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STANDARD OPERATING PROCEDURE (SOP) HUMAN ANATOMY LABORATORY

George Augusto Barros e Matos

Glender Ferreira Santos

Cláudio Silva Teixeira

Barbara de Lima Lucas

Luis Carlos Bandeira Santos Júnior

PHYSICAL SPACE

The Human Anatomy Laboratory (LAH) is located on the ground floor of the medicine course building, in Cidade Universitária (Jatobá Unit) (figure 1). It is divided into three structures: a room for dry parts, a room for wet parts, a room for practical classes, and an entrance and circulation hall. It is equipped with central air conditioning that promotes, in addition to cooling, the recirculation of ambient air. The exhaust system on the ceiling of the physical spaces allows for 16 air changes per hour and a flow of 437 m3 as described in Process SEI 23854.004289/2022-12. The LAH is equipped with synthetic anatomical parts, a human body from the unclaimed bodies system, and human parts fixed in formalin solution and preserved in glycerin and alcohol.

The dry parts room has a space of 59.07m² (figure 2). It is equipped with cabinets in masonry with an epoxy finish, a stainless steel sink, furniture for the teachers and technicians who attend the LAH. The wet parts room, or vat room, has a space of 59.34m² (figure 3) and is equipped with two freezers, five stainless steel vats, three of which are for whole bodies (measuring 180cm in length, 78cm in width and 58cm tall with a capacity of 835 liters of solution) and two for organs and smaller natural parts (measuring 105cm in length, 78cm in width and 58cm in height, with capacity for 487 liters of solution). Countertops in masonry with ceramic coating, stainless steel sinks, two stainless steel carts with wheels for transporting parts, a stainless steel stretcher with wheels, equip this room dedicated to the preparation of the LAH collection of natural pieces. The room for practical classes has ample space of 129.51m² (figure 4) with capacity for 35 students. It is equipped with a whiteboard, eight tables for dissection and preparation of parts, benches and stainless steel sinks (90 cm).

The laboratory has a sewage system, whose retention tank is located outside the building. This tank is dedicated to effluents from vats and other points (Process SEI 23854.004289/2022-12). The management and disposal of biological and chemical waste are defined by resolutions and specific legislation in accordance with the UFJ Waste Management Program. Every human resource team involved in laboratory tasks must be aware not only of the Basic Guide for Waste Management, but also of the Laboratory Norms that contain the procedures and protocols to be adopted in case of emergency situations. The team must also be fully aware of the handling and location of protective equipment, such as fire extinguishers, alarm and warning systems for the concentration of chemical substances present in atmospheric air, and the symptoms that indicate intoxication and/or poisoning. It must remain attentive to correct the harmful effects of chemical substances, explosions or electric shock, among others. Special care is also recommended for the personnel who deal with the processing of the received samples, aiming not only at the contamination of the samples among themselves, but also of the technicians themselves.

Figure 1: Laboratory of Human Anatomy (LAH) on the ground floor of the medical course building

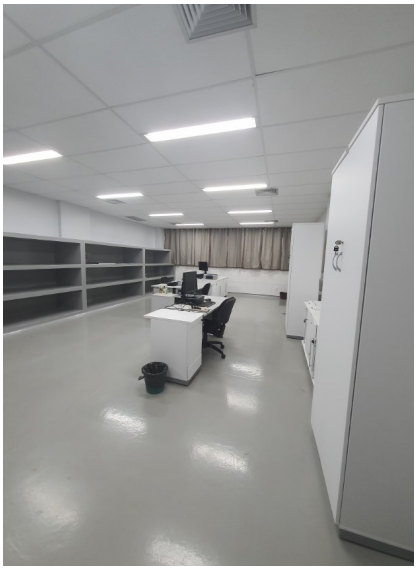

Figure 2: Room of dry parts of the Laboratory of Human Anatomy.

Figure 3: Wet parts preparation room.

Figure 4: Practical classroom.

EQUIPMENT AND FURNITURE

Dry parts room			
N°	**Description**	**Quantity**	**Patrimony**
1	Office style tables	3	656363, 656364, 656379
2	Office type chairs	3	660678, 660664, 363023
3	Computers (monitor, case, keyboard)	2	673266, 673252, 673282, 673265, 673251, 673281
4	Vertical cabinet (with 2-door shelves)	2	714014, 714005
5	4 door book storage unit	3	714016, 714017, 714015
Wet parts room			
N°	**Description**	**Quantity**	**Patrimony**
6	Freezer Horizontal	1	672982
7	Stainless stroller with wheels	2	666919, 666949
8	Stainless steel stretcher with wheels	1	714414
9	Lady with wheels	6	711544, 711537, 711512, 711479, 711541, 711504
10	Freezer -80	1	711504
Practical classroom			
N°	**Description**	**Quantity**	**Patrimony**
11	Stainless steel benches for practice class	8	665697, 665694, 665693, 665700, 665695, 665699, 665698, 665692
12	Lady with wheels	34	711485, 711525, 711523, 711542, 711507, 711524, 711489, 711535, 711522, 711527, 711530, 711546, 711532, 711469, 711539, 711533, 711540, 711471, 711515, 711529, 711477, 711496, 711519, 711534, 711531, 711503, 711511, 711470, 711487, 711543, 711500, 711528, 711497, 711536
13	Television Smart TV Flat Screen	1	672995
14	Glass Shelves with two doors	3	673322, 673317, 673326
15	Drawer	1	714026
16	Dummy dolls with superficial muscles	2	673991, 6739990

LABORATORY OPERATION

The laboratory is available to the community from 07:00 to 17:00 from Monday to Friday. Visitations are not allowed, considering the presence of a collection of human parts whose presentation is restricted to scientific purposes. Every six months, the coordinator prepares, with the teachers and coordinators who use the space, a spreadsheet with regular class schedules, and related activities such as monitoring, research and extension projects. Given the need and availability, the space can be used by interested parties upon formal request. In order to use the laboratory, the interested party must request an appointment by e-mail (lah@ufj.edu.br), attaching the Term of Responsibility (attached to the Laboratory Norms), the presence of 32 students per class. The division of classes is essential, both for the pedagogical aspect and for safety reasons. All practical laboratory activities must be previously planned and scheduled with the technician responsible for the laboratory via email (lah@ufj.edu.br). Students in practical classes must only have access to the laboratory with the presence of a server responsible for the activity.

PREPARATION OF NATURAL PARTS

The activities of the Human Anatomy service are carried out in a dedicated area that allows the development of activities assigned to the sector, having as a guideline the administrative presence of the responsible technician, subordinate to the Coordination of the Medicine Course.

RECEIPT OF SAMPLES

Materials are received in the wet parts room/ parts preparation room. Bottles containing natural parts must be identified and stored. Materials will only be received accompanied by the requests filled in with the following data: identification of the material, origin, clinical data and complete documentation of donation or term of release of biological material/body from the Secretariat of Security of the Scientific Technical Police SPTC/ GO, term of donation of cemetery material (Agreement 022/2022, August 2022).

Criteria for receiving Biological Material:

1-Body rules (exceptions are possible on a case-by-case basis): Weight: (Women: 45 and 80 kg, Men: 45 and 90 kg); Height: up to 1.90 m.

2- Absence of infections in the medical history, blood disorders and contaminants, including, but not exclusively:

- History of hepatitis A-E (including hepatitis C);
- HIV, AIDS;
- Tuberculosis, meningitis, sepsis, jaundice, gangrene.

3- Preventive situations for receiving the body/biological part:

- Material received after 72 hours of death or surgical removal of the organism;
- Documents without proper completion and signatures;
- Piece: absence of identification.

FIXATION

It is prerequisite the fixation of natural pieces, aiming at the preservation of the cellular structure and conservation of the details, with a minimum of distortion. The solutions used for this purpose are called "fixators", and their choice depends on the material to be prepared, what is intended to be studied and the anatomical technique to be developed. It is recommended that the sample be immediately immersed in a closed container containing the fixative liquid:

- 35% formalin solution, 10 volumes;
- Fixation time varies. Usually, the human body immersed in a fixative solution in a stainless steel vat must

remain between two and six months.

- Filtration and periodic renewal of fixative solutions.
- Solution change every two years. It will be drained into the reservoir external to the building so that the Programa de Gerenciamento de Resíduos da UFJ determine the company that will collect the chemical waste.

PREPARATION OF THE DONATED BODY

Step 1: Hygiene and trichotomy of the donated body

Wash the entire skin with a sponge and neutral detergent, especially in the joint and intimate areas. It is necessary to carry out trichotomy in the regions of the head and in the intimate regions. Then rinse the entire skin with sodium hypochlorite.

Necessary materials:

1. 2 sponges;
2. 2 brushes;
3. 2 detergents or soap in bar;
4. 2 liters of 2% sodium hypochlorite;
5. Trichotome (shaving apparatus);
6. Compresses and bleached cloths.

Step 2: Location of the vessels in the femoral triangle and adaptation of the cannulas:

Move the large joints (shoulder, elbow, wrist, hip, knee and ankle), placing the body in the described anatomical position. Place your hands palm up on the stretcher, with your fingers straight, keeping your hands open. Locate a line between the anterior superior iliac spine and the pubic tubercle (Figure 5). Divide this line into 3 equal parts. Make an incision of about 5 cm in the lower third, corresponding to the region of the femoral triangle.

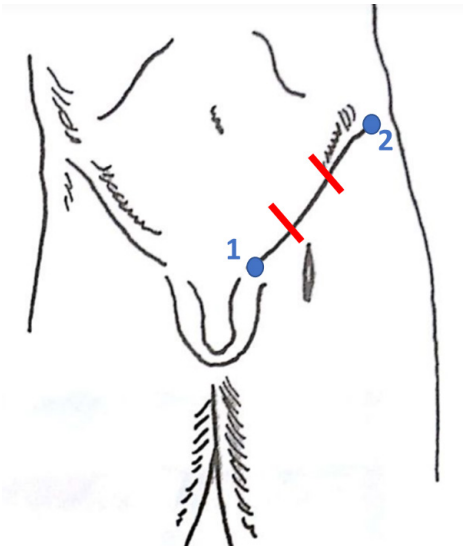

Figure 5: References for the incision in the femoral triangle and location of the femoral artery. 1. pubic tubercle; 2. superior iliac spine. Incision made in the lower third of the line between these two points. Source: Adapted from Rodrigues (2010).

Locate and expose the femoral artery by isolating it from the femoral vein and nerve. Pass a cotton thread under the artery superiorly and inferiorly. Carry out a small longitudinal section only on the anterior wall of the femoral artery, insert the cannula in a "Y" or "T" shape so that one of the exits is in a proximal direction and the other exit is distal. Using the threads passed under the artery, tie the ends of the cannula with a string or cotton thread, stabilizing it inside the vessel to prevent the solution from leaking.

Necessary materials:

- 2 Hemostatic forceps;
- 2 Simple dissecting forceps;
- 2 Mouse tooth tweezers;
- 2 curved Metzenbaum scissors;
- 2 Removable blade scalpel handles no. 4;
- 4 Scalpel Blades nº 23 (20 a 24);
- 2 Farabeuf retractors;
- 2 Needled threads for suturing the skin;
- 2 Needle holder;
- No. 0 cotton yarn (cordone) not stiff

like nylon, thicker string-like;

- Metal luer lock cannulas, for thanatopraxy, or plastic probes (urethral type, sizes 12 or 16) or Y or T system.
- Procedure glove and other PPE's.

Step 3: Preparing the system for gravity perfusion:

1-The container containing it must be attached to the support, at least 1 meter away from the body to be fixed.

Figure 6: * Transparent plastic container, with a capacity of 8 liters, adapted with a drain in the lower portion with division for two hoses.

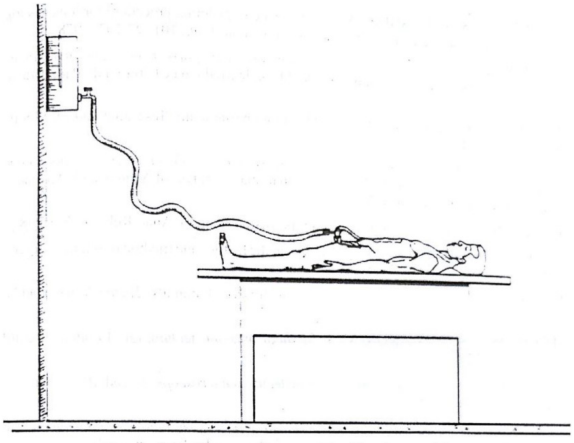

Figure 7 - Gravity technique for fixing bodies, height of the container at least 1 meter from the height of the body. Adapted from Rodrigues (2010)

Step 4: Perfusion of saline and fixative solution:

A) Washing of the cardiovascular system with saline solution (opening of the drainage system through the femoral vein)

Check the need for washing the cardiovascular system For a body weighing 70 kg, five liters of saline solution will be needed: 1-Fill the container with 5 liters of saline solution or saline solution (NaCl 0.9%) and let the air out of the inside the hose and cannula, by means of gravity; 2- Keep the hoses closed with the serum inside, until they are adapted to the cannulas of the arteries; 3- To wash the cardiovascular system with serum, a longitudinal incision must be made in the previously isolated femoral vein, freeing the drainage system for the blood to exit; 4- After confirming that the cannulas are well adapted to the arteries, attach them to the hoses that contain only serum inside. 5-Approximately 5 liters of saline solution will be perfused to wash the cardiovascular system; 6-Check often that the cannulas are well adapted to your hose.

B) Fixation of the body with perfusion of 10% formalin solution (closing the drainage system):

Finally, when the drained blood reduces its reddish color indicating that water is being drained, or when all the serum has been perfused, the femoral vein is then closed to prevent drainage of the fixative solution. Tie the vase with a thick thread. Avoid the rigid suture thread that could sever the referred vessel.

To fix a donated body weighing approximately 70 kg, prepare 5 liters of 35% formaldehyde solution (10 volumes): 1. Add 500 mL of formaldehyde to the test tube; 2.Transfer the amount of formaldehyde from the test tube to a 5-liter beaker; 3. Complete the volume to 5 liters with distilled water and homogenize.

The fixative solution is added to the adapted container* and the fixation of the body with the solution begins. 1-Fill the container with 5 liters of fixative solution and let the air out of the interior of the hose and the cannula, by means of gravity; 2- Keep the hoses closed with the solution inside, until they adapt to the cannulas of the arteries.

Observe the turgidity of the body and the increase in abdominal volume due to the accumulation of the fixative inside. After injecting 2 to 3 liters of solution, opening the venous system is optional. Massage the different parts of the body, particularly the extremities (hands and feet), buttocks and back. During the massage, the increase in turgidity due to the infusion of the fixative must be noticed. After passing all the solution, remove the cannula and tie it firmly above and below the insertion site.

Necessary materials:

- 1 beaker 5L;
- 1 **test tube** 1L;
- 1 gallon of 5 liters of formaldehyde at 35%;
- Distilled water;
- 1 transparent container adapted with drain (at least 5 liters volume)*;
- 4 meters of hose/ equipment.

C) Fixation of the body with other solutions

Other solutions, alternatives to formaldehyde, can be used to fix the bodies received, depending on their peculiarities and availability of materials and the intended purpose of the biological material.

Alternative solution for fixation - 20 liters for 1 body (Oxley, Barros Fazan, 2021)

- Ethyl alcohol 96 GL - 1000 ml
- Phenol P.A. C6H5OH (Cas 108-95-2) -1000g
- Glycerin p.a. - 1000ml
- Sodium Nitrate P.A. NaNO3 (CAS 7631-99-4) -1000g
- Formaldehyde P.A. HCHO (CAS: 50-00-0) - 2000ml
- Distilled Water - 14,000 ml

Thiel's solution

This solution is interesting for materials intended for training surgical or clinical skills, since it preserves the natural characteristics of the body with greater richness.

Thiel's method was first described by Walter Thiel in 1992 and updated in 2002 (THIEL, 1992, 2002). Originally, the Thiel method is basically composed of two types of solutions: one for intravascular injection and the other for immersion. Each of these solutions, in turn, corresponds to a mixture of other solutions.

Cadavers are perfused with this solution using the saphenous vein, femoral artery and/or common carotid artery. The original study described further perfusion of the lungs using a tracheal tube, the intestine using a gastric tube, and the brain via the cribriform plate and the superior sagittal sinus(OTTONE et al., 2016; THIEL, 1992).

After fixation, bodies must be stored in soaking solution for two to six months. After this period, the bodies can be stored in polyethylene bags, with no need for refrigeration or vacuum packaging, and can be used for years (EISMA; LAMB; SOAMES, 2013; OTTONE et al., 2016; THIEL, 1992). The concentrations of these substances were also used in different ways by more recent studies(OTTONE et al., 2016).

Intravascular injection solution for an 80 kg body (THIEL, 1992, 2002):

- 14,300 ml of solution A
  - 3g of boric acid
  - 30 ml of ethylene glycol
  - 20g ammonium nitrate
  - 5g potassium nitrate
  - 100 ml of hot water
- 500 ml of solution B
  - 10 ml of ethylene glycol

- 1g of 4-chloro-3-methylphenol
- 300 ml of formaldehyde and 700g of sodium sulfate.

Immersion solution (THIEL, 1992, 2002):

- 3g of boric acid
- 10g of ethylene glycol
- 10g ammonium nitrate
- 5g of potassium nitrate
- 7g of sulfit of sodium
- 2g formaline
- 2g solution B
- 100 ml of hot water

Solution A	Solution B	Injection Solution	Immersion Solution
Boric Acid - 3G	EthylenoGlicol - 10ml	Solution A - 14300ml	Boric Acid - 3G
EthylenoGlicol - 30ml	4-Chloro-3Methylphenol-1ml	Solution B - 500ml	Ethylenoglycol - 10 ml
Ammonium nitrate - 20g		Formaldehyde - 300ml	Ammonium nitrate - 10g
Potassium nitrate - 5g		Sodium sulfate - 700g	Potassium nitrate - 10g
Hot water - 100ml			Hot water - 100ml
			Sodium sulfite - 7g
			Solução B - 2ml

Modified Larssen's Solution

The Modified Larssen Solution (MLS) is also indicated for the preparation of bodies intended for training surgical skills.

Necessary materials:

- 100 ml of 10% formalina
- 400 ml of glycerol
- 200 g of chlorine hydrate
- 200 g of sodium sulfate
- 200 g of sodium bicarbonate
- 180 g of sodium chloride
- 2 l of distilled water.

One part of this concentrate must be mixed with three parts of distilled water, at room temperature, with the help of a blender. Its application is similar to that of other conventional methods, although in tropical countries it is recommended to preserve the body between each use in refrigeration between -16°C and -20°C (GUIMARÃES DA SILVA; MATERA; RIBEIRO, 2004).

Step 5: Intramuscular injection of 10% formalin solution

After completing the perfusion of all the fixative solution, remove the cannulas and close the open vessels by tying a string. Palpate the entire body and, in places that are still soft, perform the fixation by injecting directly into the region, solution of formaldehyde 10% with syringe.

Hygiene the donated body again with soap and water and prepare it for immersion in the formaldehyde solution (item 4.2.4), in the stainless steel tank, so that it remains in the anatomical position so that it is stored until the beginning of its dissection. Ideally, the donated body must remain immersed in the vat for 2 to 6 months before being used. The body fixed with formaldehyde can stay between 2 and 5 days on the stretcher outside the stainless steel tank, to be examined repeatedly and to be sure that the perfusion was adequate.

Necessary materials:

- prepared 10% formalin solution.
- 10 Needled syringes for localized intramuscular injections;
- Procedure glove and other PPE's.

BODY PREPARATION FROM THE UNCLAIMED BODY SYSTEM WITH INJECTION OF 10% FORMALIN SOLUTION:

Usually, these bodies remain frozen for at least 30 days. Freezing produces blood clotting in the vessels, making it impossible to fix the solution by perfusion through the arteries. Another compromising factor is vessel injury after the necropsy examination, or resulting

from the cause of death. In these situations the cardiovascular system is not closed.

To fix a donated body weighing approximately 70 kg, prepare 2.5 liters of 35% formalin solution (10 volumes). This solution will be provided at a concentration of 10%. 1.Add 250 mL of formaldehyde to the test tube; 2. Transfer the amount of formaldehyde from the test tube to a 5-liter beaker; 3. Complete the volume until reaching 2.5 liters, with distilled water and homogenize.

Palpate the entire body and, in areas that are still soft, perform fixation by injecting a 10% formalin solution directly into the region with a syringe. Observe the turgidity of the body and the increase in abdominal volume due to the accumulation of the fixative inside. After injecting 2.5 liters of solution. Massage the different parts of the body, particularly the extremities (hands and feet), buttocks and back. During the massage, the increase in turgidity due to the infusion of the fixative must be noticed. Hygiene the donated body again with soap and water and prepare it for immersion in the formaldehyde solution (item 4.2.4), in the stainless steel tank, so that it remains in the anatomical position so that it is stored until the beginning of its dissection.

Necessary materials:

- 1 beaker 5L;
- test tube 1L;
- 1 gallon of 5 liters of formaldehyde at 35%;
- Distilled water;
- 10 Syringes of 20 ml needed for localized intramuscular injections;
- Procedure Glove and other EPIs.

PREPARATION OF THE FIXATIVE SOLUTION FOR IMMERSION IN THE STAINLESS STEEL TANK

The stainless steel vat has approximately 835 m3. Therefore, for a body, prepare the volume that corresponds to half of the vat. The 35% solution (10 volumes) must be provided at 10% concentration. For a volume of 417,000 liters, add 41.7 liters of 35% formaldehyde (10 volumes) and fill up with water up to half of the tank, that is, 29 cm in height. Donated body parts, such as amputated upper and lower limbs, must be immersed in the smallest stainless steel vat (487 m3) and follow the same preparation as the donated body with due proportions.

Necessary materials:

- 1 stainless steel tank of 835 m3 for 1 body to fill 417m3;
- 9 gallons of 5 liters of 35% formaldehyde;
- 1 stainless steel tank of 487 m3 for 1 member to fill 243 m3;
- 5 gallons of 35% formaldehyde;
- Water transferred by a hose or buckets;
- Procedure glove and other PPE's;
- Rubber glove for cleaning.

PREPARATION OF ORGANS, SMALLER NATURAL PARTS AND ABORTION PRODUCTS (FETUSES)

For the fixation of a donated organ/fetuses, it will be necessary to separate the appropriate container for the dimensions of the piece. Prepare 1 liter of 35% formaldehyde solution (10 volumes): 1. Add 100 mL of formaldehyde to the test tube; 2.Transfer the amount of formaldehyde from the test tube to a 1 liter beaker; 3. Complete the volume to 1 liter with distilled water and homogenize.

Necessary materials:

- 1 Beaker 1 L;
- 1 Test tube 1L;
- 1 gallon of 1 liter of Formaldehyde at 35%;
- Distilled water;
- 2 Needled syringes for localized injections;
- Procedure glove and other PPE's.

BONES RECEIVED VIA AGREEMENT 02/2022 MUNICIPAL CEMETERY (MUNICIPAL LAW NO. 4.340/2021)

MATERIAL REQUEST VIA THE ELECTRONIC INFORMATION SYSTEM (SEI 23854.002873/2022-25)

Requests must be made by members of the biological material commission according to ordinance 186 of November 29, 2021 (Process SEI 23070.044323/2019-03), via the Electronic Information System (SEI) and directed to the Secretariat for the Environment and Urbanism, responsible for the administration and management of the Municipal Cemetery. The standard texts of the aforementioned documents were included in the Electronic Information System (SEI) under numbers 443 and 243. When the bones are received from the cemetery, viable bones will be selected for cleaning.

CLEANING AND WHITENING

The bones will be cleaned in running water with the help of sponges, brushes, and neutral liquid soap, without the use of cooking (boiling). Scrubbing them gently to remove any dirt and avoid damaging the structure. Then, they will be immersed in a 50% sodium hypochlorite solution for 24 hours. Again, they will be washed under running water and kept vertically to drain excess water and dry naturally for 12 hours (Oxley, Barros Fazan, 2021).

Whitening can also be carried out with immersion in 130 volumes of hydrogen peroxide diluted in 30% for 12 hours. Hydrogen peroxide remains corroding the bone structure, so they will be washed under running water after immersion. None of the solutions will be heated, because although boiling speeds up the whitening time, it ends up weakening the bone structure. Finishing the whitening process by exposing the bones to the sun greatly favors the process.

MAINTENANCE AND STORAGE

A varnish, paint or resin coating will be applied after the bones have been cleaned and whitened. They will be periodically cleaned by spraying 70% ethyl alcohol and drying with a paper towel. It is forbidden to handle dry bones with gloves soiled with glycerin, as this can encourage the development of fungi and bacteria. Periodically washed with 2% sodium hypochlorite.

The bones will be stored in transparent plastic boxes, which will be periodically washed with water and 2% sodium hypochlorite. They must remain in the dry parts room, and transported to the laboratory of practical classes only upon request, to guarantee that they will not have contact with solutions, such as glycerin and formalin.

Necessary materials:

- neutral liquid soap;
- sponge and brushes;
- clear plastic boxes with lids;
- 2% sodium hypochlorite;
- 70% ethyl alcohol;
- hydrogen peroxide 130 volumes diluted by 30%;
- 50% sodium hypochlorite;
- varnish, paint, white sole, acrylic resin or other sealant;
- jogo de pincéis; brush set;
- Procedure glove and other PPE's.

PRESERVATION

GLYCERINATION

When talking about glycerination for the preservation of anatomical parts, one takes into account the washing of parts that were preserved in 10% formaldehyde with water for 48 hours and subsequent drying in the shade. Afterwards, the pieces are placed in 10% hydrogen peroxide for 48 hours in a

closed container and, after that, removed, washed in water and dried. After that, the pieces are submerged and closed in absolute alcohol (99%) until the measurement of the concentration with the aid of an alcoholometer is 65%. This takes about three to three and a half months. Next, the pieces must be submerged in glycerin for two months. Glycerin hydrates the pieces altered by alcohol and partially recovers the color that was removed by hydrogen peroxide. Finally, the pieces bathed in glycerin are placed in a colander for at least eight hours and then stored in plastic containers (CURY; CENSONI; AMBRÓSIO, 2013).

After remaining in absolute alcohol, the lightness and rigidity of the organs increased dramatically, due to the loss of water, and they were still pale due to hydrogen peroxide and very dry (CURY; CENSONI; AMBRÓSIO, 2013). It is inferred that these characteristics are not ideal for the practice of Operative Technique and surgeries, but the study of Anatomy can be favored by the ease of handling the parts, since they become firmer, drier and rubbery (KARAM et al., 2016). Glycerination preserves anatomical parts very well and is ideal for practical anatomy classes when considering the low risk to students' health. The technique promotes good durability and there is rarely a need for maintenance, in addition to the possibility of preserving the parts completely dry after performing the procedures (CURY; CENSONI; AMBRÓSIO, 2013; KARAM et al., 2016).

Glycerin acts as an antifungal and bactericidal agent. All natural pieces are previously fixed in a 10% formalin solution. Afterwards, they will be washed in running water and dried in the shade for two days. They will be dehydrated using ethyl alcohol, preferably methyl or ethyl alcohol. To avoid evaporation, the material must remain in plastic bottles with lids, or closed stainless steel vats. Plastic bottles (boxes) are preferably made of opaque material, not transparent, to avoid exposure to sunlight. Four protocols (Karam, et.al., 2016) were proposed and will be implemented according to the availability of time and consumption material.

Protocol 1: First phase (Torres, 2004): After the pieces are fixed and immersed for 30 days, they will be immersed in a 50% glycerin and 5% hydrogen peroxide solution. The pieces will be kept in a plastic container with a lid, in a solution of glycerin PA and 92% alcohol. Periodically (annually) they will be immersed for 30 days in the aforementioned hydrogen peroxide solution for whitening. Second phase (Dias et.al., 2008): the PA glycerin and 92% alcohol solution will be switched to the 50% glycerin and sodium chloride solution.

Protocol 2 (Gigek et.al., 2009): performed in 3 stages (dehydration, bleaching, and drying). Dehydration performed with immersion in a 70% ethyl alcohol solution for seven days. Whitening in a 3% hydrogen peroxide solution for seven days. Drying: ethyl alcohol solution (70%) and glycerin PA in a 1:2 ratio.

Protocol 3 (Carvalho et.al., 2013): dehydrate in 70% ethyl alcohol solution for two days. Then, immersion in a 1:2 solution of PA Alcohol and semi-purified glycerin (80%).

Protocol 4 (Cury 2013): Parts must be submerged in 10% hydrogen peroxide for 48 hours and then washed again in running water, followed by drying in the shade. They will be immersed in 99% absolute alcohol and the alcohol concentration will be measured weekly until it reaches 65%. This process takes approximately 3 months. They will then be immersed in glycerin PA for 2 months. After this period, the pieces will be left in a colander for a minimum period of 8 hours, to remove excess glycerin. They will be stored in plastic containers without the need for any type of soaking solution.

Necessary materials:

- milky plastic boxes (not transparent) with lid;
- Ethyl alcohol 70%;
- Alcohol 92%;
- Alcohometer;
- Hydrogen peroxide 130 volumes diluted by 30%;
- glycerin P.A.;
- Semipurified glycerin 80%;
- Sodium chloride;
- 35% formaldehyde (10 volumes) provided at 10%;
- Procedure glove and other PPE.

SALINIZATION

One of the alternatives to formaldehyde, presented in the literature and by some of the interviewees, is saline solution, especially for the preservation of post-fixation bodies. There is evidence that the preservation of anatomical specimens with a 30% sodium chloride solution is extremely effective in preserving formaldehyde-fixed tissues without contamination during a 5-year study period (DE OLIVEIRA, 2014). There are other advantages of the saline solution, as, unlike formaldehyde solutions, it does not generate or release contaminated effluents or toxic gases. Furthermore, the cost of saline solution is approximately 10% of the cost of formaldehyde and is much lower than other preservation solutions such as Thiel's (DE OLIVEIRA, 2014).

Some special care with the saline solution must be taken. Due to the difference in density between human tissues and saline, bodies tend to float in immersion tanks. Therefore, placing a weight on the bodies helps to keep them immersed. For this reason, the tank must remain closed. Regarding the pieces arranged on the benches, a good consideration is to cover the bodies/pieces with a cotton blanket that will keep the humidity avoiding the dehydration of the material (DE OLIVEIRA, 2014). Finally, a cover with material to prevent the passage of light (blackout type) placed over the cotton blanket, can prevent photolysis of the piece. There is a consensus on the importance of periodic cleaning with soap and water of countertops and metallic objects that come into contact with parts preserved in saline solution, since salts favor the oxidation of metallic materials (DE OLIVEIRA, 2014).

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QUALITY CONTROL, STORAGE AND MATERIAL REGISTRATION

QUALITY CONTROL

Quality control corresponds to a series of principles and practices that aim to minimize the probability of errors. It fundamentally depends on the good performance of technical and administrative activities. The supervision of tasks must follow the functional organization, thus starting at the health unit that obtains the material.

At the reception of the laboratory, the control takes place in relation to the documentation

that accompanies the material, in accordance with current legislation, for each situation of origin of the biological material. Samples must be received accompanied by the respective Donation Terms, identification documents and medical history (and when applicable, death certificate and signed death certificate).

STORAGE

The handling of the material must be firm, but carried out with delicacy, so as not to damage the piece, or lose the most delicate material. The laboratory has, in its physical structure, an area suitable for the functioning of the archive and report of anatomical techniques. All natural parts fixed, are later stored in plastic boxes with lids. The material is preserved in a glycerin and alcohol solution. Previously, the pieces must be dehydrated with sequential concentrations of ethyl alcohol. Once the dehydration and bleaching process is complete, the pieces are finally immersed in a glycerin and alcohol solution.

REGISTRY

Samples must be registered in an online spreadsheet, coded, and periodically updated via SEI. The record must only be made after checking the conditions of the material to be examined. The material is described in relation to its size, weight, thickness, dimension, consistency, color and relevant macroscopic characteristics. A worksheet contains individual information about each case, the part code, anatomical techniques performed, name of the student/technician responsible for the manipulation.

The encoding of physical files represents a facilitating agent in the preparation of reports and for the practice of future research. The information of each material received is stored in the online spreadsheet (Process 23070.007259/2022-77 migrated to 23854.007850/2022-15), with all relevant information regarding the origin of the material, according to the techniques recommended for report files.

MAINTENANCE OF THE LABORATORY AND PARTS COLLECTION

The purpose of cleaning and maintaining the LAH is to protect the health of its users (cleaning staff, visitors, employees and students), in addition to preserving the collection of natural and artificial pieces with greater durability. Daily reinforcement in cleaning with 70% alcohol is carried out in areas and instruments that are frequently touched and manipulated: door handles, stainless steel countertops and stool (seat stool). This cleaning must always take place after changing shifts (morning/evening) or between changing classes/subclasses. Gel alcohol will be available in the laboratory's three work environments.

The daily maintenance of the LAH is carried out with the removal of solids and dust from the floor using a broom, followed by cleaning with a damp cloth soaked in disinfectant. Once a week, the entire laboratory floor is cleaned with water, soap and a cloth soaked in 2% sodium hypochlorite. Sinks and countertops must be cleaned with 70% alcohol after washing. The cleaning of the laboratory (physical structure – floors, walls, windows) is carried out by the Campus cleaning team (outsourced team). The cleaning of equipment and utensils used in practical classes and research and extension activities is the responsibility of students and public servants (technicians and professors).

Synthetic parts are cleaned with a dry cloth and stored in a dry place without direct exposure to light. For the conservation of biological material, the room temperature must be maintained between 20 and 22 degrees Celsius. Therefore, windows must remain closed as well as curtains with blackout

material.

Natural pieces are stored in boxes containing glycerin and ethyl alcohol, and when displayed on countertops, they must remain covered by covers that block natural lighting (blackout). Periodically, the hydration of the pieces is interspersed with anatomical techniques to maintain their color.

It is forbidden to transport equipment, utensils and anatomical material from the laboratory without the authorization of those responsible; their conservation is of fundamental importance for the study of other students. Users of laboratories must check all specifications on the equipment used before use. If in doubt, refer to the technician in charge and/or teachers.

DUTIES AND RESPONSIBILITIES

TECHNICAL BODY

I. Comply with and enforce the regulations, standards and routines pre-established by the laboratory coordination;
II. Receive, register and previously prepare materials related to laboratory activity;
III. Monitor all academic activities developed in the laboratory space;
IV. Guide teachers, students and visitors regarding the rules for entering, leaving and using the laboratory;
V. Ensure the organization and cleaning of glassware, equipment and the laboratory, before, during and after activities;
VI. Request maintenance of equipment in the laboratory area, whenever necessary;
VII. Supervise and control the use of chemical materials and reagents;
VIII. Contribute to the construction of spreadsheets for the purchase of consumables and permanent material for the laboratory;
IX. Communicate via email (lah@ufj.edu.br) to the laboratory coordinator any irregularities that may occur in the laboratory;
X. Prohibit the entry of strange people into the laboratory premises;
XI. The laboratory technician must notify accidents to the laboratory coordination.

LABORATORY COORDINATOR

I. Plan, monitor and evaluate the actions developed in the laboratory;
II. Supervise compliance with technical and administrative obligations, aiming at the preservation of public property and the maximum use of space for previously scheduled and publicized classes;
III. Hold regular meetings with administrative technicians;
IV. Establish regulations, standards and routines for the proper functioning of the laboratory.

FACULTY

I. Comply with and enforce compliance with the regulations, standards and routines pre-established by the laboratory's coordination whenever they use its facilities;
II. Schedule academic activities with the laboratory technician, respecting the advance notice of at least 48 hours, with the technician responsible for the laboratory via email (lah@ufj.edu.br), and the priority of attendance will be for classes already scheduled;
III. Be responsible for maintaining order in the environment while using the laboratory facilities;
IV. Be responsible for the materials, furniture and equipment whenever these are used for classes and academic-scientific meetings;
V. Communicate to the technician responsible for the laboratory via e-mail (lah@ufj.edu.br) any irregularities or eventualities while using their facilities.

REGARDING THE STUDENT

I. To be properly dressed (long-sleeved lab coat, pants and closed-toe shoes) and use the PPE recommended by Institutional resolutions and regulations;

II. Maintain order and cleanliness in the laboratory, closing any open windows, washing the instruments used and properly closing the taps used, storing discarded gloves in the recommended garbage, properly storing any biological materials used in the practical activity, turning off the devices used and turning off the lights in the laboratories;

III. Take care of and be responsible for all materials, furniture and equipment available for academic-scientific use;

IV. Communicate directly to the professor, or in writing to the laboratory technician, any irregularities or eventualities during the time they are using the laboratory facilities;

V. Comply with the predetermination of schedules for using the laboratory;

VI. Maintain adequate silence in and around the laboratory;

VII. Schedule the monitoring time with the laboratory technician by e-mail (lah@ufj.edu.br);

VIII. Present authorization from the professor of the subject to carry out practical activities outside the established hours.

MONITORS, INTERNS AND MEMBERS OF THE ACADEMIC LEAGUE OF CLINICAL ANATOMY (LAAC)

I. All activities must be supervised by a responsible server;

II. It is the teacher's responsibility to organize viable monitoring schedules so as not to compromise regular teaching activities;

III. The student must be punctual, assiduous and responsible for organizing and cleaning the laboratory during activity periods;

IV. The student must report their experiences during the activities to the teacher in charge/supervisor;

V. It is expressly forbidden to give any student the keys to the laboratory. Authorized students, by the laboratory technician or coordinator, will be able to collect the laboratory key from those responsible for the control of them;

VI. Any and all alterations noticed inside the laboratory must be informed in writing, via e-mail (lah@ufj.edu.br) to the coordinator or technician responsible for the laboratory.

VISITORS

I. Be properly dressed (long-sleeved lab coat, pants and closed-toe shoes) and use the PPE recommended by Institutional resolutions and regulations;

II. Do not overcrowd the laboratory, respecting the defined maximum capacity;

III. Communicate to the person responsible for the laboratory the occurrence of damages or accidents that occurred within the laboratory;

IV. Behave appropriately to avoid damage and/or accidents inside the laboratory, not consuming food or drink. According to federal legislation, smoking is prohibited indoors;

V. Maintain due silence in the laboratory premises, as well as order and organization.

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This document was prepared considering the Standard Operating Procedures (SOP) of the Human Anatomy Laboratory of the Centro de Ensino Barão de Mauá, Ribeirão Preto, (SP) prepared by Professor Camila de Albuquerque, with guidance from Professor Claudio da Silva Teixeira of the Centro de Ensino and Goiás Research (INEPG), Rio Verde, Goiás. The following bibliographical references were considered:

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