Abstract— Introduction: The need for reduction of post-tonsillectomy hemorrhage has led to promotion of tonsillotomy techniques for tonsil tissue reduction in obstructive tonsillar hypertrophy. A first study compares ablative tissue effects using 1470nm diode laser and CO2-laser for tonsillotomy in an intraindividual design. A number of different laser systems have been used for volume reduction of hyperplastic nasal turbinates. The aim of a 2nd clinical feasibility study was to show the coagulative and tissue reducing effects using a novel Tm: fiber laser system emitting at 1940 nm

Keywords— laser, tonsillotomy, turbinate hyperplasia

I. PATIENTS AND METHODS:

First 21 children aged 3-13 years (mean age 6.3 years) underwent laser tonsillotomy for obstructive tonsillar hypertrophy in this double blind, prospective, randomized, clinical feasibility trial. In each case, tonsillotomy was performed using fibre guided 1470nm diode laser (contact mode, 15 W) on the one side and CO2-laser (12 W) on the other side. An independent physician documented clinical presentation and patients’ symptoms preoperatively and on day 1, 3, 7, 14 and 21 postoperatively using standardized questionnaire including VAS for each side separately. The 2nd clinical feasibility trial included 11 patients suffering from hyperplastic inferior nasal turbinates, who were therapy-refractory to conservative medical treatment. The obstructive nasal cavity was treated using the 1940 nm Tm: fiber laser at <5 W output power. The treatment was performed in non-contact mode under endoscopic control. Patients’ symptoms were documented both preoperatively and on days 1–3 and 28 postoperatively using a non-validated questionnaire. Additionally, an endoscopic examination was performed.

II. RESULTS

Mean duration of single tonsillotomy operative treatment was 2.7 min using 1470nm laser and 4.9 min using CO2 laser respectively. Intraoperative bleeding and the frequency of bipolar forceps use for intraoperative bleeding control was significantly less pronounced using the 1470nm diode laser system. There was no difference in postoperative pain scores between the CO2-laser treated and the 1470nm fibre guided diode laser treated side. No infections, hemorrhages or other complications occurred in the course of the three weeks postoperative period.

In the turbinate study, none of the patients showed infections, and no hemorrhages or other complications occurred intra- or postoperatively. The mean laser activation time was extremely short being 28.0 ± 8.5 s. In conjunction with a low power setting (median, 3 W; mean ± standard deviation, 3.3 ± 1.1 W), a low energy of 90.2 ± 37.8 J was applied. A significant reduction in nasal obstruction could be documented in all patients on day 28 postoperatively. Evaluation, as assessed preoperatively and 4 weeks postoperatively, showed significant subjective improvements.

III. CONCLUSION

A fiber-guided 1470nm diode laser system offers an efficient and safe method for tonsillotomy as treatment of obstructive tonsillar hypertrophy. Compared to our standard practice with CO2- laser, 1470nm laser application provides comparable tissue ablation effects with less intraoperative bleeding and shorter operation time. The treatment of hyperplastic inferior turbinates using a 1940 nm Tm: fiber laser provides sufficient tissue reduction in a short operation time using low total energy. Patients described a significant improvement in nasal breathing postoperatively.