NCMEC Forensic Resources:

How DNA is Increasing the Efficacy of Facial Approximations

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WHO WE ARE

- Founded in 1984
- Nonprofit, non-governmental organization
- Congressionally funded in part to operate 15 programs related to missing and exploited children
- National resource center for families, law enforcement and other professionals

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OUR MISSION

Find Missing Children

Reduce Child Sexual Exploitation

Prevent Future Victimization

Hope is why we're here.

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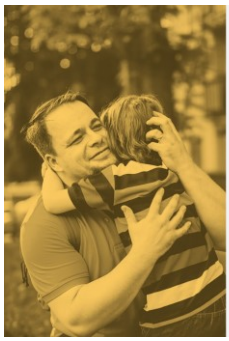

Finding Missing Children

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Reducing Child Sexual Exploitation

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Preventing Future Victimization

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Case Resolution from Layers of Resources

- Facial Approximations
- Media Distribution
- Forensic Case Work
- Analytical Support

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NCMEC Forensic Resources

- DNA Technology
- Forensic Genealogy
- Pollen & Soil Analysis
- Audio & Video Enhancement
- Digital Forensics
- Latent Fingerprint Exam
- Document Examination
- Forensic Anthropology

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Three Main Disciplines of Forensic Art

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01
Composite Imagery: Image to create likeness or similarity of subject to generate leads

10


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02
Image Modification: Alteration or enhancement of image for the purpose of updating, clarifying, or Identifying a subject

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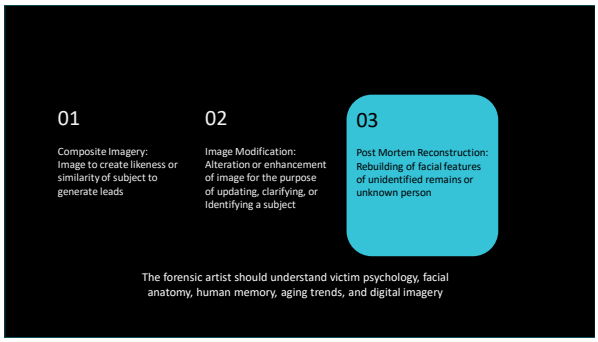
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Composite Imagery: Image to create likeness or similarity of subject to generate leads
02
Image Modification: Alteration or enhancement of image for the purpose of updating, clarifying, or Identifying a subject
03
Post Mortem Reconstruction: Rebuilding of facial features of unidentified remains or unknown person
The forensic artist should understand victim psychology, facial anatomy, human memory, aging trends, and digital imagery

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NCMEC Forensic Imaging Unit

Postmortem Reconstruction:

- 2D photo compositing from soft tissue remains
- 2D photo compositing from skeletal remains
- 3D modeling from CT scan of skeletal remains

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Case Example: Mebane, North Carolina John Doe

01

NCMEC has modified this John Doe's image five times with updated biological information, advanced 3D modeling technology, and DNA phenotypes

On September 25, 1998 skeletal remains found of victim: 9-12 years old, Caucasian, male, dark brown hair 3-4" inches long

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Case Example: Mebane, North Carolina John Doe

02

Based on a photograph of skull and 1998 biological assessment, NCMEC completed a 2D facial reconstruction (original reconstruction)

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Case Example: Mebane, North Carolina John Doe

03

2010 updated biographical assessment of victim: ancestry more likely Hispanic

2012 completed 3D facial reconstruction using CT scan of skull (second reconstruction)

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Case Example: Mebane, North Carolina John Doe

04

2018 phenotyping completed by Parabon Nanolabs revealing ancestry of mixed East Asian and European (mom Asian, father European), had light brown or fair skin color, brown or hazel eyes, and black hair

An updated approximation was created with applied color information (third reconstruction)

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Case Example: Mebane, North Carolina John Doe

05

2019 genealogy was pursued by genealogist Barbara Rae-Venter and lead was developed which produced identification

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Case Example: Allenstown, New Hampshire Jane Doe

01

NCMEC has modified this Jane Doe's image three times with updated biographical information, DNA ancestry information and family reference photograph of father.

This unidentified child was found on May 9, 2000 on private property next to Bear Brook State Park in Allenstown, NH.

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Case Example: Allenstown, New Hampshire Jane Doe

02

2000 biographical assessment of victim:
4-8 years old, Caucasian, slightly wavy, fine
brown hair 12-13 inches long, noticeable overbite
(original reconstruction)

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Case Example: Allenstown, New Hampshire Jane Doe

03

2015 new biographical assessment of victim:
2-4 years old, Caucasian, slightly wavy, fine brown hair 5 inches long, noticeable overbite
(second reconstruction)

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Case Example: Allenstown, New Hampshire Jane Doe

04

2019 investigation developed lead to potential suspect. Nuclear DNA testing and kinship analysis completed by Bode Technology revealed suspect was biological father to child.

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Case Example: Allenstown, New Hampshire Jane Doe

05

2020 whole genome sequencing completed by Astrea Forensics on victim's hair produce genome file that was uploaded into genealogy databases revealing ancestry is primarily Caucasian with a small amount of Asian, Black and American Indian ancestry (third reconstruction)

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NATIONAL CENTER FOR
MISSING &
EXPLOITED
CHILDREN

For more resources, please visit
NCMEC.org

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