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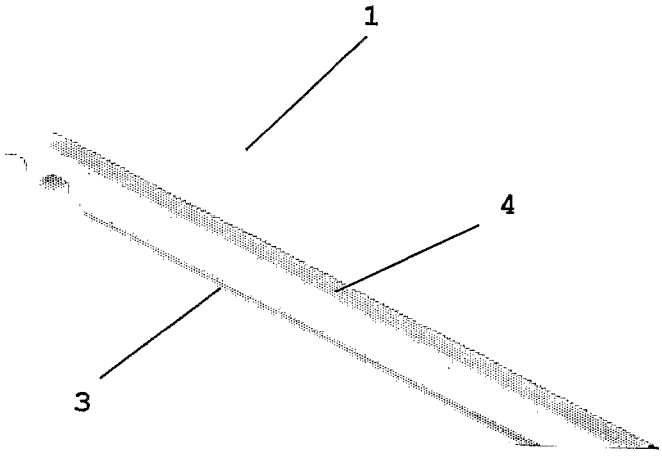
(54) **Title:** LIGHT GUIDED LIPOSUCTION APPARATUS



(57) **Abstract:** The present invention refers to an apparatus for liposuction procedures related to aesthetical/correction surgeries in which a optical fiber light emission provides a depth guide when a liposuction procedure is accomplished.

WO 2007/095703 A2

LIGHT GUIDED LIPOSUCTION APPARATUS

The present invention refers to an apparatus for liposuction procedures related to aesthetical/correction surgeries in which a optical fiber light emission provides a depth guide when a liposuction procedure is accomplished.

BACKGROUND OF THE INVENTION

Aesthetical surgeries, particularly liposuction procedures, in general comprise an invasive procedure in which a puncture instrument is introduced in under the skin and above the muscle. A hollow device coupled to a void pump is the responsible for fat suction outside the Human body.

Severe puncture injuries are problems related to the liposuction procedure. Some liposuction procedures cause damage to the muscle, veins, and nerves, because there is no safe depth control of the liposuction apparatus penetration. Therefore the first limitation of the liposuction art is that the procedure is very health risky.

Other limitation - related to the liposuction procedures of the art - comprise the cost for insurance. Aesthetical surgeries are very expensive, even in necessary case such as obesity reduction, because the risk of the procedure. Surgeons have to work conditioned to a health risk insurance which rises to prohibitive levels when a liposuction operation is involved. Therefore a more safe procedure leads to lower cost for patients, Medical Institutions, Surgeons and Insurance Agents.

In the art some teachings related to liposuction apparatuses are found, for example:

The patent document US2003105422 refers to a liposuction apparatus (1) comprising in combination a tubular canula (3) having at its distal extremity (18) one or more suction orifices (24) and connected at its proximate extremity (19) to a suction source (14) in communication with these orifices, and a hand piece (2) delivering a spray of working liquid (4) under pressure. The hand piece delivers the spray of liquid under pressure using a conduit opening into an ejection orifice which, when the canula is attached to the hand piece, is located opposite an ejection orifice in the canula located at its distal extremity. A liposuction method using the apparatus is also taught. This invention is of interest to manufacturers and users of surgical equipment.

In spite of the effective configuration of liposuction apparatus no depth guide or other injury prevention device is provided.

The patent document DE10159424 a canula tip (2) which is solid or filled with a packing material instead of being hollow. No injury prevention device and/or condition is provided.

The patent document FR2627087 refers to The piston 1 contains a rigidification and locking bar 15 carrying a precontoured flexible blade 17 whose end 18 returns towards the bar. This end abuts against the syringe body 2. The canula 3 carries a flange 9 intended to bear against the

inner face of the cover 4 of the syringe body, an end thread 20 receiving a locking button 21.

The above discussed patent documents and in the art, no injury prevention device and/or apparatus configuration has been provide in order to minimize health risk for patients, to lower the insurance cost related to aesthetical surgeries, particularly, liposuction procedures.

OBJECTIVES OF THE PRESENT INVENTION

Therefore, is an objective of the present invention to provide a liposuction canula for safe and injury preventing surgeries wherein the under skin fat layers (deep and surface fat layers) can be identified by light intensity difference.

Other objective of the present invention is to provide a liposuction apparatus for a safe liposuction procedure, for avoid injuries such as abdominal puncture and abdominal cavity organs injury. The liposuction apparatus of the present invention permits that important tissues and organs can be identified by light intensity difference.

DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a liposuction apparatus of the present invention in which a light emission source is provided;

Figure 2 illustrates a schematic view of the liposuction apparatus and a representative Human torso wherein the liposuction apparatus is positioned outside the Human torso and is defining a high intensity condition;

Figure 3 illustrates a schematic view of the liposuction apparatus and a representative Human torso wherein the liposuction apparatus is positioned under the skin and being inserted in a superficial fat layer defining a lower intensity light condition;

Figure 4 illustrates a schematic view of the liposuction apparatus and the representative Human torso wherein the liposuction apparatus is positioned under the skin and being inserted in a deep fat layer defining a lowest light intensity;

Figure 5 illustrates a schematic view of the liposuction apparatus and the representative Human torso wherein the liposuction apparatus is positioned under the skin and being inserted in the abdominal muscle beam defining a no light emission condition;

Figure 6 illustrates a schematic view of the liposuction apparatus and the representative Human torso wherein the liposuction apparatus is positioned under the skin and being inserted in the ribs bone system defining other no light emission condition; and

Figure 7 illustrates the controller wherein a light intensity regulator is provided.

DESCRIPTION OF THE INVENTION

According to the Figure 1, the liposuction apparatus comprises a suction means (1) and a controller (2). The suction means (1) has a canula (3) coupled to a light emission source (4). Therefore the edge of the light

emission source (4) matches the edge of the canula (3) indicating the position of the canula edge.

The controller (2), in the Figure 7, comprises a switching means (5), a display (6), a first led control (7), a second led control (8), a intensity led (9), and a liposuction condition indicator (10). The suction means (1) and the controller (2) are connected by means of known techniques in the art.

As seen in Figures 2 to 6, the liposuction apparatus is shown from an initial step to a final step just for disclose the operation of the invention apparatus.

In Figure 2 the liposuction apparatus is ready to be inserted in the fat layer under the skin. In this condition the light intensity level of the liposuction apparatus shows its maximum intensity. As deep as the liposuction apparatus is inserted the intensity level is gradually reduced up to reach a no light emission condition indicating that the insertion is to be stopped. The no light emission condition is detected prior an organ/tissue injury is caused, providing a safe liposuction procedure.

For superficial fat layers under the skin the liposuction apparatus is able to provide a light emission having a detectable light intensity; for deep fat layers the intensity is still detectable but the light signal is reduced. For compensate this light reduction, the controller (2) can provide a light monitoring associated to the suction means (1) penetration and inform the insertion limit prior an injury is to be caused.

The optical fiber cable permits that a laser type light be conducted from the controller (2) to the edge of the suction means (1), therefore, a depth control can be performed from the controller (2) in the cases where the light emission is not eye detected easily. This provides a safe double control, *i.e.*, eye detected control and instrument control.

The present invention has been disclosed in terms of its particular embodiment, but certain variations and/or modifications will be considered obvious to a skilled person. Such variations and/or modifications are included in the scope as claimed below.

CLAIMS:

1-Liposuction apparatus comprising a suction means (1) and a controller (2); the suction means (1) has a canula (3) coupled to a light emission source (4); the controller (2) comprises a switching means (5), a display (6), a first led control (7), a second led control (8), a intensity led (9), and a liposuction condition indicator (10).

2-Liposuction apparatus, according to claim 1, wherein the edge of the light emission source (4) matches the edge of the canula (3) indicating the position of the canula edge.

3-Liposuction apparatus, according to claim 1, wherein the light emission intensity defines a depth control condition of the suction means (2).

4-Liposuction apparatus, according to claim 1, wherein the switching means (5), a display (6), a first led control (7), a second led control (8), a intensity led (9), and a liposuction condition indicator (10) define a instrument depth control condition.

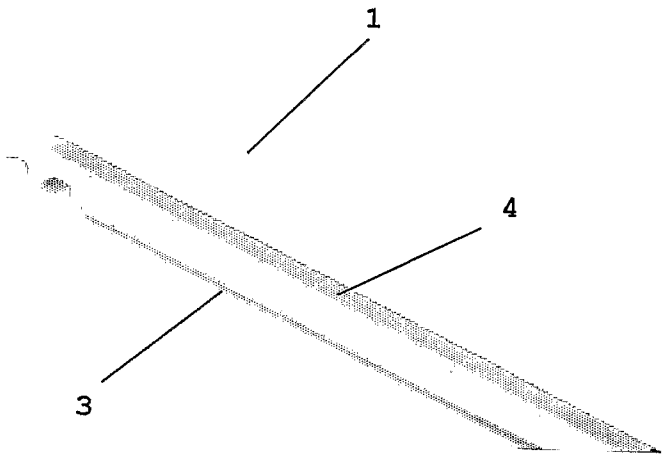


FIG. 1

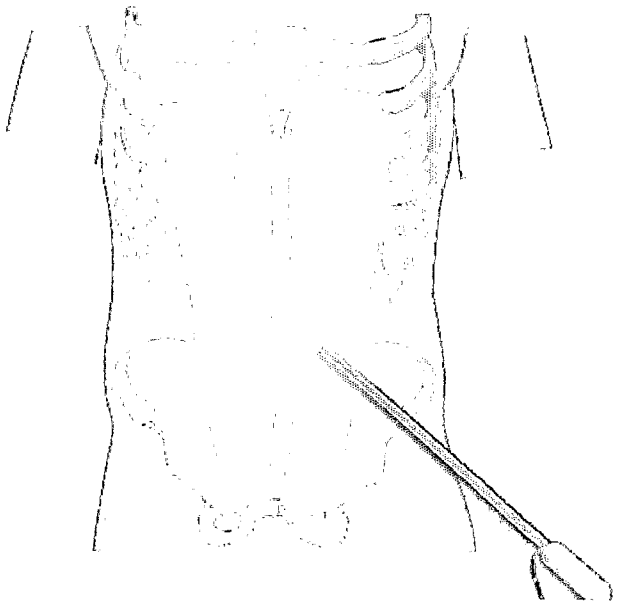


FIG. 2

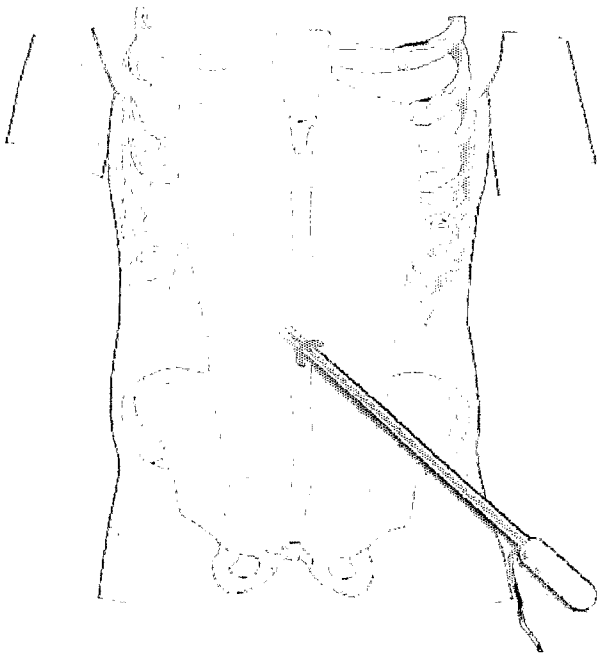


FIG. 3

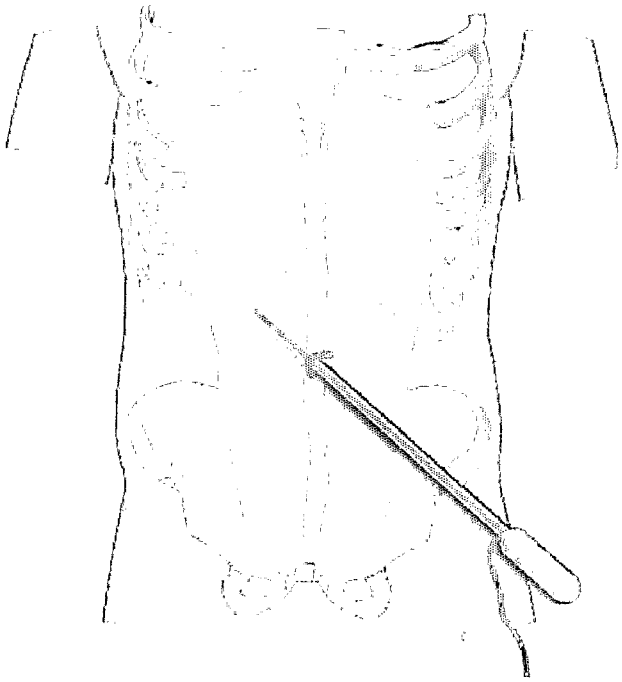


FIG. 4

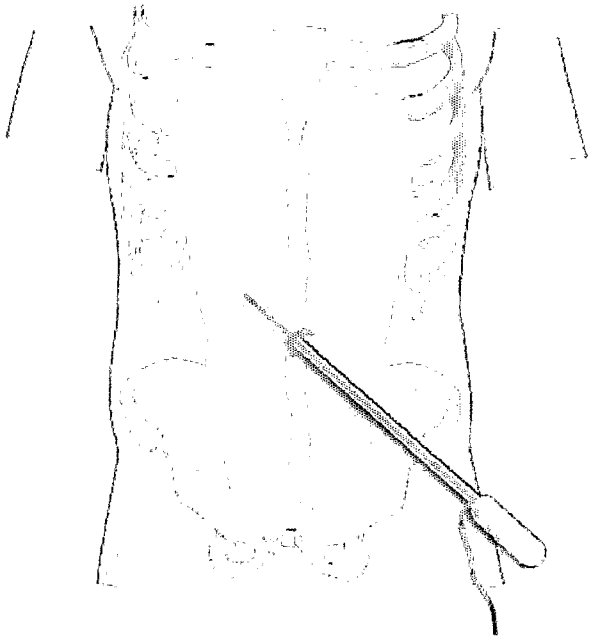


FIG. 5

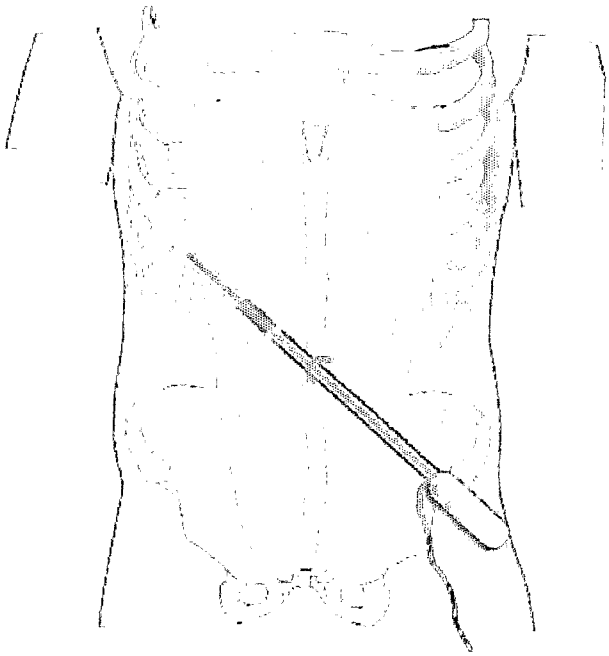


FIG. 6

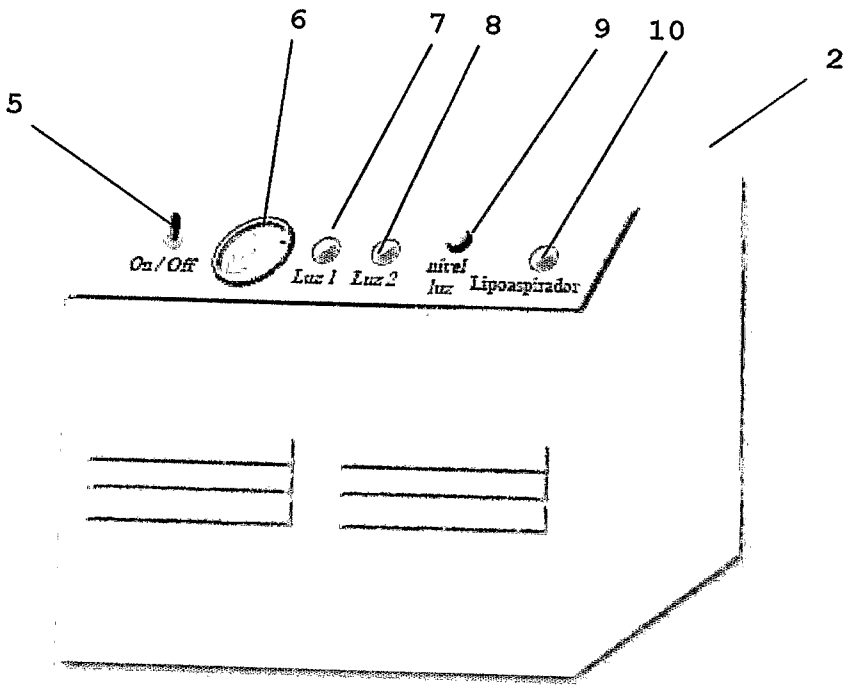


FIG. 7