Patent claims

1. A method for calibrating a light source (104) of a medical device (102), wherein the light source (104) is connectable to at least one light-guiding fiber (112) such that electromagnetic radiation of a defined light power that is generated by the light source (104) is at least partly coupled into the light-guiding fiber (112), wherein the medical device (102) is connected to at least one calibration port (108), wherein the calibration port (108) comprises sensor means for determining a spatial emission characteristic of a light-guiding fiber (112) introduced into the calibration port (108), wherein the method comprises the following steps:

a) connecting the light-guiding fiber (112) to the light source (104),

b) inserting a positioning device (110) for the light-guiding fiber (112) into the calibration port (108), wherein the positioning device (110) comprises a receiving channel for receiving the light-guiding fiber (112) and also at least one emission opening, wherein the at least one emission opening enables the transmission of a light power coupled out of the light-guiding fiber (112) in at least one defined spatial direction,

c) introducing the light-guiding fiber (112) into the receiving channel of the positioning device (110),

d) coupling electromagnetic radiation of a defined light power into the light-guiding fiber (112),

e) determining the spatial emission characteristic of the light power coupled out of the light-guiding fiber (112) in the region of the calibration port (108) as an actual emission characteristic,

f) determining a desired emission characteristic of the light power coupled out of the light-guiding fiber (112) in the region of the calibration port (108) for the light power coupled into the light-guiding fiber (112) by means of the sensor means,

g) comparing the determined actual emission characteristic with the determined desired emission characteristic,

h) if the actual emission characteristic corresponds to the desired emission characteristic, releasing the light-guiding fiber (112) for further use, and

i) if the actual emission characteristic does not correspond to the desired emission characteristic, outputting an error message.

characterized in that the sensor means comprise at least one lateral photodiode (114) arranged laterally at the calibration port (108), and also at least one frontal photodiode (114) arranged at a longitudinal end of the calibration port (108),

wherein determining the actual emission characteristic comprises determining the respective photocurrent generated in the photodiodes (114) by the light power coupled out from the light-guiding fiber (112), and

wherein comparing the determined actual emission characteristic with the determined desired emission characteristic comprises comparing the determined photocurrents with photocurrents contained in the desired emission characteristic for the respective photodiodes (114).

2. The method as claimed in claim 1, characterized in that a light-guiding fiber (112) is a fiber (112) of a first fiber type or of a second fiber type, wherein the first fiber type is configured to emit electromagnetic radiation coupled into the light-guiding fiber (112) in the longitudinal direction of the fiber (112), and wherein the second fiber type is configured to emit electromagnetic radiation coupled into the light-guiding fiber (112) transversely with respect to the longitudinal direction of the fiber (112) over a defined length of the fiber (112), wherein the method furthermore comprises determining the fiber type used, wherein the determination of the desired emission characteristic takes account of the determined fiber type.

3. The method as claimed in claim 2, characterized in that determining the fiber type used comprises a user input.

4. The method as claimed in claim 1, characterized in that the method furthermore includes determining the defined light power to be coupled into the light-guiding fiber (112) on the basis of the fiber type connected to the light source (104).

5. The method as claimed in claim 1, characterized in that if the ratios of the photocurrents of the actual emission characteristic correspond to the ratios of the photocurrents of the desired emission characteristic, but the photocurrents of the actual emission characteristic are lower than the corresponding photocurrents of the desired emission characteristic, the error message indicates a defect of the light-guiding fiber (112) and/or

of the coupling between the light-guiding fiber (112) and the light source (104) and/or a defective emissive area of the light-guiding fiber (112).

6. The method as claimed in claim 1, characterized in that the medical device (102) comprises at least two light sources (104), which are in each case connectable to a light-guiding fiber (112) such that electromagnetic radiation generated by the light sources (104) is in each case at least partly coupled into the light-guiding fiber (112) connected to a light source (104), wherein at least method steps a) and c) to i) are carried out individually for the light-guiding fibers (112) connected to the light sources (104).

7. The method as claimed in any of the preceding claims, characterized in that after the release of a fiber (112), the light source (104) connected to the fiber (112) couples light having a wavelength of between 350 nm and 850 nm into the fiber (112) for a defined time period.

8. A medical device (102) comprising at least one light source (104), wherein the light source (104) is connectable to at least one light-guiding fiber (112) such that electromagnetic radiation of a defined light power that is generated by the light source (104) is at least partly coupled into the light-guiding fiber (112), wherein the medical device (102) is connected to at least one calibration port (108), wherein the calibration port (108) comprises sensor means for determining a spatial emission characteristic of a light-guiding fiber (112) introduced into the calibration port (108), wherein the device (102) is configured:

- to couple electromagnetic radiation of a defined light power into a light-guiding fiber (112) connected to the device (102) and positioned in the calibration port (108),
- to determine the spatial emission characteristic of the light power coupled out of the light-guiding fiber (112) in the region of the calibration port (108) as an actual emission characteristic,
- to determine a desired emission characteristic of the light power coupled out of the light-guiding fiber (112) in the region of the calibration port (108) for the light power coupled into the light-guiding fiber (112),
- to compare the determined actual emission characteristic with the determined desired emission characteristic,

- if the actual emission characteristic corresponds to the desired emission characteristic, to release the light-guiding fiber (112) for use, and
- if the actual emission characteristic does not correspond to the desired emission characteristic, to output an error message.

characterized in that the sensor means comprise at least one lateral photodiode (114) arranged laterally at the calibration port (108), and also at least one frontal photodiode (114) arranged at a longitudinal end of the calibration port (108),

wherein the device (102) for determining the actual emission characteristic is configured to determine the respective photocurrent generated in the photodiodes (114) by the light power coupled out from the light-guiding fiber (112), and

wherein the device (102) for comparing the determined actual emission characteristic with the determined desired emission characteristic is configured to compare the determined photocurrents with photocurrents contained in the desired emission characteristic for the respective photodiodes (114).