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RESEARCH ARTICLE

ROLE OF THERMOCOL IN ANATOMY DISSECTION TO PREVENT THE DRYING OF DISSECTED PARTS OF CADAVER

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ABSTRACT

Anatomy stands as a backbone in medical education, teaching of gross anatomy in dissection hall by dissecting the cadavers facilitates the students to understand the subject very much advantageously in more efficient mode. Common problem encountered during anatomy dissection is drying of dissected parts of the cadaver and it is a major problem for medical colleges which are running in hot and dry climate areas like vidarbha region of Maharashtra. The concept of using thermocol in anatomy dissection for prevention of drying of dissected parts of cadaver is an innovative idea. Two adult male cadavers were used for the study, femoral triangle was dissected in both cadavers, Superficial and deep dissection was done by giving time interval for the study purpose. The dissected part of the cadaver (II) which was covered by thermocol box remains fresh, easy to identify the structures and to carry out further dissection. Other hand, dissected area of uncovered cadaver (I) was dried,the muscular boundaries and Neurovascular contents are decolourised and not clear for identification. The ideal thermocol box utilized for the study is most reliable, cost effective and easy to handle.

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INTRODUCTION

Dissection is an integral part of medical education. Study of anatomy remains incomplete without dissection of the cadaver (Johnson, 2002). The cadaver remains on the dissection table from Monday to Saturday. Drying up of the dissected part is common problem seen in almost all the dissection halls of anatomy department all around the country (Frederick and Strub, 1989), particularly in the hot and dry climate of vidarbha region of Maharashtra. The concept of using thermocol in anatomy dissection for prevention of drying of dissected parts of cadaver is an innovative idea. Thermocol is widely used for insulation in refrigerator, cold storage, refrigerated trucks, AC ducts, building ceilings, cemented water tanks etc. It is also used for packaging of fragile products and delicate equipment's across many industrial segments. Thermocol is extremely light, can be molded into any desired shape and is yet sufficiently rigid to absorb shocks and physical impact. It comes with closed cell structure and thus supports low thermal conductivity, hence it is highly preferred for thermal insulation. Thermocol is perfect material to maintain temperature balance; it is tasteless, odourless and fungi resistant. Thermocol is first used in anatomy by Dr. Ramakrishna (Ramakrishna and Prasad, 2011), a professor of Anatomy in veterinary college, Bangalore for plastination of specimens and organs. The aim of the present study is to find out the usefulness of thermocol for prevention of drying of the dissected parts of cadaver in anatomy dissection halls. The study was also aimed to propose ideal thermocol box for covering cadaver to maintain thermal balance. Thermocol boxes was used only as an adjunct to wetting solution and by no means intended to replace the wetting solution.

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MATERIALS AND METHODS

The current study was conducted in department of anatomy, JNMC, Sawangi, Wardha, Vidarbha region, Maharashtra. Two cadavers were selected for the study (I & II), which are preserved by routine embalming procedure. Cadavers are taken out of the storage tank and placed over the dissection table. The dissection of femoral triangle was done based on instructions given in Cunningham's manual of practical Anatomy, superficial dissection of femoral triangle was carried on both cadavers I & II. Photographs are taken, Cadaver – I

was kept as it is or covered with rubber sheet. Cadaver – II was covered with Thermocol box made up of sheets of thermocol which are 4cm thickness. The cadavers were left in dissection hall for 6 days. On 6th day the thermocol box, and rubber sheet was uncovered from the cadavers. The dissected part i.e. superficial dissection of femoral triangle was examined carefully and photographs were taken. Both cadavers are immersed in storage tank on 6th day and taken out on 8th day. Further dissection carried on cadavers to expose the boundaries and contents of femoral triangle, photographs of deep dissection were saved. Cadaver – II was covered with Thermocol box and the cadaver – I was left uncovered or simply covered with rubber sheet. At the end of 13th day, the dissected part of Cadaver I & II was thoroughly examined and photographs were taken.

Specifications of Thermocol Box

The box was prepared by using the 4cm thickness thermocol sheets which are obtained from market. Thermocol box should be open at one side for covering the cadaver, remaining 3 sides must be closed and all the corners were sealed properly.

Measurements:

188 cm × 60 cm × 40 cm (Length×Width×Height)

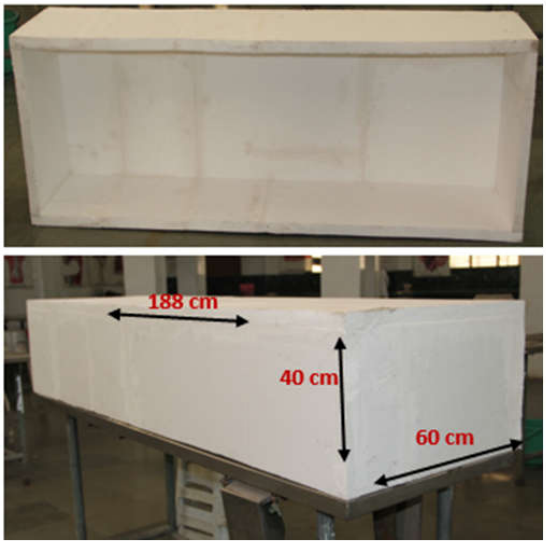

Fig. 1. Photograph of Model of Thermocol box

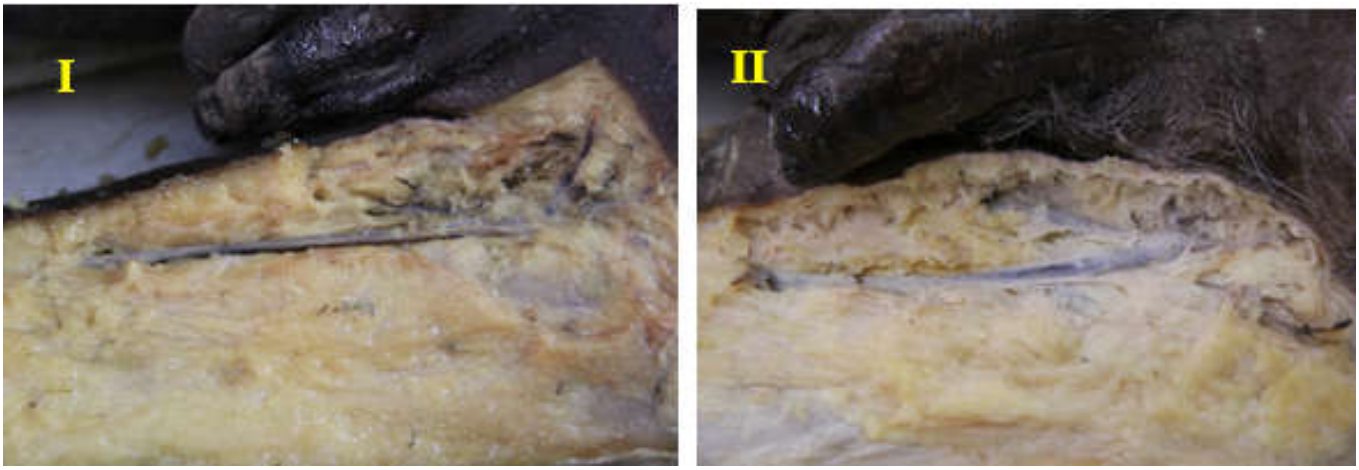

Fig. 2. Photographs showing superficial dissection of femoral triangle on 1st day. Cadaver – I, Cadaver – II

Fig. 3. Photographs showing superficial dissection of femoral triangle on 6th day. Cadaver I – uncovered, Cadaver II – covered with thermocol box

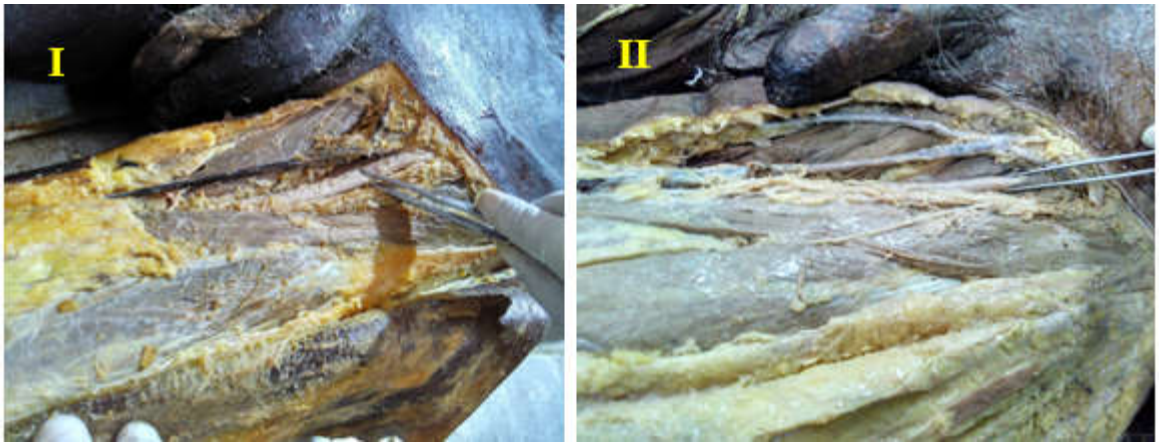

Fig. 4. Photographs showing deep dissection of femoral triangle on 8th day. Cadaver – I, Cadaver - II

Fig. 5. Photographs showing deep dissection of femoral triangle on 13th day. Cadaver I – uncovered, Cadaver II – covered with thermocol box

Observations

On the 1st day of dissection both formalin fixed cadavers (I & II) were in good condition. After the completion of superficial dissection of cadaver I & II, the fat and superficial structures were clear. Examination of the cadavers was done on 6th day of dissection.It was observed that the dissected part of cadaver – II which was covered with thermocol box was remained fresh and easy to handle for further dissection. On the other hand superficial dissection of cadaver – I was shown decolourisation of superficial structures and drying of dissected area. The cadavers were kept in storage tank for one day, deep dissection of femoral triangle of both cadavers (I & II) was carried out on 8th day of dissection. Cadaver – II covered with thermocol box and the cadaver – I left uncovered till 13th day of dissection. On 13th day, it was noticed that the deep dissected part of femoral triangle of cadaver – II remained fresh as compared to the dissected part of the second uncovered cadaver. The muscular boundaries and neurovascular contents of dissected part were very fresh, clear and easy for identification by the students in cadaver - II which was covered by thermocol box. On the other hand, the dissected part of the cadaver – I which was not covered was dried up, the muscular boundaries and neurovascular contents are decolourised and not clear for identification.

DISCUSSION

Cadavers are preserved effectively through the process of embalming, in which, a chemical fixative is injected into body tissues by various methods (Johnson, 2002), (Phil Cain *et al*., 2013). The embalming process meant for preserving dead body, a life-like state and retaining the relationships of human anatomy as are required for dissection purposes (Blaney *et al*., 1989). The traditional formulae contained varying percentages of formalin, phenol, methylated spirit, glycerine and water. Formalin is the most important preservative used in the embalming fluid, and it preserves the tissues by dehydration (Saunders and Rice, 1944). Conventional methods of preservation using more amount of formaldehyde leave the body stiff and rigid leading to difficulty during dissection (Phil Cain *et al*., 2013; Saunders and Rice, 1944). Even though the gross anatomy was taught by a conventional lectures, tutorials, models but still cadaver dissection is the best method to teach gross anatomy (Pulvertaft, 1950). Teaching of gross anatomy in dissection hall on cadavers presents many difficulties which have to overcome by adopting advance methods in maintenance of dissection hall. The cadavers are dissected regularly according to the academic schedule of the particular anatomy department. The prosected specimens and dissected part of the cadaver is more prone for drying depends on the

weather condition, thus, it is a challenge for anatomy department to maintain fresh state of dissected parts with clear cut details of all the structures. Ones the dissected part is dried up, it becomes more difficult to the students for identification of various structures. Such type of decolourised dissected specimens cannot be utilized for practical examination and for displaying in museum. It is not possible to continue the dissection on dried part of the cadaver. For preservation of the soft tissues of body in their original state, soft embalming methods have been introduced by many scientists. The cadaver is infused with altered composition of embalming solution, which allows to practice surgeries, makes organs and tissues softer than conventionally embalmed cadavers (Thiel, 1992). Necessary care must be taken to prevent drying of the muscles and internal structures of cadaver for better demonstration to the students. Decolourised dried specimens may effects on perception of students. Nowadays some of the medical colleges are come up with air conditioned dissection halls but still majority of medical colleges doesn't have such facilities. Generally, drying of dissected part of cadaver is prevented by tropical application of preservative fluid which contains minimal concentration of formalin and glycerine, but it is not beneficial as the solution evaporates rapidly in hot climate (Pulvertaft, 1950), (Thiel, 1992). The preservative fluid is useful during dissection to moisten the cadavers. Therefore it is advisable to putting on tropical solution on dissected part of the cadaver and subsequently cover with thermocol boxes which gives most beneficial results.

Conclusion

The observations of the present study reveals that dissected parts of the cadaver can be maintained as fresh state by minimising the drying effect. The dissection hall of anatomy departments can utilize thermocol boxes to prevent drying of the dissected and exposed part of cadavers while they are out of the preservation tanks. The ideal Thermocol box used in the current study is most reliable and cost effective, can be prepared in large quantity at any part of the country as thermocol sheets are widely accessible for purchase. Thermocol boxes are light weight easy to handle, concurrently life time of these thermocol boxes are questionable. Hence, to overcome the damage effect wooden boxes insulated with thermocol sheets can be prepared and utilized for the same.

Conflicts of interest: None to declare

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