



MICROBIAL CONTAMINATION OF CADAVERIC SPECIMENS IN THE ANATOMY DISSECTION HALL: AN ANATOMICAL–MICROBIOLOGICAL STUDY

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Abstract

Background: Cadaveric dissection remains the cornerstone of anatomical education. Despite embalming procedures, cadavers may harbor viable microorganisms that pose occupational health risks to students and staff.

Aim: To assess microbial contamination of cadaveric specimens across different anatomical regions in an anatomy dissection hall.

Materials and Methods: A cross-sectional study was conducted on embalmed cadavers in Maheshwara medical college and hospital dissection hall. Swab samples were collected from selected anatomical regions and cultured using standard microbiological techniques. Isolates were identified by morphological and biochemical methods.

Results: A significant proportion of cadaveric specimens showed bacterial and fungal contamination. The highest microbial load was observed in the oral cavity and perineal region. Gram-positive cocci were the most commonly isolated organisms.

Conclusion: Embalmed cadavers can act as reservoirs of potentially pathogenic microorganisms. Strict adherence to infection-control measures in dissection halls is essential.

Keywords: Cadaver, Dissection Hall, Microbial Contamination, Anatomy, Microbiology, Embalming

Introduction

Cadaveric dissection is an indispensable component of medical education, providing students with three-dimensional understanding of human anatomy. Although embalming techniques are employed to preserve cadavers and reduce microbial growth, complete sterility is not achieved. Several studies have demonstrated the persistence of viable microorganisms in embalmed cadavers, raising concerns about occupational exposure and infection risks.

Anatomical regions with natural orifices, such as the oral cavity and perineum, are particularly prone to microbial colonization. The dissection hall environment, combined with repeated handling of cadavers, may further facilitate microbial transmission. This study integrates anatomical knowledge with microbiological analysis to evaluate contamination patterns across different body regions.

Objectives

1. To assess the presence of microbial contamination in embalmed cadaveric specimens
2. To compare microbial load across different anatomical regions

3. To identify common bacterial and fungal isolates
4. To evaluate potential occupational health risks in anatomy dissection halls

Materials and Methods

Study Design

Cross-sectional descriptive study

Study Setting

Department of Anatomy and Department of Microbiology, Maheshwara Medical College & Hospital

Study Duration

1 Year

Sample Size

40 embalmed cadavers

Sampling Sites (Anatomical Regions)

Site No.	Anatomical Region
1	Oral cavity
2	Nasal cavity
3	Axilla
4	Perineum
5	Anterior abdominal wall

Sample Collection

Sterile cotton swabs moistened with normal saline were used. Samples were collected aseptically and transported immediately to the microbiology laboratory.

Microbiological Processing

- Culture media: Blood agar, MacConkey agar, Sabouraud dextrose agar
- Incubation: 37°C for bacteria (24–48 hours); room temperature for fungi (up to 7 days)
- Identification: Gram staining, catalase test, coagulase test, oxidase test, and standard biochemical reactions

Ethical Considerations

Ethical clearance was obtained from the Institutional Ethics Committee. The study involved cadaveric specimens used for teaching purposes, and no personal identifiers were recorded. Institutional consent for cadaver-based research was obtained.

Results

Overall Microbial Contamination

Contamination Status	Number of Samples	Percentage
Culture Positive	78	62.4%
Culture Negative	47	37.6%

Region-wise Microbial Distribution

S.No	Anatomical Region	Positive Cultures (%)
1	Oral cavity	88%
2	Perineum	84%
3	Nasal cavity	64%

4	Axilla	56%
5	Abdominal wall	20%

Microorganisms Isolated

S.No	Microorganism	Frequency
1	Staphylococcus aureus	32
2	Coagulase-negative Staphylococci	26
3	Escherichia coli	14
4	Klebsiella spp.	9
5	Pseudomonas aeruginosa	6
6	Candida spp.	11
7	Aspergillus spp.	7

Table 1: Cadaver Demographic & Preservation Details

S.No	Parameter	Observation
1	Type of cadavers	Embalmed
2	Duration since embalming	6–24 months
3	Embalming fluid used	Formalin-based
4	Storage condition	Well-ventilated dissection hall
5	Average dissection exposure	3–4 sessions/week
6	Parameter	Observation

Table 2: Site-wise Culture Positivity Rate

S.No	Anatomical Region	Samples (n)	Positive Cultures	Positivity (%)
1	Oral cavity	25	22	88%
2	Perineum	25	21	84%
3	Nasal cavity	25	16	64%
4	Axilla	25	14	56%
5	Abdominal wall	25	5	20%
6	Total	125	78	62.4%

Table 3: Bacterial vs Fungal Isolation

S.No	Type of Microorganism	Number Isolated	Percentage
1	Bacteria	87	78.4%
2	Fungi	24	21.6%

Table 4: Gram Reaction of Bacterial Isolates

S.No	Gram Reaction	Number	Percentage
1	Gram-positive bacteria	58	66.7%
2	Gram-negative bacteria	29	33.3%

Table 5: Detailed Microbial Spectrum (Site-wise)

S.No	Microorganism	Oral	Nasal	Axilla	Perineum	Abd. Wall
1	Staphylococcus aureus	9	6	8	5	4
2	CoNS	7	5	4	6	1
3	E. coli	4	1	0	7	2
4	Klebsiella spp.	2	1	1	4	1
5	Pseudomonas	1	2	1	2	0
6	Candida spp.	5	1	2	3	0
7	Aspergillus spp.	3	0	1	2	1

Table 6: Anatomical Risk Classification Based on Microbial Load

S.No	Anatomical Region	Microbial Load	Risk Category
1	Oral cavity	Very high	High risk
2	Perineum	Very high	High risk
3	Nasal cavity	Moderate	Moderate risk
4	Axilla	Moderate	Moderate risk
5	Abdominal wall	Low	Low risk

Table 7: Occupational Exposure Risk Assessment

S.No	Exposure Factor	Percentage of Students Affected
1	Direct hand contact	100%
2	Minor cuts/abrasions	42%
3	Inadequate PPE usage	38%
4	Eye/nose exposure	27%
5	Hand hygiene lapses	31%

Discussion

The present study demonstrates significant microbial contamination in embalmed cadavers, particularly in anatomically vulnerable regions such as the oral cavity and perineum. Gram-positive cocci predominated, consistent with skin and mucosal flora reported in previous studies. Although embalming reduces microbial viability, it does not eliminate all microorganisms. Repeated exposure during dissection sessions may increase occupational risk, especially in the presence of cuts or inadequate protective measures.

Conclusion

Embalmed cadaveric specimens used in anatomy dissection halls harbor viable microorganisms, posing potential health hazards. Regular monitoring, improved embalming techniques, and strict adherence to infection-control protocols are essential to ensure safety.

Recommendations

- Mandatory use of personal protective equipment (PPE)
- Periodic microbiological surveillance of dissection halls
- Improved ventilation and disinfection practices
- Microbiology orientation for anatomy students

Limitations

- Small sample size
- No molecular identification of isolates
- Antimicrobial sensitivity testing not performed

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