ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

A Novel Method of Human Cadaver Embalming, Preparation of Museum Specimens and Colouring of Dissected Specimens.

SN Somayaji, SK Somayaji[2], and Mohandas Rao KG[1]*.

[1]Department of Anatomy, Melaka Manipal Medical College, Manipal University, Manipal, Karnataka, 576 104, India.
[2]Department of Conservative Dentistry and Endodontics, Manipal College of Dental Sciences, Manipal University, Manipal, Karnataka, 576 104, India.

ABSTRACT

Dissection and demonstration of the specimens have high importance in teaching learning process especially in disciplines like human anatomy where it is essential for health science students to have visual experience and understanding of three dimensional relationships of the structures. Properly prepared, coloured and labelled specimens make learning easier for students especially undergraduates. For effective long lasting colouring of the specimens, proper fixation of the specimen using good and effective embalming techniques are equally important for long preservation of specimens. Since, these specimens are used for decades, fungal growth on them is one of the commonly faced problems in the labs and museums. Hence, a revised fixation technique which will prevent the fungal growth is the need of the hour. Keeping these in mind, we are reporting an instant yet long lasting method of embalming, colouring and labelling the structures in a dissected specimen which can be preserved for years in museums or can be used in a dissection hall during teaching learning sessions.

Keywords: Embalming, cadaveric dissection, Anatomy museum, Cadaveric specimen preparation

Corresponding author

ISSN: 0975-8585

BACKGROUND

In biological specialities, practical exposure of the topic with visual demonstration of the structures plays vital role in understanding the subject for undergraduate and postgraduate students. Dissection and demonstration of the specimens have high importance in teaching learning process especially in disciplines like human anatomy where it is essential for health science students to have visual experience and understanding of three dimensional relationships of the structures. Various methods are used for embalming and preservation of specimens [1,2, 3 4]. Lately, plastination technique is used to preserve biological specimens necessitating the development of an effective preservation technique which will make the dissection interesting and enjoyable for both teachers and students. However, plastinated specimens are very expensive and cannot be felt like embalmed dissected specimens. On the other hand, properly coloured and labelled specimens make learning even easier for students especially undergraduates. Proper display of the structures with colouring and labelling of vessels, nerves, organs etc. is equally important in specimens of the Anatomy museum. For effective long lasting colouring of the specimens, proper fixation of the specimen using good and effective embalming techniques is equally important for long preservation of specimens. Since, these specimens are used for decades, fungal growth on them is one of the commonly faced problems in the labs and museums. Hence, a revised fixation technique which will prevent the fungal growth is the need of the hour.

Keeping these in mind, we have developed an instant yet long lasting method of embalming, colouring and labelling the structures in a dissected specimen which can be preserved for years in museums or can be used in a dissection hall during teaching learning sessions.

Method of embalming of human cadaver

On arrival of a dead body, it should be washed with dilute phenol. Then the body should be kept in a proper position (body in supine position and fingers are spread out). Following this, an incision is made just below the mid-point of the inguinal ligament and femoral artery is traced, cleaned and the needle is inserted into it. The needle which is inserted to the femoral artery is connected to a vessel containing the “fixative solution 1” through a tube (Table 1). The vessel is placed at a height of about 8-10 feet so that the fixative solution can get in to the femoral artery by gravitation. Or, the fixative solution may also be injected by cadaver injecting electric pump. The formaldehyde in the solution acts as fixative and glycerine helps in smoothening the surface of the vessels and nerves. It also provides shining to these structures. Arsenic stock solution acts as an antifungal agent. A well injected body can be palpated for softness of different parts / structures of the cadaver. Depending on the size of the cadaver, if necessary, fixative injection can be continued for few hours.

Table 1: Chemical composition of cadaver “fixing solution 1”

Chemicals	Composition
Formalin	1500 cc
Glycerine	250cc
Arsenic stock solution	250cc
Tap water	1500 cc

Table 1: Table showing the chemical composition of the “fixing solution 1”. It can be noted that the arsenic stock solution contains equivolume of acid arsenic, sodium carbonate, sodium acetate and water which are thoroughly mixed and heated till the chemicals are dissolved.

After 24 hours, “solution 2” (Table 2) is injected by a 500cc syringe. The red lead in solution II gives pinkish colour to vessels. The turpentine varnish dissolves red lead easily and evaporates faster to help in immediate drying of the colour.

ISSN: 0975-8585

Table 2: Chemical composition and preparation of "solution 2"

Chemicals	Composition
Red lead	0.5
Turpentine varnish	250 cc
Linseed oil	250 cc

Table 2: Table showing the chemical composition of the "solution 2". It may noted that the red lead and linseed oil are mixed gradually and thoroughly adding a small quantity of turpentine varnish slowly from time to time stirring continuously till a uniform solution is made. The turpentine varnish is prepared by boiling resin powder and turpentine at the ratio of 4:1 till a clean solution is obtained.

After solution II injection, the body hair is shaved and cadaver is stored in a tank containing formalin tank solution (Table 3).

Table 3: Chemical composition tank solution

Chemicals	Composition
Formalin	3 buckets
Tap water	40 buckets
Carbolic acid	1 litre

Table 3: Table showing the chemical composition of the "tank solution".

Method of colouring of dissected specimens

The dissected specimen after cleaning under water is mounted on a black acrylic plate and kept out to dry thoroughly for 12 hours (If painting is required to be done immediately, the water can be wiped out by using cotton and filter paper). First a thin coat of quick fix gum mixed with amyl acetate is applied all over the muscles, blood vessels etc. This will make tiny floating structures to adhere to the parent tissue and give a shining appearance (Figure 1, Figure 2, Figure 3).

Figure 1: Coloured and labelled specimen showing the structures of the posterior compartment of the leg. It may be noted that the arteries are coloured red and the nerves are coloured with yellow.

ISSN: 0975-8585

Figure 2: Coloured and labelled specimen showing the structures of the leg and foot. It may be noted that the arteries are coloured red and veins are coloured blue.

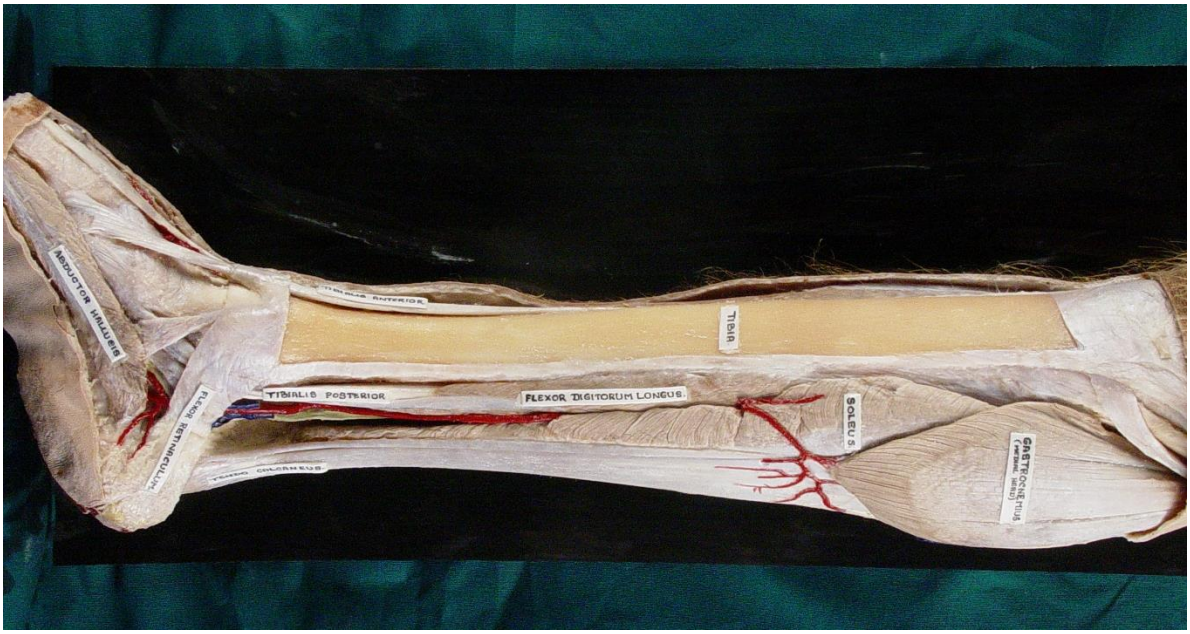
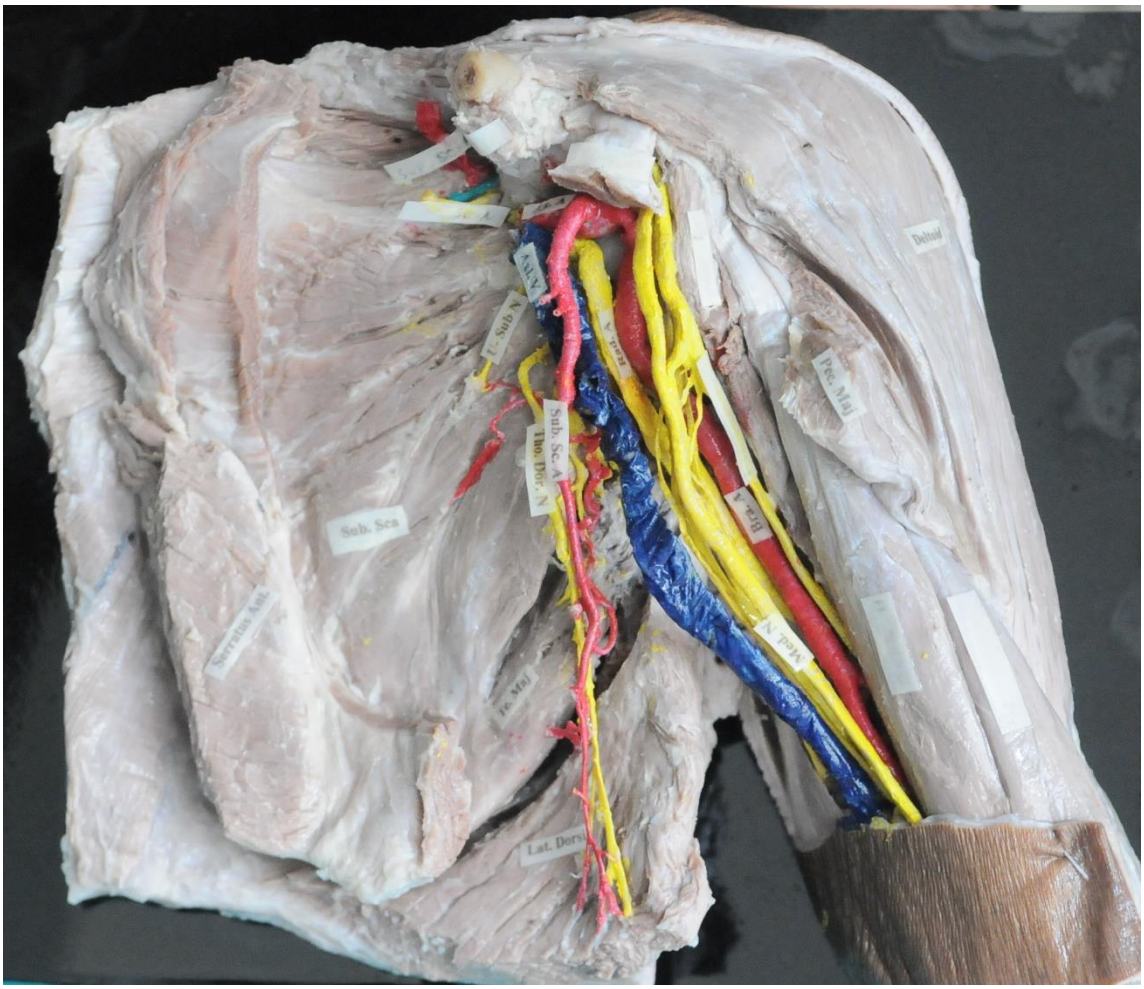


Figure 3: Coloured and labelled specimen showing the structures of the axilla. It may be noted that the muscles are labelled, arteries are coloured red and veins are coloured blue.



For painting arteries, nerves and glands, oil paint (Camel oil colours, Kokuyo Camlin Ltd, Mumbai, India) is used. The oil paint which is used for colouring is available in the form of paste in tubes. Before using, the required quantity of a particular coloured oil paint is mixed with amyl acetate in a small bottle or a deeply concave class cup or a porcelain vessel. It is then stirred well with the help of a glass rod. As it is being stirred a few drops of quick fix gum is added to the paint to make it adhesive. Thus prepared paint which is slightly thicker than the water is now ready to use. It can now be used to paint the different structures of the specimen using a small painting brush. It can be stored and readily used after stirring with a glass rod whenever required. Generally, the arteries are coloured red, veins with blue, nerves with yellow and glands with green colour (Figure 1, Figure 2, Figure 3).

After applying two coats of paint, the specimen is left for drying for about 10 minutes and then placed in a jar containing 8% formalin.

For labelling muscles, arteries etc., slightly thick oil paper is used and water proof Indian ink is used for writing letters on it. A thin coat of quick fix and amyl acetate mixture is applied over the labels twice. After the coating is dried completely, labels can be fixed with the quick fix gum on muscles and arteries etc. These labels are again coated with quick fix gum after thinning it by mixing with amyl acetate (Figure 1, Figure 2, Figure 3).

REFERENCES

[1] Goyri O'Neill J, Pais D, Freire de Andrade F, Ribeiro P, Belo A, O'Neill A, Ramos S, Neves Marques C. Acta Med Port 2013; 26(3):188-94.
[2] Thiel W. Ann Anat 1992; 174(3):185-95.
[3] Anderson SD. Clin Anat 2006; 19(1):8-11.
[4] Wineski LE1, English AW. Acta Anat (Basel) 1989; 136(2):155-8.