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## Role of Hybrid Reconstruction Ladder in Pediatric Thermal Burns

Jackson Nuli<sup>1</sup>, Ravi Kumar Chittoria<sup>2</sup>, Barath Kumar Singh<sup>3</sup>

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### Abstract

Burns and related injuries are common causes of deaths and disability. The highest incidences of burn cases occur in children and adults. In children less than 2 years of age, contact with hot surfaces and scald burns are the most common presentation to the hospital. The practice of cooking at ground level or sleeping with a burning lamp are some of the causes. Early management of this type of burns results in better outcomes. In this case we describe the role of Hybrid reconstruction ladder using regenerative methods in the management of paediatric thermal burns.

**Keywords:** Hybrid reconstruction ladder; Paediatric; Thermal burns.

## INTRODUCTION

Burns are one of the leading causes of morbidity and mortality in children. Basic knowledge about thermal injury is important in the management of children presenting with burns. A study by Davis in 1990 quoted 2 million incidences of burns per year in the Indian Subcontinent. Forty percent of burn victims are under 15 years of age. Scalds and hot liquids make up 90% of burn injuries to children. Common sites are at home around the kitchen and open fire places. The reconstructive ladder was a term coined by plastic and reconstructive surgeons to describe

levels of increasingly complex management of soft tissue wounds.<sup>1</sup> Theoretically, the surgeon would utilize the lowest rung of the ladder, that is, the simplest reconstruction technique to address a clinical reconstructive problem. The hybrid reconstructive ladder can be used to augment the traditional reconstructive ladder with regenerative medicine modalities (Fig. 1). In this case report, we assess the role of hybrid reconstruction ladder in the management of pediatric thermal burns.



Fig. 1: Hybrid reconstruction ladder

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## MATERIAL AND METHODS

This study was conducted in the Department of Plastic Surgery in a tertiary care institute. Informed consent was obtained from the patient under study. Department scientific committee approval was obtained. It is a single center, non-randomized, non-controlled study. The patient under study was a 2-years-old female, with no other known comorbidities presented with second degree deep scald burns to the right chest, arm and forearm constituting 15% of total burn surface area (Fig. 2). The burn wound was debrided with hydro-jet (Fig. 3) and regenerative therapies like Autologous platelet rich plasma (APRP) (Fig. 4), sucralfate application (Fig. 5) and biological collagen scaffold dressing (Fig. 6) was done. APRP was applied once in a week for four weeks. Nonviable necrotic

tissue in the deep burn areas were managed with tangential excision and split skin grafting was done (Fig. 7). Negative pressure wound therapy was applied to the wound pre and post skin grafting (Fig. 8). Low level laser therapy was applied once in a week for 10 min for four weeks pre and post skin grafting (Fig. 9).



Fig. 2: At the time of presentation



Fig. 4: Autologous platelet rich plasma applied to the burn wound.



Fig. 3: Hydro jet debridement



Fig. 5: Sucralfate therapy applied to the wound.



Fig. 6: Collagen scaffold dressing





Fig. 7: Split thickness skin graft



Fig. 8: Negative pressure wound therapy

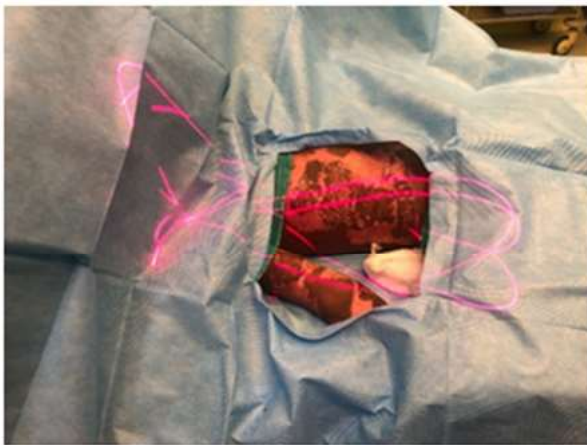


Fig. 9: Low level laser therapy

## RESULTS

The second degree superficial burn wounds healed well. The graft uptake was good at the site of second degree deep burns after tangential excision. Patient was discharged successfully with all burn wounds healed well (Fig. 10). Intraoperative and postoperative period was uneventful.



Fig. 10: Healed burn wounds at the time of discharge

## DISCUSSION

Hybrid reconstructions have transformed the management of complex injuries and have offered the extension of indications for techniques available to manage composite tissue loss. Continued research and the development of strategies to address complex tissue loss are of continued interest. The utilization of biologic scaffolds may enhance the wound healing process.<sup>1</sup> APRP is known to induce collagen, blood vessel and adipose tissue formation and also aid in tissue moulding.<sup>2,3</sup> This not only helps in the taking up of the skin grafts applied but also in ensuring more cosmetically appealing scar formation.<sup>4,5</sup>

Studies and rare case reports all show that topical sucralfate therapy is effective for treating wounds. Sucralfate suppresses the release of interleukin-2 and interferon gamma damaged skin cells while promoting the growth of dermal fibroblasts and keratinocytes in vitro.<sup>6,7</sup> Sucralfate has a physical barrier effect that reduces inflammatory response and promotes mucosal repair. Additionally, sucralfate promotes angiogenesis, which speeds up wound healing. Sucralfate raises the levels of basic fibroblast growth factor (bFGF) and epidermal growth factor in the wound.<sup>8</sup> Additionally, sucralfate promoted the release of IL-6 and PGE2 from skin cells, which aided in the healing process.<sup>9</sup>

LLLT has analgesic and anti-inflammatory properties in addition to stimulatory effects on tissue regeneration, wound healing, and repair.<sup>10</sup> At the cellular level, the LLLT stimulates cell growth, increases fibroblast proliferation, decreases the formation of fibrous tissue, promotes cell regeneration, increases the production of collagen, decreases the formation of oedema, increases the synthesis of growth factors, decreases the number of inflammatory cells, decreases the synthesis

of inflammatory mediators like substance P, bradykinin, histamine, and acetylcholine, and stimulates the production of nitric oxide. The power, wavelength, and duration of LLLT treatment all affect the photobiological effects. Gallium Arsenide Ga-As, Gallium Aluminum Arsenide, Krypton, Helium Neon He-Ne, Ruby, and argon are among the regularly utilized LLLT lasers. It has been utilized to manage burn wounds as well as acute and chronic pain, wrinkles, scars, hair loss, and photo rejuvenation of photodamaged skin. Due to its bio stimulatory qualities, LLLT has been demonstrated to be beneficial as an adjuvant therapy in the care of wounds. Burn wounds treatment using low-level laser therapy (LLLT) can enhance and hasten the healing process and also in scar modulation.<sup>11</sup>

According to the literature, negative pressure wound therapy is thought to have four main mechanisms of action: contraction of the wound, stabilization of the wound environment, removal of extracellular fluids, and micro deformation at the foam wound interface.<sup>12,13</sup> It has been useful in the healing of burn wounds and scar modulation.

## CONCLUSION

The hybrid reconstruction ladder with regenerative modalities can be used to manage cases of pediatric scald burns with satisfactory results.

*Conflicts of interest:* None.

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## REFERENCES

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## Role of Forensic nursing in Sexual Assault Forensic Examination Including Protection of Children from Sexual Offences 2012

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### Abstract

Sexual offence cases are a common problematic crime for prosecution. The conviction rate of these cases is significantly less due to lack of circumstantial evidences and in many cases there is only the version of the survivor vs accused. Medicolegal evidence play a pivotal role in conviction of accused. Sexual assault nurse examiner (SANE) is an established concept in many countries where trained Forensic nurses plays an important part in history taking, prompt collection of evidence and documentation of injuries, resulting in timely examination of Sexual assault survivors with a sensitive and humanitarian approach. This system is still not in practice in our country. The current system is based on the examination of survivors in already overloaded emergency department of hospitals by doctors involved in life saving procedures leading to delay in examination of survivor. The article intends to outline and educate the nursing professionals about the medicolegal examination in sexual assault case and POCSO cases, evidence collection, and other aspects. The article deliberate the basic knowledge about the medicolegal examination procedures, preservation of samples with proper chain of custody, SAFE Kit and the POCSO act of 2012 that will be helpful for forensic nursing professionals orientation and training.

**Keywords:** Sexual Assault Nurse Examiner; Sexual Assault Forensic examination (SAFE); SAFE Kit; Forensic Nursing; POCSO Act.

## INTRODUCTION

Sexual offense cases are always a problematic crime for prosecution as there are generally

no eyewitness and the only evidences in most of the cases are scientific evidences. As per National crime record bureau (NCRB) data 2020, India has a Conviction rate of 33.3% in metropolitan cities with more than 2 million population. This low rate of conviction could be improved by timely Medicolegal examination and thorough evidence collection.<sup>1</sup> The Sexual assault forensic examination (SAFE) in our country is doctor based and is mostly conducted in the emergency departments of hospitals where management of patients with life threatening conditions is the top priority. In adult female survivors though female doctors are preferred but still the examination could be done by a male doctor after consent. But in cases of child

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victims as per Protection of Children from sexual offences (POCSO) Act, a female doctor should examine the female child, and non-availability of female doctor at that duty time may also lead to delay in examination and evidence collection.<sup>2</sup> To overcome these problems many countries have introduced the concept of dedicated and trained nursing professionals called as Sexual Assault Nurse Examiner (SANE) for medicolegal examination in sexual assault cases. They are trained and authorized nursing professionals to conduct the SAFE examination in priority with a sensitive humanitarian approach to already traumatized survivors.<sup>3,4</sup> In our country the concept of SANE is yet to be introduced. This article details the basic knowledge about the role of nursing professionals in SAFE cases, evidence collection, to act as guide in routine Medicolegal practice.

### ***Important aspects of SAFE for Forensic nursing professionals for guidance and orientation***

The detailed history taking is an important aspect of SAFE including date and time of alleged incidence, any history of intoxication, physical assault or restraint, etc. The Ministry of Health and Family welfare, Government of India has prescribed a detailed proforma for SAFE which included the columns for detailed history.<sup>5</sup> History should be elicited in the survivors own wordings without influencing, should be done in the confidential manner and with a sensitive approach.

### **PREREQUISITES**

- The examination should be conducted in a well lit room with comfortable surroundings for the survivors.
- The examination should be done confidentially with minimum number of personnel present in the room.
- Articles and requirements for SAFE should be made ready before the starting the examination. This prevents missing out on any evidence and will avoid last-minute confusion. Forensic nurses should prepare a list of requirements needed with a checklist. Then every day, check all items for evidence collection mentioned in the checklist are available i.e., the Sexual offense forensic examination kit (SAFE

kit).<sup>6</sup> Fig.1



**Fig. 1:** SAFE Kit (1) Cotton Swab stick, (2) Test tube vials (violet, grey), (3) FTA card, (4) Lancet, Syringe, needle and tourniquets, (5) Scissors, (6) Nail cutter, (7) Glass slide, (8) Magnifying lens, (9) Gauze piece, (10) Distilled water or normal saline, (11) Urine container, (12) Inch tape and Gloves as per size of examiner.

- SAFE kits are readily available on GEM portal of Indian government and could be procured by the concerned authorities. But still if it is unavailable, it consists of things which are already present in hospital supplied. The hospitals/centers can make their own kits by compiling different materials. Fig. 1 is an example, which has been made by articles coming in routine hospital supply.
- Articles like needles, lancets, nail cutters, nail scrappers, and swab sticks are used for only one case then they should be disposed off properly and not to use for another case, it can lead to contamination of DNA samples, etc.

### **CONSENT**

- Informed written consent in the prescribed manner should be taken from Survivor/ legally accepted guardian before the medicolegal examination.
- It should be in their language and well understandable about the entire procedure, evidence collection from the body and genitals, and treatment. All the queries should be clarified.
- Survivors aged 18 years and above can give consent for SAFE and further management.
- In a situation like age less than 18



years, physical and mental incapacities, intoxicated state, or language barrier, one should seek consent from parents/guardians, special educator, interpreter, and support person from the child welfare committee.

- Survivor has full rights to refuse medicolegal examination at any point in time and no examination of sexual offense survivors to be conducted on refusal.<sup>5</sup> In such cases, the refusal of the survivor needs to be documented and informed to concerned police personnel.

## MEDICOLEGAL RECORDS MAINTENANCE

*The register /digital records should be adequately maintained, which involves the following details are*

- Proper numbering of MLC cases
- Preliminary details, i.e., name, age, and gender, police station, investigating officer
- Brought by whom
- Samples preserved/Evidence collected
- Assisted by nursing officer name and examining doctors with legibly handwritten register
- The name and signature of the constable or police officer who collected the report and samples should be mentioned in the record

The confidentiality of the register should be maintained, and data can be utilized for reporting to the concerned authority for administration purposes and research without revealing the identity of the survivor.

## SAFE PROCEDURE OF SURVIVOR

*The aim of the SAFE examination should be proper visualization of injuries, genital examination, and documentation of exact findings in scientific language.*

- **Step 1:** Prior to the examination, ensure a good light source is present
- **Step 2:** Documentation of two identification marks (I.D Mark). It is necessary to mention the two (I.D mark) in the report to confirm that it examined the same person at the prosecution time. I.D marks include

moles, scars, and tattoo marks on the body, exposed parts like the face, upper limb, and lower limb.

- **Step 3:** Asking the person to stand on white paper on the floor and undress. If possible, look for falls of debris for evidence collection.
- **Step 4:** Outer and inner clothing should be preserved separately, and white paper should be kept on the floor. A clean pair of clothing needs to be provided to the survivor.
- **Step 5:** General and physical examination should be done in a standing position.
- **Step 6:** Genito-anal examination, which includes knee, and elbow position for the anal region and lithotomy position for vaginal orifice.<sup>5,7-9</sup>

## EVIDENCE COLLECTION

A forensic nurse can assist with evidence collection, which may vary from case to case. The evidence like swabs from bite marks, nail clippings and scrapping, vaginal swabs, oral swabs and their smears, pubic and scalp hair combing, clothes, blood on gauze/FTA card, blood for alcohol and drugs, etc.<sup>5</sup>

Steps for collecting blood in Flinders Technology associates (FTA) card<sup>10</sup>

- **First step:** Wear gloves and mask.
- **Second step:** Open the pack of FTA card. (Fig. 2)



**Fig. 2:** Flinder's Technology Associate card for blood collection for DNA analysis

- **Third step:** Fill in the name, Id number, and date.
- **Fourth step:** Use of lancet and prick the pulp of the finger.
- **Fifth step:** Keep a drop of blood in a circle of FTA card.
- **Final step:** Allow drying at room temperature.

**Note:** If FTA card is not available, we can use alternatives like gauze pieces for blood sample preservation in same manner.

Do's	Don't do
Use of lancet for pricking	Use of needle for pricking leads to overstaining
Use of mask and gloves	Without mask and gloves Talking and laughing (Splitting of examiner's saliva in FTA leads to artefacts)

Do's and Don't do for Blood preservation in FTA Card

## IMPORTANCE OF TRACE EVIDENCE SAMPLE PRESERVATION

All the sample preservation is mandatory if the case is reported within 72 hours without taking a bath as mentioned in Table no. 1. In Survivors, spermatozoa can be detected within 72 hours from the vagina.<sup>11</sup> The presence of vaginal discharge can suggest a sexually transmitted disease by the sexual assault that gives a clue for the duration of the incident. The

**Table 1:** Samples preservation with examination findings

Samples to be preserve	History/examination findings
Scalp Hair	
Pubic Hair	
Cut strands of pubic hair	Contact during the intercourse
Pubic hair combing	(not changing clothes/ no bathing)
Head Hair combing	DNA of accused can be detected
Clothes	
Oral swab & others swab	Oral sex, Bite mark on victim
Both Hand swab for finger in between debris	Detection of accused DNA
Blood for DNA analysis	DNA Matching
Blood for blood grouping	Blood stains found in accused can be matched
Blood and urine for testing Alcohol/ drugs	Under influence/intoxication by drug/alcohol
High vaginal swab (survivor)	Spermatazoa and semen detection
Cervical swab (survivor)	DNA of accused can be recovered (During struggle with accused at time of incident).
Nail clipping and nail scrapping	

presence of injuries like bite marks implies taking a swab from the site and documentation of injuries helpful for the alleged time of the incident.<sup>12</sup>

## PACKING AND SEALING OF SAMPLES

- The preserved samples are sealed in a paper bag/ paper envelope separately with details of the case, type of sample, date and time of collection, and signatures of the sealing person.
- The samples should be air dried before preservation and packaging to prevent fungal growth that will destroy the DNA evidence.<sup>13</sup>
- All the samples should be handed over to IO along with a sample seal for all samples, as the samples might be sent to different divisions of the forensic science laboratory/ different FSLs also.

## MEDICAL LAB INVESTIGATION

- Urine pregnancy test to be conducted
- Blood investigation like HIV, HBSAG, VDRL should be conducted so as to rule out transfer
- Other investigation like blood sugar level, serum, CBC, electrolytes, hormonal analysis may be conducted depending upon the clinical requirement

## DRAFTING REPORT

A forensic nurse will note their examination findings in an objective manner and get it confirmed and counter signed by the doctor. The role of the forensic nursing like in assistance and recording of injuries needs to be specified in the report.

## SUMMON TO WITNESS IN COURT

Honorable court issues summons to give their testimonies in the concerned case to concerned Medical professional who have signed, prepared the Medicolegal reports and were involved in SAFE. It is a must to attend the court to prove the Medicolegal reports and give clarification to the queries raised by prosecution and defense counsels.

## POCSO ACT OF 2012

The forensic nurse/Sexual assault examiner must

be aware about the detailed provisions about the POCSO Act of 2012. The Act details the issue of sexual offences against children, including sexual assault and harassment and pornography. The act describes that if any child below 18 years of age, including males and females, suffer from any sexual abuse, it is mandatory to report to the police or concerned authority. Failing to report leads to a punishable offense. The medicolegal examination should be conducted in the presence of parents and legally accepted guardians.<sup>13</sup> The report should be forwarded to the concerned authority with one copy to the victim free of cost.

## CONCLUSION

Forensic nurses if involved in SAFE of adult and POCSO survivor's will lead to a prompt medicolegal examination of sexual assault survivors and evidence preservation leading to higher conviction rates. They will not only help in the humanitarian examination of the survivor with a sensitive approach but will also take off load from already stressed out Emergency doctors leading to a better patient care.

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## Forensic Nursing in India: Need, Rationale and Future Road Map for Indian Medicolegal System

Venkatesh J<sup>1</sup>, Abhishek Yadav<sup>2</sup>, Varun Chandran<sup>3</sup>, Latha Venkatesan<sup>4</sup>,  
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### Abstract

Forensic Nursing is a much required specialty in India which is non-existent till date in the hospitals and Medicolegal setup. The nursing professional are already involved in assisting the doctors in management of Medico legal cases. The introduction of Forensic nursing will help in dealing the medicolegal cases in an efficient manner leading to an effective contribution in justice delivery system. Its implementation in health care system and Forensic medicine practice will impart professionalism. The article highlights rationale, neediness, and justification of introducing forensic nursing in our country. Further issues related to framing and implementing of curriculum will be discussed which could be helpful for providing skillful forensic nursing staff in the future and could be a future road map for the Indian Medicolegal system.

**Keywords:** Forensic Nursing; Indian Medicolegal system; Medicolegal cases; Forensic Medicine; Sexual Assault Forensic examination.

## INTRODUCTION

Forensic nursing extends traditional nursing to medicolegal practice.<sup>1</sup> It is already an emerging specialty of nursing in many countries but still is non-existent in our country despite the fact that nursing professional are already involved in management of Medicolegal cases under

the supervisions of doctors. Recently a Faculty Development Program: Short Term Course in Forensic Nursing was organized by Dte. GHS, Nursing Division, MoHFW, Government of India in collaboration with College of Nursing and Department of Forensic Medicine, AIIMS, New Delhi. The programme was an online orientation training for the nursing professionals in different aspects of Forensic practice related to nursing professionals particularly evidence collection. (Image 1). More than 1000 participants across the country participated in the programme. These aspects are not included in the nursing curriculum, resulting in a lack of awareness about medicolegal aspects.<sup>2</sup> This article highlights rationale, neediness, and justification of introducing forensic nursing in our country. Further issues related to framing and implementing of curriculum will be discussed which could be helpful for providing skillful forensic nursing staff in the future and could be a future road map for the Indian Medicolegal system.

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**Image 1:** Faculty Development Program: Short Term Course in Forensic Nursing organized by Dte.GHS, Nursing Division, MoHFW, Government of India in collaboration with College of Nursing and Department of Forensic Medicine, AIIMS, New Delhi and ECHO India.

## History/Origin of Forensic Nursing

Forensic nursing is presently considered the new specialty of nursing, but the truth behind it is nurses have been practicing this for many years without official recognition as a separate specialization.

In history, nursing emerged with the practice of forensics. Florence Nightingale, originated the profession by caring for emergencies of war without bearing in mind the victims or offenders.<sup>3</sup> The term forensic nursing was coined by Virginia A in 1986.<sup>4</sup> Lynch framed a master's degree in nursing



with a clinical specialty in Forensic Medicine, and it was accepted by the University of Texas at Arlington. In 1991, the American Association of Forensic Science was recognized and accepted as a scientific discipline of Forensic nursing. The first national conference for sexual assault nurses was held in 1992 in Minneapolis, Minnesota, and it was acknowledged as forensic nurses can be more inclusive and focused on cases like sexual offense patients, domestic violence, child abuse, and other aspects of criminal or liability connected to trauma.<sup>5</sup> Finally, in 2002, the International Association of Forensic Nurse in the United States of America was established to ensure that the practice of nursing that specializes in the application of forensic sciences to patient care and it was continued to spread to various developing and developed countries like Italy, India, and South Africa.<sup>6</sup> but still is non-existent in our country.

## **NEED AND RATIONALE AND JUSTIFICATION /IMPORTANCE OF INTRODUCTION OF FORENSIC NURSING IN INDIAN MEDICOLEGAL SYSTEM**

In the current scenario, the Medicolegal cases (MLC) are being mostly handled in hospital emergency departments where the top priority of the doctors is to manage the patients having life threatening conditions. So, the stable MLC patients and particularly sexual assault survivors, victims of domestic violence have to wait for comparatively longer periods for health care professionals. Sometimes that can lead to the loss of valuable time for collecting evidence. Educating the nursing professional about the recognition of injuries caused by violence, and documentation of injuries will lead to effective and timely management of MLC cases which may not be having life threatening conditions but are still undergoing emotional and mental trauma.<sup>7</sup> This will not only lead to a more thorough examination and documentation of injuries and will also save the time of the doctors to handle the critical cases in emergency departments.

Cases of child physical and sexual abuse are still underreported in our country due to social stigma etc, particularly when the offender is known to the victims. Sensitization and training of Health care providers, particularly nursing professionals will lead to more detection of such cases in routine clinical examination also as the children will be more comfortable in revealing their trauma to the nursing professionals. Inclusion of all these aspects in the curriculum of Forensic Nursing can provide

well-trained and specialized nursing staff for such cases, which can lead to imparting justice to the victim.<sup>8</sup>

## **CHALLENGES IN ESTABLISHING THE ROLE OF A FORENSIC NURSE IN HOSPITAL SETTINGS AND FORENSIC MEDICINE DEPARTMENT**

First of all there is no PG course in nursing curriculum regarding Forensic Nursing. There are no specific cadre/ posts for the same. There is no forensic nursing specialty in any of the hospital/ healthcare setup in our country till date. Recognizing and establishing the role of a nursing professional in Forensic practice is an uphill task, and substantial administrative efforts will be required by Dte.GHS, Nursing Division, MoHFW, Government of India and other associated regulatory authorities. There is no legal provision of any other health professional other than the doctors to record, document and signing the Medicolegal reports. The nursing professionals will have to prove their findings in the courts of law.

## **Future Road Map for Establishing Forensic Nursing as a Part of Medicolegal Examiner's**

### ***Nurses' sensitization to forensic background***

Forensic nursing is a challenging specialty. To rectify this proper internship training program related to the medicolegal case management and injury identification could be conducted in Department of Forensic Medicine for qualified Forensic nursing professional (FNP).<sup>9</sup> FNP should be capable of handling stressful situations like a medicolegal emergency with critical thinking, logical sequencing, social maturity, neutrality, observation, and communication skills. Forensic nursing is broadly classified into four categories based on practice areas, i.e., clinical forensic nursing, Sexual Assault Nurse Examiner (SANE), forensic psychiatry nursing, and institutional forensic nursing. The international forensic nurses association (IAFN) has recognized many subspecialties of forensic nursing like Forensic clinical specialists, death investigators, forensic nurse educators, legal nurse consultants, and forensic gerontology.<sup>10</sup> To sensitize forensic nursing specialties, many continuing medical education programs, workshops on forensic nursing-related things, faculty development programs, and short-term courses can be encouraged for the FNPs.

### ***Evidence based study for designing the course curriculum:***

An education should assess the recognition of the knowledge gap that can be well versed by the developing of an evidence based study for designing the curriculum for undergraduate and master's in forensic nursing. It will guarantee to resolve a part of a new and developing field and deliver a standard of practice. The lecturers should target the curriculum like nurses at various levels of approaches involved in evaluating the victimization, proper documentation, collection, and preservation of evidence. The course targets persons who choose to specialize in this emerging forensic nursing specialty and develop syllabi and teach the subject.<sup>4</sup>

### ***Problem identification and need Assessment of targeted learners***

Identification and study of a health care requirement or additional problem, that is to be addressed by the syllabus. It helps to focus on the goals and objectives of the curriculum's educational and assessment policies. The next stage is whether the curriculum is directed to resolving health care issues and what information is most needed can be assessed by curriculum developers from the target learners. The information may include preplanned training, existing skills, recent performance, observed deficiencies, and clinical understandings. The curriculum developer has clarified the neediness of learners; the curriculum is focused on the need by structuring the goals and objectives. The goals and objectives are identified, next stage is to develop the educational policies. The general content of the syllabus should be based on specific, measurable objectives.<sup>11,12</sup>

### ***Implementing the curriculum in a phased manner***

Before implementing the curriculum, identify the resources needed like faculty, administrative provision, supporting staff, learners, patients, services like space, equipment, clinical areas, financial assistance by government, professional societies, etc. If all resources are made ready, the curriculum will be introduced in a phased manner, like the initial stage of the experimental trial followed by a phase-in trial. In the final step can fully implement the curriculum. The reviewer can collect evaluation and feedback from the learners and use it to improve and guide individuals and the curriculum in the implementation phase. The assessment result may help seek funding for the curriculum, assess the individual level achievement,

gratifying external necessities, and aid as the origin for presentations and publications.<sup>11,14</sup>

### ***Academic regulation of program***

Admission for the master's in a forensic nursing specialty; the candidate must possess a bachelor of science in nursing from any recognized university/ autonomous college /Institute of National Importance and be registered in the Nursing Council of India like another specialty of the nursing branch. The course duration of two years, which includes a thesis dissertation. The internal assessment exam can be conducted at the end of each semester, and the final exam can be performed at the end of the course, which includes both theory and practical.<sup>14</sup>

### ***Recognition of Academic courses***

The candidate who obtains a postgraduate Master's degree in forensic nursing will be paid a salary/stipend as admissible under rules, and an increment can give for subsequent promoting years. In addition, Based upon the neediness for recruitment in teaching areas, clinical aspects, including casualty, one-stop crisis Centre for sexual assault survivors, and forensic medicine department, can be recruited. This will increase job opportunities and provide academic growth for the forensic nursing specialty.<sup>14</sup>

### ***Indented expected education outcome***

The learner should know the historical development of forensic nursing as a discipline of health care, Assess the effect of governmental, economic, and social factors on forensic care within the medicolegal system, application of cognitive, interpersonal, and applied skills in the practice of forensic nursing. Capability to develop comprehensive plans of forensic care by incorporating the principle of forensic nursing toward the nursing standard.<sup>11</sup>

### ***Administrative recommendations***

The role and responsibility of FNPs in Medicolegal practice under supervision of doctors will have to be endorsed by necessary authorities so that their reports could be accepted by courts of law. Designated posts for FNPs needs to be created in hospital/healthcare setups.

## **CONCLUSION**

This article mainly recommends and proposes to create forensic nursing as a subspecialty of



nursing by Dte.GHS, Nursing Division, MoHFW, Government of India and other associated regulatory authorities for professional recognition. The effective implementation of Forensic Nursing will ultimately lead to significant contribution to victims in justice delivery system.

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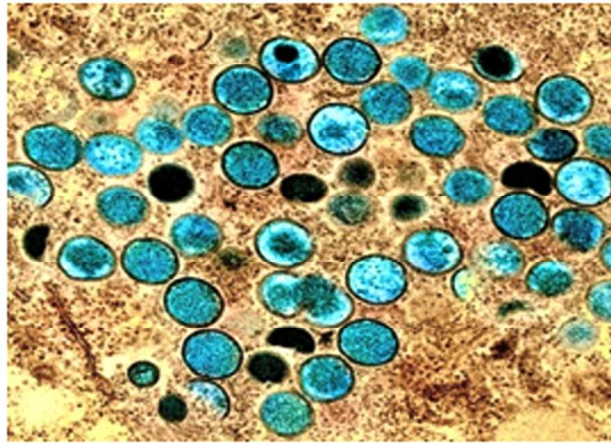
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# Monkeypox

Shibilamol C Baby



Source: National Institute of Allergy and Infectious Diseases

## INTRODUCTION

The disease is called monkeypox because it was first identified in colonies of monkeys kept for research in 1958. It was only later detected in humans in 1970. Monkeypox is an illness caused by the monkeypox virus. It is a viral zoonotic infection, meaning that it can spread from animals to humans. It is caused by infection with monkeypox virus that occurs primarily in tropical rainforest areas of Central and West Africa and is occasionally exported to other regions. Monkeypox virus belongs to the Orthopoxvirus genus in the family Poxviridae. It can also spread from person to person. In most cases, the symptoms of monkeypox go away within a few weeks. However, in some people, an infection can lead to medical complications and even death. Newborn babies, children and people

with underlying immune deficiencies may be at risk of more serious symptoms and death from monkeypox.

1% to 10% of people with monkeypox have died in past years. It is very important to note that death rates in different settings may differ due to a number of factors, such as access to health care. These Fig.s may be an overestimate because surveillance for monkeypox has generally been limited in the past. In the newly affected countries where the current outbreak is taking place, there have been no deaths to date.

## TRANSMISSION

Monkeypox can spread to people when they come into physical contact with an infected animal. Animal hosts include rodents and primates. The risk of catching monkeypox from animals can be reduced by avoiding unprotected contact with wild animals, especially those that are sick or dead (including their meat and blood). In endemic countries where animals carry monkeypox, any foods containing animal meat or parts should be cooked thoroughly before eating.

It spreads from person to person through close

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contact with someone who has a monkeypox rash, including through face-to-face, skin-to-skin, mouth-to-mouth or mouth-to-skin contact, including sexual contact. We are still learning about how long people with monkeypox are infectious for, but generally they are considered infectious until all of their lesions have crusted over, the scabs have fallen off and a new layer of skin has formed underneath.

Environments can become contaminated with the monkeypox virus, for example when an infectious person touches clothing, bedding, towels, objects, electronics and surfaces. Someone else who touches these items can then become infected. It is also possible to become infected from breathing in skin flakes or virus from clothing, bedding or towels. This is known as fomite transmission.

Ulcers, lesions or sores in the mouth can be infectious, meaning the virus can spread through direct contact with the mouth, respiratory droplets and possibly through short-range aerosols. Possible mechanisms of transmission through the air for monkeypox are not yet well understood and studies are underway to learn more. The virus can also spread from someone who is pregnant to the fetus, after birth through skin-to-skin contact, or from a parent with monkeypox to an infant or child during close contact. Although asymptomatic infection has been reported, it is not clear whether people without any symptoms can spread the disease or whether it can spread through other bodily fluids. Pieces of DNA from the monkeypox virus have been found in semen, but it is not yet known whether infection can spread through semen, vaginal fluids, amniotic fluids, breastmilk or blood. Research is underway to find out more about whether people can spread monkeypox through the exchange of these fluids during and after symptomatic infection.

## EPIDEMIOLOGY

### *Agent*

Monkeypox virus (MPXV) is an enveloped double-stranded DNA virus that belongs to the Orthopoxvirus genus of the Poxviridae family.

### *Host*

Natural reservoir is yet unknown. However, certain rodents (including rope squirrels, tree squirrels, Gambian pouched rats, dormice) and non-human primates are known to be naturally susceptible to monkeypox virus.

**Incubation period:** The incubation period (interval from infection to onset of symptoms) of monkeypox is usually from 6 to 13 days but can range from 5 to 21 days.

**Period of communicability:** 1-2 days before the rash to until all the scabs fall off/gets subsided.

**Usual onset:** 5–21 days post exposure

**Duration:** 2 to 4 weeks

## RISK GROUP

People who live with or have close contact (including sexual contact) with someone who has monkeypox, or who has regular contact with animals are most at risk. Health workers should follow infection prevention and control measures to protect themselves while caring for monkeypox patients. Newborn infants, young children and people with underlying immune deficiencies may be at risk of more serious symptoms, and in rare cases, death from monkeypox. People who were vaccinated against smallpox may have some protection against monkeypox. However, younger people are unlikely to have been vaccinated against smallpox because smallpox vaccination stopped in most settings worldwide after it was eradicated in 1980. People who have been vaccinated against smallpox should continue to take precautions to protect themselves and others.

## CLINICAL SYMPTOMS AND SIGNS

### *Prodrome (0-5 days)*

- a. Fever
- b. Lymphadenopathy
  - Typically occurs with fever onset
  - Periauricular, axillary, cervical or inguinal
  - Unilateral or bilateral
- c. Headache, muscle aches, exhaustion
- d. Chills and/or sweats
- e. Sore throat and cough

### *Skin involvement (rash)*

- a. Usually begins within 1-3 days of fever onset, lasting for around 2-4 weeks
- b. Deep-seated, well-circumscribed and often develop umbilication
- c. Lesions are often described as painful until the healing phase when they become itchy (in the

crust stage)

d. Stages of rash (slow evolution)

- Enanthem - first lesions on tongue and mouth
- Macules starting from face spreading to arms, legs, palms, and soles (centrifugal distribution), within 24 hours
- The rash goes through a macular, papular, vesicular and pustular phase. Classic lesion is vesicopustular
- Involvement by area: face (98%), palms and soles (95%), oral mucous membranes (70%), genitalia (28%), conjunctiva (20%). Generally skin rashes are more apparent on the limbs and face than on the trunk. Notably the genitalia can be involved and can be a diagnostic dilemma in STD population
- By 3rd day lesions progress to papules
- By 4th to 5th day lesions become vesicles (raised and fluid filled).
- By 6th to 7th day lesions become pustular, sharply raised, filled with opaque fluid firm and deep seated.
- May umbilicate or become confluent
- By the end of 2nd week, they dry up and crust
- Scabs remain for a week before falling off
- The lesion heals with hyperpigmented atrophic scars, hypopigmented atrophic scars, patchy alopecia, hypertrophic skin scarring and contracture/deformity of facial muscles following healing of ulcerated facial lesions
- A notable predilection for palm and soles is characteristic of monkey pox

- e. The skin manifestation depends on vaccination status, age, nutritional status, associated HIV status. It occurs in communities where there is often a high background prevalence of malnutrition, parasitic infections, and other significant health compromising conditions.
- f. The total lesion burden at the apex of rash can be quite high (>500 lesions) or relatively slight (<25).

### *Differential Diagnosis*

- Varicella (Chicken pox)
- Disseminated herpes zoster

- Disseminated herpes simplex
- Measles
- Chancroid
- Secondary syphilis
- Hand foot mouth disease
- Infectious mononucleosis
- Molluscum contagiosum.

## **DIAGNOSTIC EVALUATION**

Lymphadenopathy during the prodromal stage of illness can distinguish monkeypox from chickenpox or smallpox on physical examination. Diagnosis can be verified by testing for the virus. Polymerase chain reaction (PCR) testing of samples from skin lesions is the preferred laboratory test. PCR blood tests are usually inconclusive because the virus remains in blood only a short time. To interpret test results, information is required on date of onset of fever, date of onset of rash, date of specimen collection, current stage of rash, and patient age.

## **PREVENTION**

### *Patient Placement*

A patient with suspected or confirmed monkeypox infection should be placed in a single person room; special air handling is not required. The door should be kept closed, if safe to do so. The patient should have a dedicated bathroom. Activities that could resuspend dried material from lesions, e.g., use of portable fans, dry dusting, sweeping, or vacuuming should be avoided. Transport and movement of the patient outside of the room should be limited to medically essential purposes. If the patient is transported outside of their room, they should use well fitting source control (e.g., medical mask) and have any exposed skin lesions covered with a sheet or gown. The person should isolate from others until all of the lesions have crusted over, the scabs have fallen off and a new layer of skin has formed underneath. This will stop passing on the virus to others. Until more is understood about transmission through sexual fluids, use condoms as a precaution whilst having sexual contact for 12 weeks after you have recovered.

### *Personal Protective Equipment (PPE)*

HCW who enter the patient's room should wear the following PPE: Gloves, Gown, Eye protection (goggles or faceshield) that covers the front and sides of the face), N95 filters. HCP should remove

and discard gloves, gown and eye protection, and perform hand hygiene prior to leaving the patient's room; the respirator should be removed, discarded and replaced with a mask for source control after leaving the patient's room and closing the door.

### ***Environmental Infection Control***

CDC recommends using an EPA-registered hospital-grade disinfectant with an emerging viral pathogen claim, although most of these are hospital grade disinfectants. Any EPA-registered hospital-grade disinfectant can be used for cleaning and disinfecting environmental surfaces. Take care when handling soiled laundry (e.g., bedding, towels, personal clothing) to avoid contact with lesion material. Soiled laundry should be gently and promptly contained in an appropriate laundry bag and never be shaken or handled in manner that may disperse infectious particles. Activities such as dry dusting, sweeping, or vacuuming should be avoided. Wet cleaning methods are preferred.

Waste (i.e., handling, storage, treatment, and disposal of soiled PPE, patient dressings, etc.) should be managed as medical waste. Reduce the risk of catching monkeypox by limiting close contact with people who have suspected or confirmed monkeypox, or with animals that could be infected. Clean and disinfect environments that could have been contaminated with the virus from someone who is infectious regularly.

***If the person advised to isolate at home, do not go out and protect others from infection:***

- Isolating in a separate room
- Using a separate bathroom, or cleaning after each use
- Cleaning frequently touched surfaces with soap and water and a household disinfectant and avoiding sweeping/vacuuming (this might disturb virus particles and cause others to become infected)
- Using separate utensils, towels, bedding and electronics
- Doing own laundry (lift bedding, clothes and towels carefully without shaking them, put materials in a plastic bag before carrying it to the washing machine and wash them with hot water > 60 degrees)
- Opening windows for good ventilation
- Encouraging everyone in the house to clean their hands regularly with soap and water or an alcohol-based hand sanitizer.

***If the person cannot avoid being in the same room as someone else or having close contact with another person while isolating at home, then do best to limit their risk by:***

- Avoiding touching each other
- Cleaning hands often
- Covering the rash with clothing or bandages
- Opening windows throughout the home
- Ensuring anyone in the room with you wear well fitting medical masks
- Maintaining at least 1 meter of distance.

## **TREATMENT**

A vaccine was recently approved for preventing monkeypox. Some countries are recommending vaccination for persons at risk. Many years of research have led to development of newer and safer vaccines for an eradicated disease called smallpox, which may also be useful for monkeypox. One of these has been approved for prevention of monkeypox. Only people who are at risk should be considered for vaccination. Mass vaccination is not recommended at this time. While the smallpox vaccine was shown to be protective against monkeypox in the past, current data on the effectiveness of newer smallpox/monkeypox vaccines in the prevention of monkeypox in clinical practice and in field settings are limited. Studying the use of vaccines for monkeypox wherever they are used will allow for rapid generation of additional information on the effectiveness of these vaccines in different settings.

People with monkeypox should follow the advice of their health care provider. Symptoms normally resolve on their own without the need for treatment. If needed, medication for pain (analgesics) and fever (antipyretics) can be used to relieve some symptoms. It is important for anyone with monkeypox to stay hydrated, eat well, and get enough sleep. People who are self isolating should take care of their mental health by doing things they find relaxing and enjoyable, staying connected to loved ones using technology, exercising if they feel well enough and can do so while isolating, and asking for support with their mental health if they need it. People with monkeypox should avoid scratching their skin and take care of their rash by cleaning their hands before and after touching lesions and keeping skin dry and uncovered. They are unavoidably in a room with someone else, in

which case they should cover it with clothing or a bandage until they are able to isolate again. The rash can be kept clean with sterilised water or antiseptic. Saltwater rinses can be used for lesions in the mouth, and warm baths with baking soda and Epsom salts can help with lesions on the body. Lidocaine can be applied to oral and perianal lesions to relieve pain.

Many years of research on therapeutics for smallpox have led to development of products that may also be useful for treating monkeypox. An antiviral that was developed to treat smallpox (tecovirimat) was approved in January 2022 by the European Medicines Agency for the treatment of monkeypox. Experience with this therapeutics in the context of an outbreak of monkeypox is limited. For this reason, their use is usually accompanied by collection of information that will improve knowledge on how best to use them in future.

## COMPLICATIONS

Complications include secondary infections,

pneumonia, sepsis, encephalitis, and loss of vision with severe eye infection. If infection occurs during pregnancy, still birth or birth defects may occur. The disease may be milder in people vaccinated against smallpox in childhood.

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Reports of randomized clinical trials should be based on the CONSORT Statement (<http://www.consort-statement.org>). When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at [http://www.wma.net/e/policy/17-c\\_e.html](http://www.wma.net/e/policy/17-c_e.html)).

## Results

Present your results in logical sequence in the text, tables, and illustrations, giving the main or most important findings first. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. Extra or supplementary materials and technical details can be placed in an appendix where it will be accessible but will not interrupt the flow of the text; alternatively, it can be published only in the electronic version of the journal.

## Discussion

Include summary of key findings (primary outcome measures, secondary outcome measures, results as they relate to a prior hypothesis); Strengths and limitations of the study (study question, study design, data collection, analysis and interpretation); Interpretation and implications in the context of the totality of evidence (is there a systematic review to refer to, if not, could one be reasonably done here and now?, What this study adds to the available evidence, effects on patient care and health policy, possible mechanisms)? Controversies raised by this study; and Future research directions (for this particular research collaboration, underlying mechanisms, clinical

research). Do not repeat in detail data or other material given in the Introduction or the Results section.

## References

List references in alphabetical order. Each listed reference should be cited in text (not in alphabetic order), and each text citation should be listed in the References section. Identify references in text, tables, and legends by Arabic numerals in square bracket (e.g. [10]). Please refer to ICMJE Guidelines ([http://www.nlm.nih.gov/bsd/uniform\\_requirements.html](http://www.nlm.nih.gov/bsd/uniform_requirements.html)) for more examples.

### Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. *J Oral Pathol Med* 2006; 35: 540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. *Acta Odontol Scand* 2003; 61: 347-55.

### Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antiseptics. State of the art. *Dermatology* 1997; 195 Suppl 2: 3-9.

### Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. *J Periodontol* 2000; 71: 1792-801.

### Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. *Dent Mater* 2006.

### Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

### Chapter in book

[7] Nauntofte B, Tenovou J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O,

Kidd EAM, editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

### No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

### Reference from electronic media

[9] National Statistics Online – Trends in suicide by method in England and Wales, 1979-2001. [www.statistics.gov.uk/downloads/theme\\_health/HSQ20.pdf](http://www.statistics.gov.uk/downloads/theme_health/HSQ20.pdf) (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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