Primary soldering in the furnace

A simple technique is made easy, repeatable and safe thanks to the use of Ugin’ Dentaire’s Lectra furnace which allows the use of Argon gas.

The technique described below is designed to enable you to carry out the soldering/brazing in an automatic, repeatable, and simple manner with consistent results. The apparatus that now allows us to do this is the Lectra furnace by Ugin’ Dentaire, which can introduce Argon gas into the firing chamber during the soldering/brazing phase in order to block the oxidation and allow better flow of the solder. To better understand the simplicity of the method we need to compare it with the most common techniques used in dental technician labs:

- **Torch**: A fast but inconsistent system. The result is determined by the operator’s manual dexterity and experience. There is a risk of soldering with too little heat, which results in weak union. If it is heated beyond the casting temperature the solder is likely to become porous and create risks for future problems with the aesthetic ceramic coating.

- **Laser**: A complex system which is very expensive. This expense is caused by the apparatus which requires a strict adherence to operating protocols. The operator’s experience is also determinant in the success of this system.

- **Infrared**: A system made complex by the preparation of the solder and the time needed to carry out a series of soldering on the same job. For each single solder point it is necessary to find the thermal center and carry out the soldering process separately. This technique is also greatly influenced by the operator’s skill. Furthermore the structure is only heated at one point (heating from above can cause difficulties on long solders in the occlusal apical dimension). There is a risk that after the first solders oxidation could occur, which would not allow a proper union in the final solders.

The soldering techniques using the Lectra furnace by Ugin’ Dentaire

The advantage of this technique is that the entire procedure is done automatically, following a coded operative protocol, thanks to which the operator need not do anything. The following procedure is exceedingly quick and simple, guaranteeing excellent results and standardizing what many dental technicians consider a very delicate process.

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1. The framework is sent to the dental practice and verified by the dentist. The design of the soldering spacing is the same as in a normal torch procedure: maintain a distance between soldering joint of approximately 0.1 mm. In the part which will be filled, the structure is roughened with carborundum bur. In order to assist the dentist in the verification process, we trace signs on the framework so that the position of the part of the structure in the mouth can be visually checked against that of the model. The alloy used is Keramit Silver.

2. Once the precision and correct position in the mouth has been verified, the dentist blocks the entire framework with most suitable technique: in this case with an impression plaster key. In the lab we prepare the replacement key, screening the plaster and the soldering point with wax, for the creation of the model in refractory material. Once the investment has hardened, the model is cleaned with hot water to eliminate the wax and degrease the framework.

3. We now prepare the solder and select a soldering rod based on the alloy used for the framework (in the Nobil Metal catalogue there are more than 25 types of solder), in accordance with the indications of the Metallographic Table. In this case we used Ceram – Solder 2. The portion of solder is folded into a “U” and positioned on the soldering point together with a layer of flux. The solder must touch the structure in at least one point.
4. The bits of solder are fixed to the structure in order to avoid their moving during the insertion and removal of the refractory replacement model into and out of the furnace plate. To do this we use the same investment as that used for the replacement model, mixed with acetone.

5. All of this is placed on the Lectra furnace firing plate and the soldering program is activated.

Program followed:
- Preheating temperature: 450°C
- Plate rise: 4 minutes
- Internal preheating: 1 minute
- Temperature rise: 150°C/min.
- Start vacuum: 450°C
- Vacuum level: 95
- End/maintenance vacuum: 700-0°C
- Final temperature: 1110°C
- Stabilization: 0 minutes
- Plate opening: 0 minutes
- Cooling time: 0 minutes
- Argon: 1 minute

Secondary parameters:
- Argon led 3 duration: 10 minutes

6. The work at the end of the soldering cycle. As usual the investment is been eliminated according to one's own operating protocol.