Martin Nd:YAG MY 40 1.3
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Features and benefits of the unit

- Very small and compact laser, highly mobile;
- „On-line-power-control“: automatic control and regulation of the power;
- Separability of laser head and supply unit;
- Microprocessor controlled; Error code system;
- Easy and fast replacement of the crypton bulb;
Biophysical properties

- **LASER medium:** a quartz cylinder consisting of **Neodymium:Yttrium-Aluminum-Garnet**
- **Wavelength:** 1318 nm, infrared, invisible
  - Absorption in water: 10 x higher than 1064-nm-Laser
- **Absorption in blood:** one third of 1064-nm laser
- **Lower absorption in pigments**
- **Less scattering in tissue**
- **Better conversion of energy into heat**

**Ideal biophysical parameters for lung parenchyma surgery:** *cutting - coagulating - sealing*
Absorption spectrum of water

- Nd:YAG (1.064 μm, 1.318 μm)
- Er:YAG (2.92 μm, ~10^3)
- Ho:YAG (2.1 μm, Ho:10^2)
- CO_2 (10.6 μm)

MY60 and MY40 regions highlighted.
Laser parameters and tissue determinants

Laser parameters:
- Power
- Energy
- Exposure time
- Wavelength

Focus: 0.6 mm

Power density

Tissue determinants:
- Absorption
- Scatter
- Reflection
- Density 0.15-0.7 g/cm²
- Heat conductivity
- Heat capacity

Water content: 80%
- ø alv.: approx. 0.2 mm
- ø small art.: 0.1 mm
- ø capill.: 0.01 mm

Perfusion
Impact on tissue

1064 nm
30 watts, 1 s

1318 nm
15 watts, 1 s
Impact on tissue

- Coagulation zone
- Vaporization zone
- Marginal hyperemic zone
Martin Nd:YAG MY 40 1.3

Fields of clinical application

- Open Thoraxic Surgery
- Thoracoscopic Surgery
- Endo-bronchial ISurgery

MY 40 1.3
Clinical indications and accessories

Clinical applications in open parenchyma surgery in “non-contact“ mode using the focusing handpiece

- Lobar bridge dissection
- Air vesicle (alveoli) resection
- Open pulmonary biopsies
- Removal of benign tumors
- Bronchial carcinoma operations
- Metastatic surgery

Surgical techniques used:
Enucleation, wedge resection, lobectomy, typical and atypical segmental resections, bisegmentectomy, and a combination of any of these procedures
Benefits in metastatic surgery:

Removal of a large number of metastases (>150) possible, from rice-grain to tennis-ball size.

Deep-seated metastases and tumors can also be excised while preserving the segment or lobe.

Flexible but mechanically strong coagulation zones allow for visceral pleura suture for double safety.

Hemorrhage-free and fistula-tight resection surfaces.

Operation can be repeated in the event of recurrences.

Significantly longer life expectancies while the patient's quality of life remains almost unaffected.
Clinical indications and accessories

Application accessories 1:

- Focusing handpiece with lenses (30mm, 50mm),
- front sleeves and reusable 400-µm optical fiber
Clinical indications and accessories
Clinical indications and accessories
Clinical indications and accessories

Thoracoscopic applications using quartz fibers and irrigated fibers / VATS – video assisted thoracoscopic surgery:

- **Pulmonary alveoli removal and thermal pleurectomies in cases of spontaneous pneumothorax**
- **Pulmonary alveoli removal in pulmonary emphysema**
- **General hemostasis and fistula sealing**
- **Removal and enucleation of pleuropulmonary nodules (malignant and benign tumors)**
- **Partial resection of lung tissue**
- **Recurring pneumothorax**
- **Adhesiotomy / hemostasis / pleural sealing**
- **Pleurodesis (various causes)**
Martin Nd:YAG MY 40 1.3

Clinical indications and accessories

Endobronchial applications using quartz fibers and irrigated fibers

- Tumor removal
- Stenosis removal
- Vaporization of pathologic tissue
- Hemostasis
Clinical indications and accessories

Application accessories 2:

Irrigated fiber

Quartz fiber
Economic aspects of MY 40 1.3 use compared with other techniques:

- **Savings with regard to expensive consumables such as staplers and fibrin glues**

- **Extended, multidisciplinary application: more patients can be treated due to extended indications (open surgical, thoracoscopic and endobronchial applications)**

- **Treatability of patients who would have to be categorized as “inoperable” without the MY 40 1.3**

- **Use of innovative technology and techniques improves the hospital’s reputation**
Statistics on cancer diseases (Germany)

- 20–25% of all diseases are cancerous diseases – approx. 350,000 new cases per year
- 30% of all cancers lead to the development of pulmonary and other metastases – approx. 115,000 cases per year
- 20% of these – 23,000 cases per year – develop only pulmonary metastases and are therefore eligible for metastatic surgery according to the Rolle technique using the MY 40 1.3

Sources: Robert Koch Institute, 1998; Federal Ministry of Health, 1998
Thank you very much!