Acute SART Exams: Maximizing Evidence Recovery and Victim Care

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Learning Objectives

The participant will be able to

- List the usual forensic specimens to be collected from an acute sexual abuse/assault victim.
- Explain how sexual assault evidence may be contaminated or lost before collection.
- Define the concept of “chain of custody.”
- Understand factors that influence timing of an acute medical examination.
System Response to Child Sexual Assault:
When should a child be examined?

**Acute Exam:** The California Protocol recommends a timely exam for any sexual assault victim within 72 hours. The purpose is to...
- Document injury
- Collect evidence
- Provide indicated medical care
- Minimize trauma to the child/teen victim

**Nonacute Exam:** No time limit to potential usefulness
If afterhours --- When may an acute exam be deferred until the next day?

Small children who have already bathed at the time they disclose the abuse and do not have any painful injuries or current bleeding

Small children who have very vague disclosures and who do not have any painful injuries or current bleeding

Teens who have already showered or bathed before they disclose the assault and do not have any painful injuries or current bleeding
Reminder:

Law Enforcement is advised to call the on-call doctor from the field to discuss the case.

- If the case can be deferred until the following morning, this will avoid an unnecessary drive to Rady Children’s Hospital.
- Arrangements can be made at that time for an exam the following morning.
Young Children v. Adolescents

• Both young children and teens can be victims but there are important differences in...
  • Perpetrator relationship
  • Risk factors
  • Sexual acts
  • Anatomy – sexual immaturity vs. maturity
  • Injuries – incidence and healing
  • Medical care – STDs, pregnancy concerns
Before the forensic exam, important to establish medical stability

- Fewer than 5% sexual assault patients have serious medical problems
  - Significant bleeding
  - Mental status impairment
  - Airway compromise
  - Pain suggesting skeletal fracture

Arrange immediate emergency care
The SART Medical Team’s Approach to the Patient

Most children become comfortable and cooperative with a medical provider who takes time to build rapport.

Reassurance helps children:
- The exam is not painful
- Answer questions honestly
- Perform the exam gently
Prepubertal Children: Findings in Acute vs. Nonacute exams

<table>
<thead>
<tr>
<th>Anogenital injuries</th>
<th>Forensic evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Acute 13-20%</td>
<td>• Acute 0-24% in 1\textsuperscript{st} 24 hours</td>
</tr>
<tr>
<td>• Nonacute 5%</td>
<td>• Nonacute - none</td>
</tr>
</tbody>
</table>

Note: Most exams are normal!
Children have an immature anatomic concept of vaginal penetration. Most incidents don’t involve use of force and do not cause injury. Genital and anal tissue have elasticity—may stretch rather than tear. Small injuries heal quickly and completely. Nonspecific findings have multiple other causes. History of pain does not always correlate with injury. Use of lubricants.
Adolescent findings: Prior Sexual Experience vs. No Prior Sexual Experience

<table>
<thead>
<tr>
<th></th>
<th>No prior sexual experience</th>
<th>Prior sexual experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biggs (1998)</td>
<td>65%</td>
<td>26%</td>
</tr>
<tr>
<td>Jones (2003)*</td>
<td>91%</td>
<td>74%</td>
</tr>
<tr>
<td>White (2006)</td>
<td>53%</td>
<td>25%</td>
</tr>
</tbody>
</table>

*Exam Method: Toluidine blue dye/magnification
What happens if the exam is not performed acutely?

Injuries heal, most of them very well.

Evidence disappears. Not much left to see on the nonacute exam.
Is there still value to examining children nonacutely?

Yes

- Documentation of healed injuries, if present
- STD tests
- Assessment of other related health risks
- Reassurance about bodily integrity
- Referral for trauma counseling
May corroborate victim’s history by…
- Linking AP to victim
- Linking victim to the scene
- Linking the AP to the scene
- Identifying the perpetrator by DNA recovery

Only collected in acute cases

Lack of evidence may also corroborate the victim’s history
DNA Evidence

- Powerful investigative tool that has replaced former serology techniques
  - Trace evidence (foreign hairs, debris) still collected - less frequently processed
  - DNA evidence may be left of the victim’s body or at the scene
    - Semen, saliva, blood left by suspect on victim’s body, clothing, bedding or other items from the scene
    - Skin cells (fingernail scrapings) if the victim scratched the suspect
## Three Categories of Evidence

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Standard items</strong></td>
<td>Collect in all exams – typical sources of evidence in SA case</td>
</tr>
</tbody>
</table>
| **2. Evidence per patient history** | Patient tells of other contact that might yield evidence  
|                                | Examiner finds debris, etc. |
| **3. Reference samples**       | Informs lab to differentiate foreign material from patient’s own type of blood, hair, DNA, etc. |
## 1. Standard Items

<table>
<thead>
<tr>
<th>All</th>
<th>Prepubertal</th>
<th>Adolescent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Girls</td>
<td>Boys</td>
</tr>
<tr>
<td>Clothing</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Mouth</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Fingernails</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Anal canal</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pubic hair</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Vulva/ vestibule</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Vagina/ Cervix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penis/ scrotum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Evidence per Patient History/Exam

**Possible saliva** – any site with oral contact (usual sites: perioral, neck, suction injuries, bite marks, breasts, abdomen)

**Possible semen** (usual sites: face, abdomen, hands, external genitalia, legs)

**Rectum** - Swabs per anoscope

**DFSA cases** (Collect from perioral area, neck, breasts, abdomen)

**Debris** (Vegetation, ligatures, intra-vaginal items [condoms, retained tampons], soil or sand, fibers, paint, hair [human, animal], other)
3. Patient Reference Samples

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pubic hair</td>
<td></td>
</tr>
<tr>
<td>DNA sample: blood, buccal swabs</td>
<td>These are required to differentiate the victim’s DNA from any other DNA collected from the body of the victim or the scene</td>
</tr>
</tbody>
</table>
Working with the Forensic Lab

- There are a number of different evidence collection protocols and kits
- Important to work with local/regional crime lab to establish consistent practice
  - Best practice has not been determined in many cases
- Meet with local crime lab regularly
Prior to the exam, biological forensic evidence may be lost by...

- Rapid biochemical degradation
- Loss of sperm motility and morphology
- Gravity drainage from the vagina
- Mechanical loss: washing, brushing teeth, urinating, defecating, wiping, douching, etc.

Every effort should be made to get patient to the exam site before evidence is lost.
Relevant history assists in determining exam timing

- Time interval since assault
- Types of sexual acts
- Condom or other contraception
- Prior or subsequent sexual activity
- Post assault hygiene: urination, defecation, bathing/showering/washing, douching, eating/drinking, brushing teeth/gargling, changing clothes
If alcohol/drugs have been used to overcome the victim…

• Toxicology specimens collected
  • If patient appears under the influence
  • If there is a recent history of drug or alcohol use
  • If patient has history of loss of consciousness

• Earliest urine should be collected as some drugs of abuse are metabolized quickly and will be lost
Contamination of evidence can lead to errors in interpretation of the crime circumstances

To avoid Evidence Contamination

- Medical team processes only one patient at a time
- Exam environment cleaned after each patient
- Avoid coughing or sneezing or chewing gum - May deposit examiner DNA on patient and/or evidence
- Gloves --Always worn and changed as needed during exam
Clothing Collection

Collect, dry, and store correctly
- Body fluid stains on clothing are stable for years
- May yield more evidence than body

Collect clothes when...
- Worn during assault or put on immediately after
- Underwear put on even after bathing - may contain semen from gravity drainage

Bedding/linens collected by police at scene
Step 1: Clothing Collection

- Wear gloves throughout clothing collection
- Use gloves throughout physical exam.
- Prevents contamination of evidence with examiner’s DNA
Step 2: Clothing Collection

- Place 2 large pieces of paper on the floor for the patient to stand on while undressing
- Can use exam table paper
- Top paper will catch any debris or fibers that fall from patient while undressing
Step 3: Clothing Collection

Patient removes shoes

...and steps onto paper
Step 4: Clothing Collection

- Examiner inspects clothing while still on patient for...
  - Stains
  - Debris
  - Damage (tears, missing buttons, etc.
- Examiner asks if due to assault or not, and records
Step 5: Clothing Collection

- Patient removes clothing item by item
- Patient hands to examiner who places in labeled paper bag
Step 6: Clothing Collection

- Patient continues to remove clothes over the paper
- Patient puts on gown and steps off paper
Step 7: Clothing Collection

- Over the paper, examiner inspects for dry or wet stains
- Should avoid excessive handling
- Never use plastic bags
  - Biological evidence will degrade
If Clothing is Damp…

- Fold item loosely to avoid transferring damp area to another area of item
- Don’t fold clothing across stains
- Damp areas will dry in paper bags
If Clothing is Wet...

- Wrap wet evidence in paper and place in bag
  - Even in plastic bag
- **Mark bag clearly**
- Notify law enforcement if there are “wet evidence” bags
  - Law enforcement will dry wet evidence before impounding it
  - If left wet, biological degradation occurs
Step 8: Clothing Collection

Seal bag: Fold top over. Tape should go over the fold and around the other side. Label outside of bag with…
patient’s name
examiner’s name
date/time
contents
Write initials across seal
Step 9: Clothing Collection

- Carefully fold the top sheet of paper into a “bindle”
- Seal and label the bindle. It may contain debris from the clothes.
Step 10. Clothing Collection

- Discard the bottom sheet of paper
- It will be contaminated with debris from the floor
Clothing Collection: Finished!

• Place the bindle and the individually-bagged garments into a large paper bag
Other Collection Techniques
Head Hair and Fingernail Scrapings

Head hair reference sample: No longer requested by SDPD

Fingernail scrapings: Suspect skin cells, body fluids, semen
• If no fingernails, fingers can be swabbed down to knuckles
Instructions for Making a Bindle

7. Fold in half. Seal the open end of the bindle. Initial over the tape. Label contents.
Instructions for Collecting Swabs

For wet stains, use dry swabs. For dry stains, use swabs moistened with de-ionized water

Use 2 swabs. Rotate them to coat evenly with the available material

Use at least two swabs for each site
(Later, defense can request half the kit for tests by independent lab)
Evidence Handling following Collection

- Dry all wet swabs in a stream of ambient air for at least 60 minutes
- Make bindles to hold debris of various kinds
- Label all swabs and evidence collected:

  Patient name, dob
  Date and time of collection
  Contents
  Examiner initials
Oral Cavity Evidence

• Purpose: Recovery of sperm, foreign material

• Procedure
  • Collect 2 oral cavity swabs up to 12 hr post rape
  • Wet or dry secretions/stains around mouth
  • Any foreign material in or around mouth

• Optional use of dental floss may recover sperm from between teeth
Alternate Light Source: Locating Body Fluids Dried on the Skin

Scan entire body with alternate light source. Identify areas of fluorescence.

Remove with water-moistened swab.

Remember: Substances other than semen and saliva fluoresce.
Swabbing for Saliva

- Collect areas of possible saliva using swabs moistened with deionized water
  - Bite marks
  - Suction marks (hickeys)
  - Per patient history
  - DFSA
Genital Exam Sequence for Teen Girls

- Scan ext. genitalia w/alt. light source
- Cut matted pubic hair
- Pubic hair combing
- Inspect vulva and vestibule: Collect external specimens, debris
- Apply TB dye
- Speculum exam of vagina. Collect specimens.
- Collect endocervical specimens

Document injuries in all areas as you proceed
Pubic Hair Collection: 3 Parts

1. Cut out matted hair or crusted material
   • Put in a bindle

2. Brush/comb hair downward over clean paper under victim’s buttocks
   • Fold paper with comb inside to make a bindle

3. **Reference** standard
   • 20-30 hairs are required from random areas - Pluck/Cut as close to skin as possible

4. Label per general instructions
Collect Debris, if present from Vulva, Vestibule

- Inspect carefully
- Photograph in place
- Collect debris, vegetation, hairs, fibers using post-its, tweezers, swabs
- Place in a bindle
- Label
Collect 2 swabs each from the vulva and vestibule.
Collection from Vagina

- Speculum inserted into vagina to visualize
  - If no speculum, can collect blind

- Foreign material collected, if present
  - Tampon, condom, hair, vegetation
  - Photograph, document

- 4 swabs taken from the vaginal pool
Looking for Sperm

- Sperm recovery confirms sexual contact
- Stained slides (crime lab) will detect sperm more often than the wet mount slide
- Wet mount only opportunity to see motile sperm
- Sperm survive longer in cervical mucus than in vaginal pool
# Sperm Recovery in Living Victims

<table>
<thead>
<tr>
<th>Body cavity</th>
<th>Motile Sperm</th>
<th>Non-motile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vagina</td>
<td>6-28 h</td>
<td>14 h – 10 d</td>
</tr>
<tr>
<td>Cervix</td>
<td>3-7.5 d</td>
<td>7.5 – 19 d</td>
</tr>
<tr>
<td>Mouth</td>
<td>-</td>
<td>2 – 31 h</td>
</tr>
<tr>
<td>Rectum</td>
<td>-</td>
<td>4 – 113 h</td>
</tr>
<tr>
<td>Anus</td>
<td>-</td>
<td>2 – 44 h</td>
</tr>
</tbody>
</table>
Microscopic Examination

- Focus, using a low power, 10-x
- Using a phase contrast microscope, change to 40+x
- Sperm motility decreases quickly with time and removal from vagina
- Without removing the cover slip, submit slide with evidence kit

Phase contrast microscope
Sperm visualized with the aid of Christmas tree stain
Prepared by the forensic laboratory
Specimens from Cervix

- Obtain two swabs from endocervix
- Make sure to label “cervix”

Not possible unless cervix is visualized
### Prepubertal Female Genital Exam Sequence

- Alternate light source
- No pubic hair collection
- Swabs
  - Vulva – swab widely
  - Vestibule, if child cooperative
    - Be careful not to touch the hymen
  - Intravaginal ? – No need. If child goes to the OR for repair, intravaginal specimens can be collected under anesthesia
- Rest – same as teen
Male Genital Exam Sequence

- Prepubertal and adolescent same except for pubic hair collection.
- Alternate light source exam
- Collect 2 swabs, moistened with deionized water from...
  - Penis, both glans and shaft
    - Include coronal sulcus and base of penis
    - Include foreskin if it retracts
    - No swab from urethral meatus
  - Scrotum
Anorectal Evidence Collection

• Same procedure for male and female
  • Inspect and collect, if present...
    • Moist/dry secretions, foreign material
    • Clean the perianal area with 3 water-moistened 2x2s, back to front, prior to next step. Discard.
  • Use buttock traction to expose anus to avoid contamination.
  • Routinely collect 2 anal canal swabs by inserting the swabs cleanly into the anal canal.
  • If anoscopy indicated (teens only), collect 2 swabs from rectal mucosa through anoscope
Collect perianal debris using Post-its or a swab to brush debris into a bindle
Record all evidence collected...

- On diagrams and report
- Clothing
- Foreign materials, secretions on body
- Oral, genital, and anal samples
- Record results of vaginal wet mount
- Toxicology
- Reference samples
Recommendations for Storage

Storage of Collected Evidence

- Biological evidence once dried should be stored room temperature, refrigerated or frozen – follow crime lab recommendations
  - Swabs and slides
  - Trace evidence
  - Reference samples
- Blood and urine should be refrigerated
  - Do not freeze liquid blood samples
- Clothing should be stored in a dry area
Chain of Custody

- Definition: chronological documentation showing the collection, custody, control, transfer, analysis, and disposition of physical evidence
- Medical provider collects, labels, and packages evidence specimens from the victim
- Law enforcement signs for and receives the evidence packet
- Crime lab signs for and receives the evidence packet from law enforcement
Questions?

Presentation available for download at chadwickcenter.org homepage.
References
