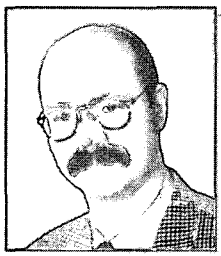


# Electroforming--Biocompatible dental restorations by a clean technology and the advantages for technician, dentists and patients

Dr. Michael Hopp



## 연자약력

- 1982~1987 Study in Dentistry at Humboldt-University in Berlin
- 1987 Assistant doctor of the Department for Prosthetic and Geroprosthodontic Dentistry
- 1990 Doctorate to degree "Dr.med." in the field of dental materials
- 1991 Assistant Professor, Head of sector 'Preclinical Prosthodontics and Propedeutics'
- 1992 Examiner in the speciality 'Preclinical Prosthodontics and Propedeutics'
- 1992 Work in various groups for dentistry at German Institute of Standardization(DIN)
- 1996 Assistant medical doctor, Chief Editor of a German Dental Journal

Electroforming has a long history in industrial application, In the 20th years of the last century, Davy and Faraday placed the theoretical foundation of this process. Rogers and Armstrong formed one of the first frameworks for dental use in the sixties. From this point start a continuous development in dentistry.

Electroforming in dentistry is a technique that needs a little distance for the metal coping on the milled tooth and shows a low material weight of the coping. The technician manufactured single objects as frameworks for ceramic fused inlays, crowns or complex constructions, that are compound of several parts. Electroformed gold has a purity upper than 99.9 percent. Mistakes in the metallic structure are rare. It is one of the mysteries in dental technology to see the creation of solid gold from a colorless solution by electric energy. The benefit of electroforming are the biocompatibility of pure gold, a excellent fit, good clinical results and universal use for dental reconstructions.

Important supposition for success with electroforming is a exact impression from the patients teeth and a high quality medel for work. The technician takes a duplicate model to manufacturing the goldcoping. The electrical conductivity of the model are realized by a silver containing varnish. This silver varnish have to removed after processing. The best methods to remove the silver is an etching in 20% nitric acid. Without removing the silver layer it corroded in the oral cavity and shows discolorations by forming brown or black sulfides.

The quality of the goldcoping can the technician controlled by the color and shape of the surface. It is one of the process marker to assess this technical step. Mistakes can be seen by changed surfaces. This is the greet benefit between electroformed and cast constructions.

All clinical indications can be realized. Electroforming is a technique to manufacture single copings. The single parts can be combined by different connecting techniques, e.g. luting,

soldering, sintering and laser welding. Surface prepare for luting will carry out by ROCATEC-technique(ESPE) or METAL-PRIMER(GC). After tribochemical treatment with ROCATEC the gold surface get a violet color. This is also a process marker for assess the benefit. It gives the technician a high security in his work. Ceramic firing to give the restorations a typical tooth-like color makes not problems in practice. All kinds of ceramics with normal and higher heat expansion are possible for firing. The metal ceramic system does not generate stress between the components. The reason we can see in the recrystallization of the metal structure and the very low hardness(VHN0,1 33) after heating. The technician can also use modern composites to coat the frameworks.

Many applications in dentures and frameworks based on electroforming today. Especially double crown systems were realized by electroformed parts. The male part of doublecrown is formed in alloys, pure metals, e.g. titanium, or ceramics. After milling and polishing the female part of the crown were formed about primary piece. The system slides excellent and for a long time with very good clinical success. In the same way produced bare retained constructions have also a good clinical success. Combined dentures based on electroforming offers the technician and patient the possibility a good services in case of repairing. Abraded female part can fast and easy replaced by luting with adhesives.

Implant retained constructions can also formed by this technology. Stress-free constructions gives the implants a long life by the active retainers in the removable dentures. In the last time this step was carry out in the patients mouth.