Beyond liposuction – the new human med AG

With last year’s takeover of human med AG we have fundamentally changed the course of the company. Today our goal, as the former manufacturer and marketer of a liposuction machine, is to establish water-jet technology in various medical disciplines and fields of application. Our current work focuses on the realisation of new product ideas.

Human med has a long tradition in water-jet surgery. We have been able to establish ourselves in this field by offering an innovative solution that holds obvious benefits for both the doctor and the patient. These benefits are always based on the advantages offered by water as a more intelligent and physiological approach to separating tissues. Water does not cut. It pushes apart sheets of cells at their weakest point. This allows the operator to separate various types of tissues or “cut” along lines of differing tissue densities. The operator is able to follow the existing anatomical structures.

In liposuction the fan-shaped water-jet has another advantageous effect. It infiltrates the surrounding fatty tissue, transforming it into a gelatinous state. This tissue can then be suctioned off more effectively and in a manner that is less stressful for the patient than conventional procedures.

Together with our users we have now assessed several new fields of application for water-jet technology. In this issue of our Hydro Surgery News we have dealt with the most advanced of these concepts.

On the following pages, you will read about how the use of the fan-shaped water-jet for the removal of sweat glands and the mobilisation of facial skin during facelifts can greatly improve the safety of these procedures. In both applications the operators had the same experience. When separating tissues with the help of a diffused stream of water the instrument tends to remain within the desired tissue layer. The water-jet separates tissues at the appropriate site. Surrounding structures, especially lateral blood vessels supplying the skin, remain intact, while underlying vessels and bands of tissue are cleanly exposed for subsequent steps of the procedure.

Our new product design for wound debridement and irrigation is being presented at the 2007 IPRAS Congress in Berlin. Here, we have succeeded in developing a technology with which surfaces can be effectively cleaned without producing the harmful aerosols. Set-up and clean-up times are minimal.

The doctor guides the instrument simply like a pen in which the aspiration is integrated (see picture). Because all parts of the system, except the supply tubing, can be resterilised the costs remain within limits.

The multitude of new ideas which we have been able to pursue in such a short period of time confirms our belief that the use of water-jet technology in the medical field has a great potential which is still largely unrecognised.

We invite you to participate in the development and testing of our new concepts. As a medical technology company our primary task is to listen to your ideas and work with you to turn them into new products. Feel free to contact me personally with any questions and input you may have!

Arnd Kessy
CEO
Human med AG

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Significant reduction of Pain and Ecchymosis after Water-Assisted Liposuction (body-jet®) compared to Traditional Liposuction

“Comparison of Power Water – Assisted and Traditional Liposuction: A Prospective Randomized Trial of Postoperative Pain”

In a prospective randomized clinical study including 60 patients, the authors have found that pain and ecchymosis was significantly reduced by water-assisted liposuction (WAL) with the body-jet® compared to traditional liposuction. After 4 days 87% of the WAL patients were completely free of pain versus 6% in the group of patients treated with traditional liposuction. Also ecchymosis was significantly reduced in the WAL group. Operation time was also significantly reduced in the WAL group.

Study Results:
“A total of 60 patients were analyzed, 28 for the traditional liposuction and 32 for the power water-assisted liposuction.”

The eligibility criteria included all patients with a body mass index (BMI) of 25 to 30 with excessive pathologic fat located in the outer and inner thighs, knees, abdomen, flanks, chest, arm, ankles, chin and buttocks.

No significant differences existed between the two groups except for the operating time, which was longer for the traditional liposuction group than for the power water-assisted group (p < 0.05).

Comparison of the pain measurements showed a significant difference, with average values 4.8-fold lower for power water-assisted than for traditional liposuction (p < 0.05).

Additionally, after 4 days, 87% (28/32) of the patients treated with power water-assisted liposuction were completely free of pain versus 6% (1/28) of those treated with traditional liposuction.

Ecchymosis measurements also were significantly lower for the patients who underwent power water-assisted rather than traditional liposuction (p < 0.05).

As shown in the Fig., both techniques showed a dramatic bruising reduction at postoperative day 5. However, the scores were significantly lower for the power water-assisted liposuction in every assessment during the first 5 postoperative days.

For all these reasons, the hypothesis that less trauma is produced for tissue nerves and blood vessels with power water-assisted liposuction than with traditional liposuction is consistent. With a fine jet of water that follows anatomic structures without damaging them, whose pressure can be adapted to different connective tissue structures, it is possible to selectively remove fat cells while sparing blood vessels and nerves.

Conclusion:
Postoperative pain is an important factor that needs to be analyzed when new techniques in cosmetic surgery are introduced. This study gives clear proof that power water-assisted liposuction is an almost painless procedure as compared with tumescent liposuction.

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New wound debridement cannula
**Water-Jet Assisted Face Lifting with Aqualift®**

**hydro surgery news:** Aqualift® with the Water-Jet. What is the concept behind this method?

**Dr. Tork:** Throughout its developmental history for medical applications, water-jet technology has been used in cases where the top priority was a dissection of the target structure with minimal tissue damage as well as minimal irritation of the surrounding vessels, nerves and sheets of connective tissue. Furthermore, depending on the shape and pressure of the water-jet, it can also be used for loosening solid structures, such as scars, and for cutting adhesions with minimal tissue trauma.

**hydro surgery news:** In which areas do you use water-jet technology with the body-jet?

**Dr. Tork:** In the lower half of the face and the chin/neck area, the adhesions and band structures mentioned earlier are the reasons for the development of ‘marionette’ wrinkles and, subsequently, for the typical development of sagging skin owing to the effects of gravity on the soft tissues of the cheek.

Furthermore, in many cases, the aging phenomena are associated with the development of a double chin, which can be treated at the same time using a suction cannula instead of a cannula designed for dissection only.

**hydro surgery news:** In your experience, can water-jet technology also be used for fat transfer procedures, otherwise known as “Lipo-Shifting”? For example, in cases where the patient has a thin neck?

**Dr. Tork:** In more slender patients with thin necks and mobile cervical skin structures, the surgeon generally chooses not to remove moderate submental fat deposits by means of liposuction but to mobilise the fat cells by means of fat transfer, or “Lipo-Shifting”. This helps producing a more youthful appearance by filling out the ventral cervical areas of skin.

Using a special fan nozzle with a diameter of 2.4 mm and a V-shaped water beam it is possible to remove these adhesions without doing serious damage to tissues. The tissue mobilisation is accomplished in a cross-cross technique using fan-shaped movements under constant monitoring of the dissection level by the guiding hand.

**hydro surgery news:** Why do you consider the water-jet-assisted Aqualift method to be especially gentle on tissues?

**Dr. Tork:** The gentle nature of this technology is demonstrated by the low incidence of haematomas and postoperative swelling from the release of histamine. An additional indication is the rapid healing and the completely natural-looking postoperative flexibility and mobility of the cheek structures. A sufficient mobilisation has been achieved if, when pulling gently on the cheek skin parallel to the line of the chin, the tissue all the way to the tip of the chin exhibits a uniform flexibility. Adhesions above the jawbone connecting the jawbone with the corner of the mouth can be successfully mobilised with very visible results. When conventional techniques are used in such cases a high degree of tissue trauma with the classic clinical symptoms such as swelling and the development of haematomas is practically unavoidable.

Using a fine 2.4 mm cannula and a pulsating jet the tissue dissection is easy to direct, and a safe method of operation can be guaranteed by constantly assessing the dissection depth using the guide hand.

**hydro surgery news:** What risks, in your opinion, are associated with the Aqualift method?

**Dr. Tork:** Inexperienced operators could underestimate the dissection energy of the water-jet and, therefore, perform a more intensive dissection than planned. However, when used properly, the technology offers a reduction in the known risks. This fact is substantiated by the nature of the technology itself and justifies its potential use, for example, in neurosurgery.

**hydro surgery news:** Dr. Tork, can I ask you for a final word?

**Dr. Tork:** In my view hydrodissection and the Aqualift® concept represent a highly effective, time-saving tool.

**hydro surgery news:** Thank you for your time!

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**Dr. Thomas B. Tork**

Graduate medical training in general surgery, aesthetic-plastic surgery and dermatology, board-certified dermatologist, specialists in aesthetic surgery affiliated with the surgical centre of the Group for Operative Surgery in Schüttorf, Germany.

Surgical centre: Kronenbauweg 1, 48465 Schüttorf, Germany.

Email: info@tb-tork.de

Internet: www.tb-tork.de

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**Dr. med. T. Lorentzen**

Outpatient Surgery in Schüttorf, Germany.

Surgical centre: Kronenbauweg 55-58, 10117 Berlin, Germany.

Tel.: +49 (0) 30 20 45 56 10

Email: info@BeautyBerlin.de

Internet: www.BeoeyBerlin.de

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Specialist for Surgery/Aesthetic Surgery

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The photographs show a 57-year-old patient with night-induced Cushing Syndrome, preoperatively and 4 weeks after treatment, which included Aqualift®, liposuction of the chin area and upper eyelid blepharoplasty.

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**Interview**

**hyDRO SURgERy NEWS PAgE 2**
Water-Jet Assisted Sweat Gland Removal with the Body-jet®: Gentle Procedure with Permanent Results

Water-Jet Assisted Sweat Gland Removal
In the search for an alternative treatment with permanent results and low risks, water-jet assisted sweat gland removal was developed. First the sweat-producing area is marked by means of an iodine-starch test. Then, under local anaesthetic and using a procedure which has been further developed and perfected by Dr. Meyer, the lower layer of dermis, where the sweat glands are located, is exposed using a liquid jet in a more selective manner than previously possible. Then the apocrine glands are scraped out using a sharp curette with a special design. Previous techniques for mechanical removal were associated with unsatisfactory permanent success rates and frequent complications in the form of partial or complete necrosis because the subdermal and intradermal vascular plexus had to be destroyed in order to reach the gland-containing layer. The fine line between radical sweat gland removal and preservation of the skin perfusion was very narrow indeed.

With the new technique it is possible to expose the relevant layer of dermis with minimal damage to the surrounding structures, so that the perfusion of the treatment area through transdermal connections remains at least marginally guaranteed. The result is a drastic reduction in the risk of necrosis along with an increase in effectiveness. Surgical access is provided by a one-centimeter incision. The resulting scar is minimal and inconspicuous.

Success Rate
The initial success rate for 193 patients over a 30-month treatment period was 87% (based on the results of a patient survey). Only 3 cases of surface erosion, in the form of partial necrosis, were reported.

Duration of the Procedure
Ambulatory surgery using the water-jet assisted method only takes about 45 minutes for both axillae. The application of the liquid jet is completely painless and is well tolerated by all patients. The applied medications are equivalent to the composition of a tumescent solution with the goal of anaesthesia and vasoconstriction. The actual tumescent effect, however, is not required because there is no need for liposuction. The subsequent mechanical curettage can therefore be performed in a completely pain-free manner with practically no bleeding. Haematomas can be effectively prevented by applying local compression for the first few days after treatment.

Hydrothoraxis is often experienced as embarrassing and socially debilitating. It is estimated that up to 2 million people in Germany suffer from this condition.

Conservative Treatment Methods
with topical agents often fail owing either to bothersome accompanying symptoms, such as skin irritation, or poor patient compliance.

Surgical Methods:
The partial or total skin excision with reconstructive flap surgery must be seen as a last resort and is not appropriate for cases of ‘simple’ hydrothoraxis. Mechanical Curettage: With a low initial success rate of only 50-70%, this procedure is often futile and, especially owing to the high complication rate, disadvantageous. The main problem is the risk of partial or total necrosis.

Paravertebral Neurotomy:
A very effective treatment. However, the procedure is highly complicated, and the associated risks are correspondingly high.

Botulinum Toxin:
Injections of botulinum toxin offer an effective alternative. However, this treatment is quite costly and must be repeated in several-month intervals.

No traces of lymphatic endothelial cells in the aspirate of 20 subsequent Lipoedema patients.

Lipoedema is a symmetrical fat distribution disorder which occurs almost exclusively in women and usually manifests in the thighs and lower legs but can also affect the arms. The result is an extreme disproportion between the enlarged legs and the typically slender to thin torso.

Primary Lipoedema is rarely a symmetrical condition. This disorder, which is caused by a defect in the lymph conducting pathways, can also lead to a progressive increase in leg volume. Until just a few years ago surgical procedures such as liposuction had been rejected by the scientific lymphological societies. This position was based on the results of cosmetic liposuction procedures, which were usually performed using a criss-cross technique. As numerous lymph vessels were damaged by the mechanical shearing forces lipoedema sufferers experienced a worsening of the already existing high-volume lymph transport insufficiency, and in many cases lipoedema developed into lipo-lymphoedema.

After ground-breaking papers were published in the early 90s liposuction was recognised as a treatment for lipoedema. Such procedures must be carried out with strict consideration of the anatomy of the lymphatic structures so that there are no detrimental effects on the lymphatic system. The guidelines of the German Society for Phlebology name liposuction as a method for reducing adipose tissue in patients with lipoedema. Procedures focused on the preservation of lymphatic structures did not lead to a worsening of the oedema. On the contrary: The symptoms were significantly relieved, and the positive effects were still noticeable several years after the liposuction treatment.

Proof of the Structural Integrity of the Lymph Vessels
Contrast radiography was once the only means of proving the macroscopic-anatomical integrity of the lymph vessels after liposuction. Recently, however, a new method of immunohistological analysis has been developed which looks for lymphatic endothelial cells in the aspirate by means of vascular endothelial cell markers and is therefore able to detect the presence of cells from lymphatic vessels. This test is far more sensitive than comparable anatomical methods. The liposuction aspirates were examined for general vascular endothelial cell markers (CD 31 antibodies) as well as selective markers for lymphatic endothelium (D2-40 antibodies).

For a total of 22 lipoedema patients whose treatment area included the inner knee, the aspirate that was removed from these knee zones was sent to the Institute for Dermatohistology of Drs. Krahl where it was examined for the presence of the above named markers.

This region on the inside of the knee collected in patients with lipoedema and lymphoedema offers large quantities of lipoedema and lymphoedema vessels. This refutes the assertion that water-jet assisted liposuction injures the lymphatic system. This test also confirmed the results of a patient survey. Only 3 cases of surface erosion, in the form of partial necrosis, were reported.

WAL for Patients with Primary Lipoedema
As these results were so positive, I also performed a liposuction treatment for the first time on a patient with primary lymphoedema who had exhausted all conservative treatment options.

The aspirated area comprised the entire lower leg and the distal thigh. Again, samples of liposuction aspirate from the vulnerable zone on the inside of the knee collected from the beginning to the end of the procedure were sent in for immunohistological analysis. Even in this case of primary lymphoedema with large quantities of lymphatic endothelial cells could be detected.

Conclusion:
In light of these first studies it can be concluded that, even for this indication, water-jet assisted liposuction (WAL) represents a gentle treatment method. Until now, patients for whom conservative methods had brought little or no relief had few surgical options available to them for reducing the movement-restricting layer of connective tissue. With water-jet assisted liposuction (WAL) we now have a broader spectrum of treatment options for lipoedema at our disposal. I am aware of the need for additional tests and long-term studies. Nevertheless the use of WAL for both lipoedema and lymphoedema offers an extremely promising expansion of the therapeutic options.

No traces of lymphatic endothelial cells in the aspirate of 20 subsequent Lipoedema patients.

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Water-Jet Assisted Liposuction

"WAL shortens surgery times significantly"  

Dr. A. Z. Taufig


In the book ‘Liposuction, Principles and Practice’ Dr. Taufig concludes in his article that ‘the technique of water-jet liposuction is a safe, gentle and targeted method to remove subcutaneous fat build-ups. It offers a very good way for moulding the tissue during the operation.’

‘Apart from the solution for the water jet no additional drugs are required, therefore, drug-related side effects are not to be expected. The method is simple, easily explained to the patient and quickly learned by the surgeon.’

‘WAL shortens surgery times significantly’, finds Dr. Taufig.

Risk of the tumescent technique

While liposuction has steadily been gaining popularity worldwide, the risk of the tumescent technique has been very much neglected. Alongside local complications like overcorrection or undercorrection as well as dents and steps, other side effects caused by the drugs contained in the tumescent solution are a problem. The chief ingredient of the solution used for tumescent liposuction is the local anesthetic lidocaine, which can only be absorbed by the body up to a certain limit. There are no side effects from local anesthetic with the water-jet technique since local anesthetic tumescence is not used. The water-jet technique uses an isotonic sodium chloride solution with an additive of adrenaline in the ratio of 1 ml to 3 l of sodium chloride solution, which is suctioned off almost at the same time as the dissolved fat particles, therefore, no side effects are caused by the solution that is used as with the tumescent technique.

Precise correction

“The simultaneous suction of the fat tissue allows the surgeon to determine, at any time, the magnitude of the fat tissue that is to be removed. Borders and margins can be harmoniously aligned by adjusting the pressure of the water jet. The tumescent method does not allow such a precise correction of margins because the area that is being worked on loses its original shape owing to the tumescent solution.

The postoperative leakage of fluid from the incisions with the tumescent method is largely reduced if not even stopped…”

Statistical Data

“During the period from October 1999 until March 2003, 280 patients were treated with this new method of liposuction.”

Results

“It has been noted by the author that surgery times can be reduced by more than 40%. This is mainly caused by the fact that the phase for the instillation of tumescent solution and the period until it takes effect with the tumescence technique does not apply for the water-jet technique. A large part of the saving in time rises from the fact that immediately after inserting the cannula and starting the water-jet the suction process is started. The removal of fat tissue and the molding of the surrounding area can start right from the beginning of the operation. Compared with other methods only little fluid remains in the tissue, which is perceived by the patient as being very pleasant.”

Fax Reply to +49 (0) 385 3 95 70-10  
Human Med AG

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I am especially interested in (please mark):  

- Liposuction – body contouring  
- Treatment of Lipodema  
- Removal of sweat glands  
- Face lifting  
- Wound debridement  

Other, please specify:

Further development of water-jet technologies

Water-jet Workshops in plastic surgery

Special body-jet® workshops and user meetings are organized regionally and internationally on a regular basis.

Topics:

- New scientific investigations and clinical studies.
- New applications and indications of the water-assisted technology.
- Practical demonstrations of water-assisted liposuction (WAL), body contouring and other applications of the water-jet.
- Life-operations.

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