

The jael dental and orthodontic system™

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The JAEL dental and orthodontic system is a four-stage protocol which aims to give the practitioner greater control over the construction of set-up models and the design and manufacture of lingual archwires. The system makes use of two robots, Modelbot™ and LAMDABOT™, and the software program LAMDA. The robots are small, easy to use, and designed to be used inside the clinician's own clinic.

The four stages of the system are as follows:

1. Model set-up. When brackets are bonded in an indirect manner, or the technician needs the construction of a set-up model which expresses the desired tooth positions and occlusion, we use a system to construct the set-up model.
2. The Modelbot™ robot is used to section the malocclusion models into individual teeth, when it is used for orthodontics, or in complete segments, when surgical procedures are the objective. Sectioning malocclusion models by hand is a laborious and potentially dangerous process which produces a significant quantity of dust. Modelbot™ allows the technician to avoid these inconveniences. The technician uses a computer program to determine where the malocclusion model should be cut and trimmed. This information is then transferred to Modelbot™, which uses a high-speed bur to cut and trim the model. This procedure makes the sectioning of malocclusion models both more precise and more rapid. The operator controls the position of the bur by looking at the image on a computer screen; no direct visual contact with the model is needed. This allows the operator to section the model remotely. We may imagine a situation in which several people in different locations use a single Modelbot™ to section and trim their models.
3. The lingual archwire is designed using the LAMDA program. A photograph of the set-up model is taken and uploaded to LAMDA. The image appears on the technician's computer screen. Two points 1 cm apart are drawn on the set-up model, and these points are included in the photograph for calibration. The technician first uses LAMDA to record the intermolar and intercanine distances (these distances must be respected throughout the treatment). The technician then proceeds to trace out the desired archwire on the image, locating the desired positions of the bracket slots. LAMDA represents the archwire as the union of straight line segments. LAMDA calculates the lengths of these segments and the angles between neighboring segments, and thus obtains a complete mathematical description of the archwire.
4. LAMDABOT™ is used to bend the lingual archwire. LAMDABOT™ is connected to the LAMDA program. LAMDABOT™ uses the mathematical description of the archwire design sent by LAMDA to bend the archwire in accordance with the operator's design. LAMDABOT™ possesses an electronic device which is able to heat the archwire, allowing the robot to bend nickel titanium archwires as well as the well-known stainless steel wires.

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