

Laser Welding In the Dental Lab

The introduction of " the great biocompatible " Titanium to the dental world has brought about great change and challenges to the dental laboratory. Implants are big business and lets face it you would have nothing but a Titanium Implant placed in your jawbone these days. But how do we work with this stuff? Well years ago people asked the same questions about Aluminium and yet today we take it for granted.

Titanium has sparked it 's own technology within the Dental world. Titanium casting, Titanium milling (via CAD /CAM systems) and the big question is "how on earth do you join this metal?"

The answer is of course with a LASER.

LASER is an acronym for "Light Amplification by the Stimulated Emission of Radiation" which produces a sharp focused light beam that melts a very small area of metal. The benefit of this technology is that very little heat is generated at the weld point, allowing users to easily weld .25 to 1.0mm away from the most complicated and intricate component parts without damaging heat sensitive materials. The laser welder allows the operator hold parts in their hands while viewing the application through a stereomicroscope in the welding chamber. This is ideal for Titanium and of course other metals. No other method is available to join Titanium so easily.

Why laser weld? No solder, simple. Because laser welding joins parent metals together, it does not introduce solder to make a connection. The coefficient of expansion remains consistent giving absolute accuracy with no expansion or contraction at the connection this is especially important during porcelain application. However, the preparation of the join is critical.

The weld-effected area is in a limited range of only approximately 0.25 to 2 mm, depending on the material. The laser welds two metals together and thus permits safe, durable, and precise and non-warp joining of parts in the form of a spot or seam. Because of the very short time of the laser pulse the zone of heat influence is limited to the immediate vicinity of the welded spot or seam.

Benefits of laser welding:

Weld is with the parent metal without the introduction of additional metals or alloys thereby eliminating any galvanic effect

- * Totally biocompatible
- * Makes it easy to adjust appliances
- * Provides an esthetic and natural feel to appliances
- * Easy to handle, so it saves time
- * Gives a great value for your money
- * Corrosion resistant welding technology without solder
- * High mechanical strength
- * Homogenous welded structure
- * Smaller heat affected area, therefore less warping occurs
- * Ability to work closer to ceramic, plastic and composites
- * Suitable for all dental alloys and titanium
- * Titanium can be laser welded in argon gas environment providing a bio-compatible & corrosion free appliance

Laser beam micro-adjusts in width and power output enabling a precision weld of finer parts and precision attachments without risk of damage.

A laser welded bridge will not warp in a porcelain furnace

More precise fit due to welding directly on the master model.

Laser welding technology has become a tool of great value in the dental laboratory. It is quicker and easier than ever to repair breaks, add clasps, eliminate rocking or other alterations to fixed bridges and cast partials.

Repairs are made directly on the model without causing damage to porcelain or acrylic. Orthodontic appliances are an area just being explored due to the new materials for this specialty eg TMA wire.