

Success Story / **Preoperative planning with simulation**

# Symmetry through optimized cutting

One risk of forced palatal expansion (RPE) is that the face may be asymmetrically widened by the distractor. Simulation-based optimization can aim the surgical incision to reduce the risk of asymmetric opening. Medical device manufacturers of distractors can use this process to add value to their product by providing an additional service.



*„We looked into the potential and possibilities of simulation to expand our services and improve our products at an early stage. In the meantime, several applications from Simq are in use and we have successfully integrated them into our processes. I am sure that this is just the beginning.“*

**Frank Reinauer /**  
Head of Innovations and Production Biomaterials / KLS Martin Group

## The task

Rapid palatal expansion (RPE) is an orthodontic treatment of a narrow jaw. It is used for transversal expansion of the upper jaw. One risk of forced palatal expansion is that the upper jaw is expanded unevenly by the expansion device, the distractor, in over 55% of cases\*. Thus, after the treatment, in 25% of the cases the patient even has a strongly asymmetrical face (more than 5 mm asymmetry). By means of patient-specific simulative surgical planning, suggestions for osteotomy guidance and a suitable drill and marking guide have to be made in order to guarantee a symmetrical facial shape after treatment (**Figure 1**).



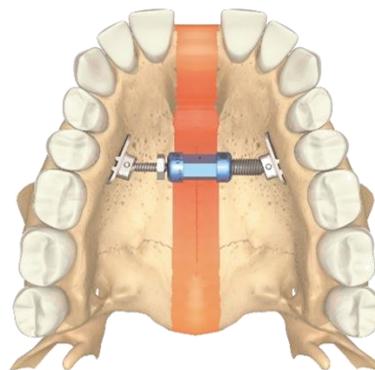
**Figure 1:** Distractor Rapid Palatal Expander (RPE)

## The solution

Our Simq RPE software supports the treating physician/orthodontist in treatment planning and considers the biomechanical behavior of the individual upper jaw. The surgical procedure is individually simulated, optimized, and digitally documented for each patient.

Based on the existing patient scan, a three-dimensional model is generated for the simulation and the individual osteotomies are predefined.

The patient-specific numerical simulation is the core of the procedure. Here, the optimum symmetry is calculated based on the anatomy with different cutting lengths. The subsequent additively manufactured drill and marking guide transfers the planning to the operating room and serves as a template for the ideal osteotomies and the use of the distractor (**Figure 2**).



**Figure 2:** Distractor in upper jaw

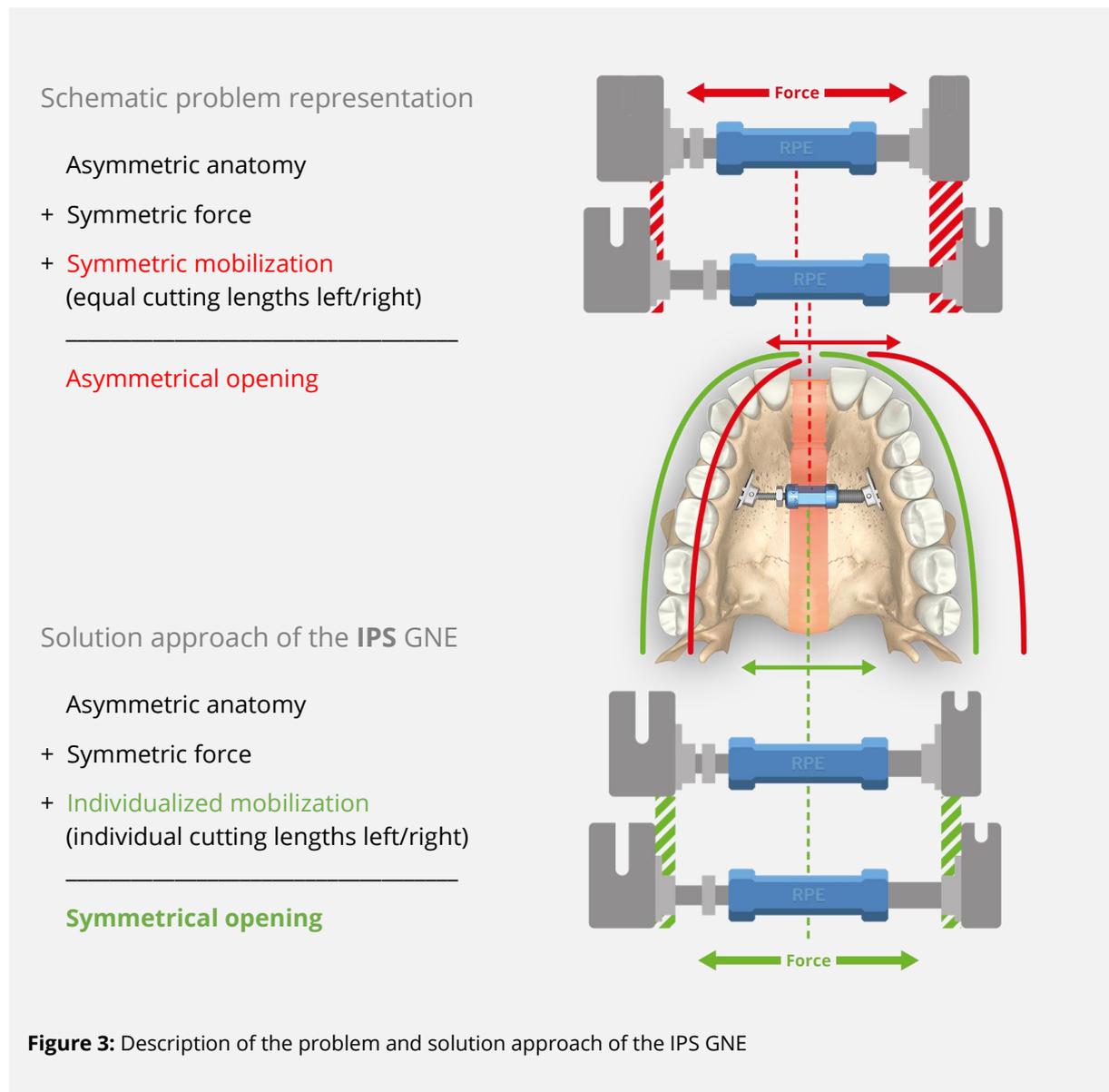
## The result

Simq's patented simulation-based planning of the surgical expansion of the maxilla allows the procedure to be specifically optimized, the trauma to be minimized and the risk of an asymmetrical opening of the maxilla to be virtually reduced.

Simq RPE is the best solution for accurate distraction and a symmetrical face after forced palatal expansion.

With the state-of-the-art, patient-specific procedure, the risk during surgery as well as of postoperative treatments can be brought to a minimum (**Figure 3**).

With this approach, the KLS Martin Group can add a patient-specific treatment and thus an additional service to its product (IPS® GNE).



## Your contact



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### About the customer

The KLS Martin Group is an internationally active group of companies for innovative medical technology in almost all areas of surgery. With their innovative medical technology solutions such as implant systems, high-frequency surgical devices, surgical lasers, sterilization containers, surgical lights, surgical instruments as well as individual OR solutions, they have set new standards many times.

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GROUP

### About Simq

The company was founded in 2014 and is part of the CADFEM Group. Simq's products and services enable medical device manufacturers, clinicians and medical staff to practically apply numerical simulation and use it for more effective and safer patient care.

Simq is committed to the standardization and broader application of in silico medicine as part of the Avicenna Alliance, thereby ensuring safe, affordable and cost-effective healthcare.



**Simq is a certified simulation service provider and software manufacturer in the field of medicine and medical technology and is one of the pioneers of in silico medicine.**