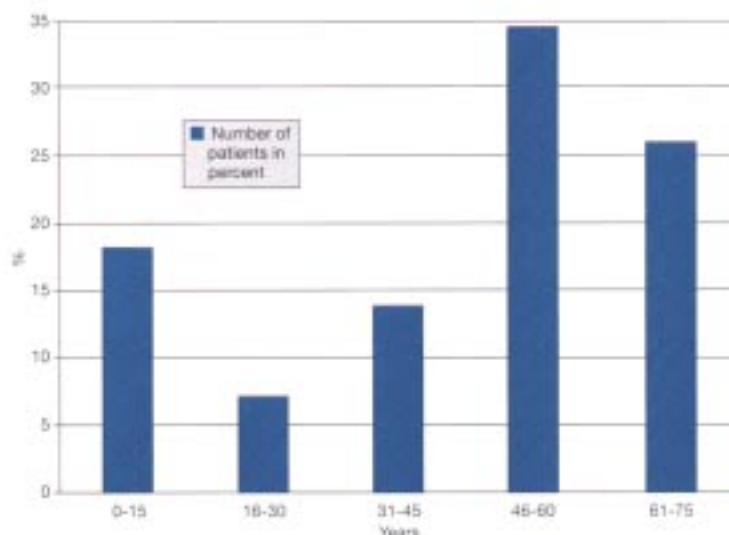
Bridge to transplant
Weaning off / Recovery



► Patients range

Age: From 4 days to 76 years
Weight: From 3,1 kg to 135 kg

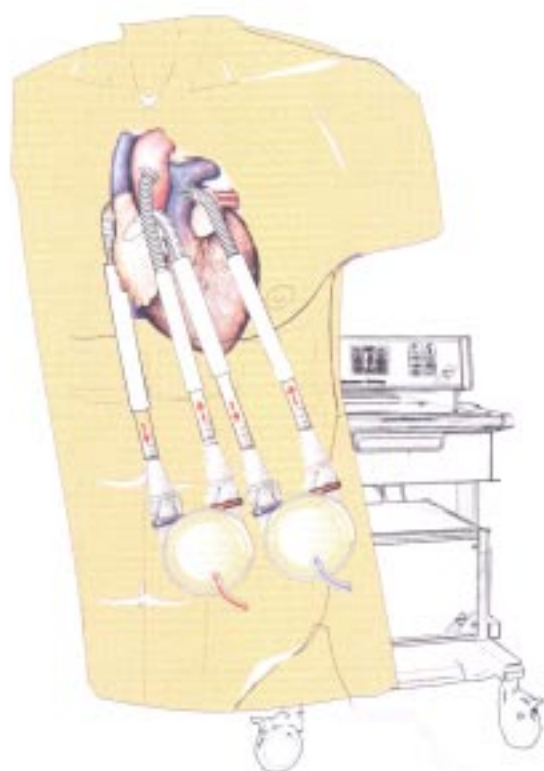
Distribution of the patient ages



The MEDOS VAD-System is a mechanical Heart Assist Device which can be equally used for newborn, children and adults.

The MEDOS VAD-System is designed for left-, right- and biventricular application

The MEDOS VAD-System is a pneumatically driven system, applicable in a very userfriendly way by a touch screen monitor.



► Pediatric Clinical Experience

„Mechanical circulatory support in children with a dilated aorta with the use of new paediatric-sized pneumatic pumps“ Michael Hayward et al. *J Thorac Cardiovasc Surg* 1997; 114: 522-527

„Clinical experience with the MEDOS HIA VAD system in infants and children: a preliminary report“ Wangping Kuwano, et al. *Ann Thorac Surg* 1997; 62: 1128-1134.

„Klinische Erfahrung mit Herzpumpen- und Kreislaufhilfen“ W. Kuwano et al. *Kardiologie* 1997; 3: 24-31

„Klinische Erfahrung mit dem MEDOS HIA VAD System bei Säuglingen und Kindern“ Erich Kern et al. *Erkrankungen Säuglinge et al.* Internist 8 1998

► Adult Clinical Experience

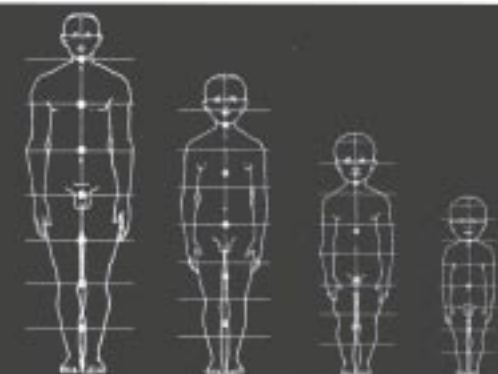
„Resuscitation of the brain in a child: effects on selection of the anaesthetic agent“ J. Wang (in)

► Research and Development

„Entwicklung und Herstellung von Herzpumpen mit kunststoffmechanischer Applikation“ B. Kasper et al. *Kardiologie* 1996; 30: 12-1300-1294

„Herzunterstützung durch die HIA VAD System einer Säuglings“ B. Kasper et al. *Kardiologie* 1996; 30: 428-434

„Evaluation of a Pumped for Adult Experience with the Heartbeat Left Ventricular Assist Device“ O. Reichert et al. *Ann Thorac Surg* 1998; 66: 122-129



„Mechanical circulatory support in children“ Wangping Kuwano, et al. *J. Arch. Organs* 1997; 60: 507-510

„Mechanical circulatory assist in pediatric patient“ Wolfgang Kuwano, et al. *J. Arch. Organs* 1997; 33: 587-590

„MEDOS HIA VAD System: first experience with mechanical circulatory assist in infants and children“ Wangping Kuwano et al. *J. Arch. Organs* 1997; 33: 588-594

„Pathophysiological consequences concerning the end organ during mechanical cardiac assist“ Franz-Joachim Walzberger, et al. *J. Arch. Organs* 1997; 33: 604-607

„Experience with the VAD and transvenous ECMO circulatory support in pediatric patients“ Andrej Russek et al. *Int. J. Art. Organs* 1997; 20: 895-900

„In vivo animal experiments in pediatric mechanical circulatory support for bridge to transplant and mechanical recovery“ Sabine Dittler et al. *Mechanical circulatory support*, Springer 1999, 198-213

„Evaluation of a Novel Pediatric Right Ventricular Assist Device in a Right Heart Failure Model“ Dariusz Szpak, et al. and H. A. Cramer et al. *OTA Annual Meeting Abstract* 1997

„Pediatric Circulatory Support: Resuscitation“ Subroto Ghosh et al. *J. Heart Lung Transp.* 1998; 15: 287-296

„Support of the brain in a child“ Wangping Kuwano et al. *Ann Thorac Surg* 1996; 62: 98-102

„First clinical application of the Medos, first ventricular support system: monitoring of the pump pressure for safety of the pump for the recipient“ J. Wang et al. *Artif. Organs* 1996; 20: 291-296

„First pediatric experience with left ventricular assist device“ Wangping Kuwano, et al. *Int. J. Art. Organs* 1997; 20: 175-182

„Clinical experience with the MEDOS VAD device“ Bernd Stobatz, *Cardiovasc Eng* 1997; 2: 16-18

„First use of total artificial heart for emergency of left ventricular failure“ Martin Hentsch, *Support et al. Int. J. Artif. Organs* 1997; 20: 213-220

„Resuscitation of a child with ventricular pressure“ Franz-Joachim Walzberger, et al. *J. Arch. Organs* 1997; 60: 234

„First use of ventricular mechanical circulatory support“ Franz-Joachim Walzberger, et al. *J. Arch. Organs* 1998; 65: 87-90

„Anwendung von Herzpumpen zur Unterstützung des Kreislaufes bei Implantation einer assistierten Zirkulation bei zwei MEDOS HIA VAD Systemen“ Gert G. Gumpert et al. *Artif. Organs* 1997; 21: 207-210

„First experience of the HIA VAD Pump in Animal Experiments“ Hoff Eckert et al. *Artif. Organs* 1996; 20: 513-518

„Comparison with adult left ventricular assist device and first ventricular left ventricular assist device“ Wangping Kuwano, et al. *Artif. Organs* 1996; 20: 519-524

„Comparative evaluation of peak and residual flow in left ventricular assist device“ Hoff Eckert et al. *Artif. Organs* 1996; 20: 527-530

„CAD - design, implantation and in vivo evaluation of ventricular assist device“ Wangping Kuwano, et al. *Artif. Organs* 1996; 20: 577-580

„Artificial heart and use of device“ Wangping Kuwano, et al. *Artif. Organs* 1996; 20: 581-584

„In vivo Evaluation of the HIA VAD System with Ventricular Assist Device“ Wangping Kuwano, et al. *Artif. Organs* 1996; 20: 585-588

„Blood interaction with a device flow in ventricular assist device“ Wangping Kuwano, et al. *Artif. Organs* 1997; 21: 207-210

„Left Ventricular Assist Device with a New Pediatric Assist HIA VAD System and its Influence on Myocardial Priming“ G. G. Gumpert et al. *Thorac Cardiovasc Surg* 97; 1999; 47: 219

Product- and Performance Spectrum

- Ventricular Assist Device
- Perfusion Systems
- Oxygenators
- Reservoirs and Filters
- Holders
- Custom-tubing-packs
- Cannulae
- Instruments
- Blood Pressure Monitoring Set
- Perfusion Service
- Heart Valves



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