

# Apprenticeship as a Medical Preparator at the Walter-Gropius Berufskolleg in Bochum

## Pillars of Training, Developments and Outlook

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**Abstract** The lecture gave an overview of the training structures of the three-year, full-time, school-based education at the Walter-Gropius Berufskolleg in Bochum, Germany. An integral part of the training concerns subjects of preparation techniques, histology, anatomy, physiology, chemistry, pathology, forensic medicine and photography. In the subject of dissection technique, different focal points are set over the three years of education. Gross anatomy takes place on body donations, which were fixed with formol, in the Anatomical Institute of the Ruhr-University Bochum. The sectioning technique is taught in cooperation with the Berufsgenossenschaftliches Universitätsklinikum Bergmannsheil in Bochum. Due to the different professional requirements of medical preparators, appropriate developments in school education have become indispensable in the last five years. These include dealing with collections and imparting knowledge about historical preparation techniques as the corrosion technique and making and restoring wet collections. Also, macerations and making of skeleton specimens are taught in this context. Some cooperation have been initiated and established, for instance with the Association of German Preparators and Taxidermists (VDP). However, further development is necessary to meet the demands of diverse tasks of preparators.

Ten trainees at least 18 years or older (with completed secondary school entrance qualification) are accepted each year for the three-year vocational training to become state-certified preparation assistants in the field of medicine alongside twenty other candidates for the fields of geosciences and biology at the Walter-Gropius-Berufskolleg in Bochum. Desired as proof of aptitude is an already completed internship in the environment with deceased people; this can take place in an institute of anatomy, pathology, forensic medicine or with a mortician.

In addition to the vocational qualification, the advanced technical college entrance qualification (Fachhochschulreife) can be obtained at the same time. General education subjects such as mathematics, German, economics, English, and ethics are also taught. Further emphasis is placed primarily on subject-specific teaching subjects such as forensic medicine, anatomy, physiology, microscopy, exhibition documentation, histology, photography, chemistry, and specialist practice (anatomical dissection technique and dissection technique).

Since the training takes place at a state school, no tuition is charged. The focus of this summary is on the specialist practical emphases in the subject of medical preparation technology and the adaptations within the framework of the training to the professional requirements over the past five years.

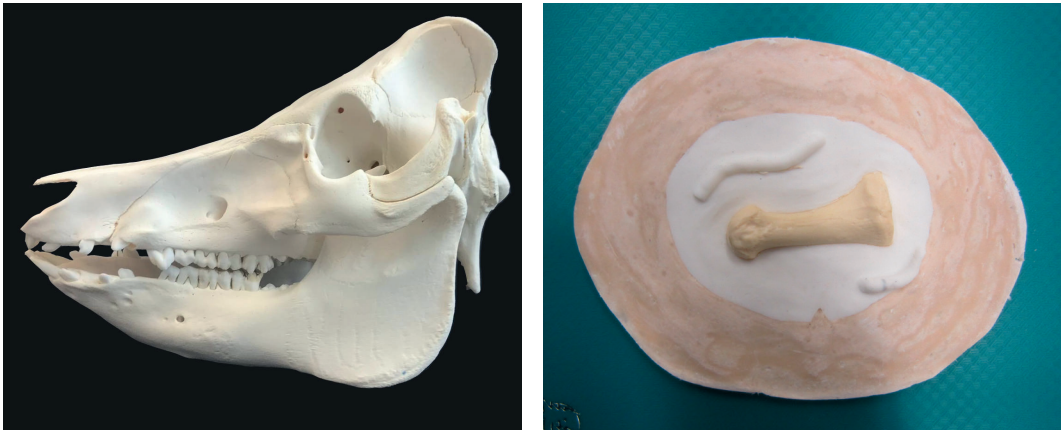
In the first year of training, important basics are taught. Essential here are hygiene standards in dealing with the deceased, fixation and preservation procedures, care of corpses and basic, ethical aspects of dealing with the deceased and collection objects. An introduction to working in a laboratory and with the available equipment is also given, considering occupational safety (cooperation with the Anatomical Institute of the Ruhr-University Bochum, see **Fig.1**). In the anatomical preparation, mainly the skin and fat preparation on body donations fixed with formol is taught; here epifascial structures (veins and cutaneous nerves) are shown. At the same time, the basics of tissue science are taught and the passive musculoskeletal system, including all ligaments and joints, is explained.

Parallel to anatomical preparation, other techniques such as enzymatic maceration to produce decomposed skeletons and skeletal mounting are taught and carried out using zoological specimens as examples. The fabrication of a two-part crucible mould for the production of bone replicas from polyester resins is also part of the first year of training and belongs to the subject of form casting (see **Fig.2**).

In the second year of training, the focus in anatomical preparation is on the topographical representation of the active musculoskeletal system (muscle teaching, see **Fig.3**). The setting down of extremities, opening of the vertebral canal and opening of the body cavities are also performed here. In addition to the theory of pathology, specialized practical instruction in dissection technique is given once a week. This instruction is made possible through cooperation with the Berufsgenossenschaftliches Klinikum Bergmannsheil in Bochum.



**Fig.1** Dissecting room of the Ruhr University Bochum Manufacturer: Medis Company. © Walter-Gropius Berufskolleg, Bochum



**Fig.2** Left: Decomposition preparation of a domestic pig skull, right: crucible mold with bone replica of a human foot bone. © Walter-Gropius Berufskolleg Bochum.



**Fig. 3** Muscle preparation of a human body donation from the Ruhr University Bochum. © Walter-Gropius Berufskolleg Bochum.

Another preparation technique taught is resin-casting, in which students cast and protect delicate preparations such as small bones, corrosion preparations, insects, or plastinates from damage and understand the many applications of this method.

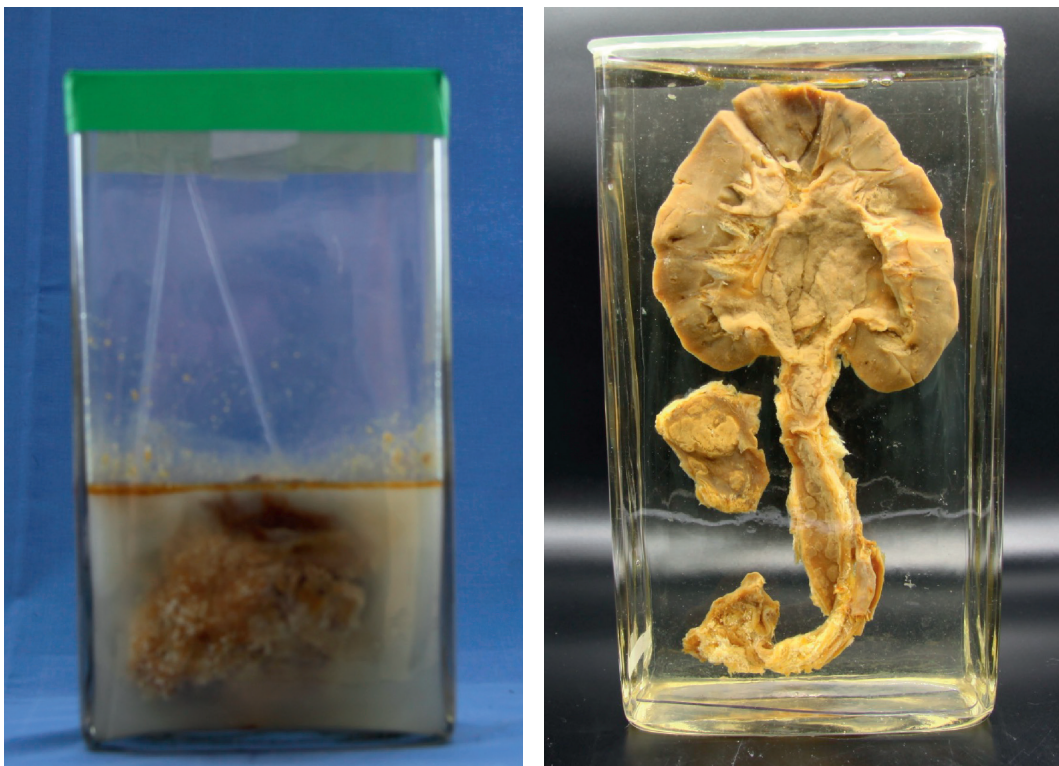
Beside the techniques learned in the first two years of training, digital preparation instructions with annotated illustrations are elaborated and scientific posters are created with a graphics program in a large format (DINAo).

Additionally, a two-day workshop will be held in cooperation with Dr. Sara Doll and Dr. med. Stefan Schulz (Anatomy Heidelberg and Medical History Collection of the Ruhr University Bochum) titled “Handling objects from collections.” Here, the basics of exhibition conception, creation of inventories, storage of objects, reprocessing and the significance of historical preparations from collections are given and content on this is worked out by the students in practical exercise units. The professional but also sensitive handling of the deceased and their relatives is also the subject of a one-day seminar in cooperation with the school’s protestant pastor Mr. Meyerhoff-Roesener and the chaplains Mrs. Jung-Borutta and Mr. Zielonka of the St. Elisabeth Hospital in Bochum. Finally, the students take part in the burial of the body donations of the Anatomical Institute of the Ruhr-University Bochum.

In the second year of training, in addition to the school education, two internships are completed over a period of three weeks, each in an anatomical and a pathological institute. The aim is to deepen the students’ knowledge and to give them an impression of later working life in the various professional fields.

In the third and final year of training, the topographical representation of the situs is learned in the subject anatomical preparation technique. The vascular supply of the organs is shown in detail and the organs are dissected with consideration of various questions. In addition, the head/neck area is dissected, brain sampling is performed and topographical and functional basics on the complex topic of the central nervous system (CNS) are taught. Students learn how to assign different brain section series and core areas of the CNS. Parallel to the pathology lessons and the technique of dissection, theoretical basics in forensic medicine and practical basics in histology are taught. This includes the preparation of section series using a microtome and the use of various staining techniques to produce histological preparations.

Another focus in this training year is the handling of wet preparations and wet collections. The long-standing cooperation with the German Tuberculosis Archive in Heidelberg (founded in summer 2019) obliges the students to maintain and process the wet collection of the museum. Here, the students are taught important aspects in collection work such as: the necessary technical knowledge for handling specimens, technical knowledge of fixation and preservation solutions and their mode of action for the specimens. Inventory, documentation, handling of historical labels, photography and description of possible pathologies and expertise around understanding the chosen presentation of the specimens is also part of this work (see **Fig.4**). Students



**Fig. 4** preparation of a human kidney, before (right) and after (left) processing. Preparation of the German Tuberculosis Archive in Heidelberg. © Walter-Gropius Berufskolleg Bochum.

understand the use of various preservation solutions, make a variety of mountings, and perform glasswork to make custom-fit lids for collection jars.

Another preparation technique taught in this school year is the corrosion technique, in which casts with plastics are made from hollow organs or vessels (e.g., on zoological specimens such as kidneys, liver, lungs or vascular systems of rats, see **Fig. 5**).



**Fig. 5** Resin-cast of a corrosion preparation, Arteries of the kidney of a domestic pig. © Walter-Gropius Berufskolleg Bochum.

A final four-week, third internship is recommended in an institute of forensic medicine but may again be in an anatomical or pathological institute.

The six-hour practical final examination takes place annually in May and is supplemented by an oral examination part. Written examinations must also be taken in the subjects of pathology, anatomy and materials technology.

Over the past five years, training in the medical field has been significantly restructured through training courses in cooperation with the Association of German

Preparators (VDP). Collection work has become an essential aspect of training. Other techniques such as mould making, corrosion, maceration and resin-casting are now also part of the repertoire of teaching content. In-depth workshops and seminars on individual techniques have been established and are being newly developed and integrated into the curriculum. We are always open to new collaborations and welcome suggestions and support.

The goal of our schoolwork is to generate well-trained specialists who meet the demands of the institutes for the job market. This includes a basic understanding of old preparation techniques and preparations from collections, as well as the ability to create new preparations and ensure proper handling of these objects.