



*DNA Collection Products  
Driving Forensic Laboratory Success*

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# AGENDA

*As technology advances, the choice in the DNA collector, both for buccal & surfaces can have a significant impact on the quality, quantity and success of your case*

Dan Watsula



- **Introduction to Bode Technology**
- **Overview of Reference Sample Collection**
- **DNA Evidence Collection**
- **Importance of Collection Product Quality**

# Bode Technology

*Located in Lorton, VA, Bode has been partnering with the Forensic Community and Law Enforcement for over 25 years.*

**Employees**

**>250  
Employees**

**Samples Run**

**>35K  
Samples/yr**

**Human ID**

**>30K Tested  
Remains**

**Swabs Sold**

**+10M  
Sampling  
Devices Sold**

**Geography**

**Clients in 50  
States,  
South America  
Latin America  
Europe, APAC**



*90% of our employees are in the laboratory,  
focused on delivering timely, quality results*



# Choosing the Correct Collection Method:

## Direct Collection: Direct Success



# Reference Sample Collection Methods

## “One Step”

Direct  
Collection

Vs.

Transfer  
Collection

## “Multi-Step”

- Collection device is used to collect a reference sample from individual’s cheek.
- One step-no secondary transfer step.
- Limited chance of a sample switch.

- Swab is used to collect a reference sample from individual’s cheek.
- Swab is then pressed against a different material to transfer the sample
- Increased chance of a sample switch.

# Laboratory Benefits of Direct Collection

Direct Collection has shown better performance across several critical areas necessary for successful DNA Identification

**Simpler Chain  
of Custody**

**More  
Consistent  
DNA Yields**

**Higher 1<sup>st</sup>  
Pass Success  
Rates**

**Lower Overall  
Failure Rate**

# Laboratory Benefits: Chain of Custody

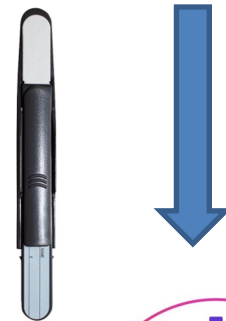
## Direct Collection from the Donor's mouth

- Ensures sample collected is sample processed
- No transfer step from a swab to card
- Prevents loss of sample or sample switch



## The collector can have a barcode (1D or 2D) affixed as well as an RFID tag

- Further ensures COC
- Barcode /RFID tag remains with sample throughout process



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# Laboratory Benefits: 1<sup>st</sup> Pass Success Rates & Failure Rates

## Collection Products can Drive Laboratory Success!

*Table 1: Field Collected Samples Submitted to Bode's Databasing Unit Over a 12 month period- 1<sup>st</sup> Pass Success Rate*

| Sample Substrate    | Samples Tested | First Pass Success Rate | Reload Rate | ReAmp/ ReExtract Rate |
|---------------------|----------------|-------------------------|-------------|-----------------------|
| Direct Collection   | 30,166         | 90.89%                  | 3.95%       | 5.15%                 |
| Transfer Collection | 12,958         | 78.34%                  | 4.32%       | 17.34%                |

*Table 2: 5 years of data from Bode's Databasing Unit-Failure Rate*

| Sample Substrate    | Samples Tested | Failed Samples | Failure Rate |
|---------------------|----------------|----------------|--------------|
| Direct Collection   | 239,352        | 255            | .11%         |
| Transfer Collection | 94,704         | 643            | .68%         |

**Transfer Collections have a 6X higher failure rate!**





# Laboratory Benefits: Sample Collection & Laboratory Budget Impact

- Example Laboratory A
  - Processes 30,000 reference samples/year
  - Each sample costs \$35 to process
    - Laboratory chemicals, plastics, analysis, labor etc.
  - Laboratory will test a sample three times before failing.

| DNA Analysis Process                             | Direct Collection        | Transfer Collection     |
|--|--------------------------|-------------------------|
| Laboratory's Yearly Volume                       | 30,000 Reference Samples |                         |
| First Pass Success Rate                          | 90.90%                   | 78.34%                  |
| Number of Samples Completed First Pass           | 27,270                   | 23,502                  |
| Number of Samples Requiring Reprocessing         | 2,730                    | 6,498                   |
| Number of Samples Requiring Reloading            | 3.95% or 1,185 Samples   | 4.32% or 1,296 Samples  |
| Number of Samples Requiring Re-amp/Re-extract    | 5.15% or 1,545 Samples   | 17.34% or 5,202 Samples |
| Number of Collected Samples Estimated to Fail    | 0.11% or 33 Samples      | 0.68% or 204 Samples    |
| Total Samples Processed to Yield 30,000 Profiles | 32,890                   | 37,334                  |
| Additional Costs to Obtain 30,000 Profiles       | \$0.00                   | \$155,540               |

# Sample Collection: Easy to Use and Superior Quality

## Bode Buccal DNA Collector



100% Cotton  
Collection  
Paper

Slider

Handle

Over 5M Collectors Delivered Since 2017

# Crime Scene Evidence: Better Collections: Better Results



# DNA Evidence Collection

- Why are you collecting DNA at a crime scene?
  - Assists with solving a crime
    - Develop a profile
      - Enter into database (CODIS)
      - Returns a suspect or generate a case lead



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DNA is a very powerful tool that requires cooperation between Law Enforcement Agencies and Crime Laboratories.

# DNA Evidence Collection

## 3 Key Parameters of DNA Evidence Collection

- Quantity
  - Sufficient DNA must be present
- Quality
  - DNA must not be significantly degraded
- Timely
  - Enables immediate action and investigation continuity



# DNA Evidence Collection

*What are we collecting exactly?*

Cellular material which the crime lab uses to remove and analyze the DNA

*Where is it located?*

Nearly every cell in the body contains DNA  
Blood, skin cells (touched items), saliva, seminal fluid/semen

*Types of Stains*

Wet-collected using a dry swab

Dry- collected using a swab moistened with sterile water

# DNA Evidence Collection

## Key Steps in DNA Evidence Collection



### Always Put Fresh Gloves On

- Do not touch your face during collection
- Change gloves between collections
- Change gloves if you handle your phone or handle items with DNA
- Do Not Talk or Eat over the Crime Scene



### Wet Stain Collection

- Swab wet items with a dry swab
- Collect as much of the wet item as the swab will absorb
- Rotate the swab in the stain to ensure full coverage (Try not to have it dripping fluid)
- Allow sufficient time for more viscous fluids to absorb onto the swab

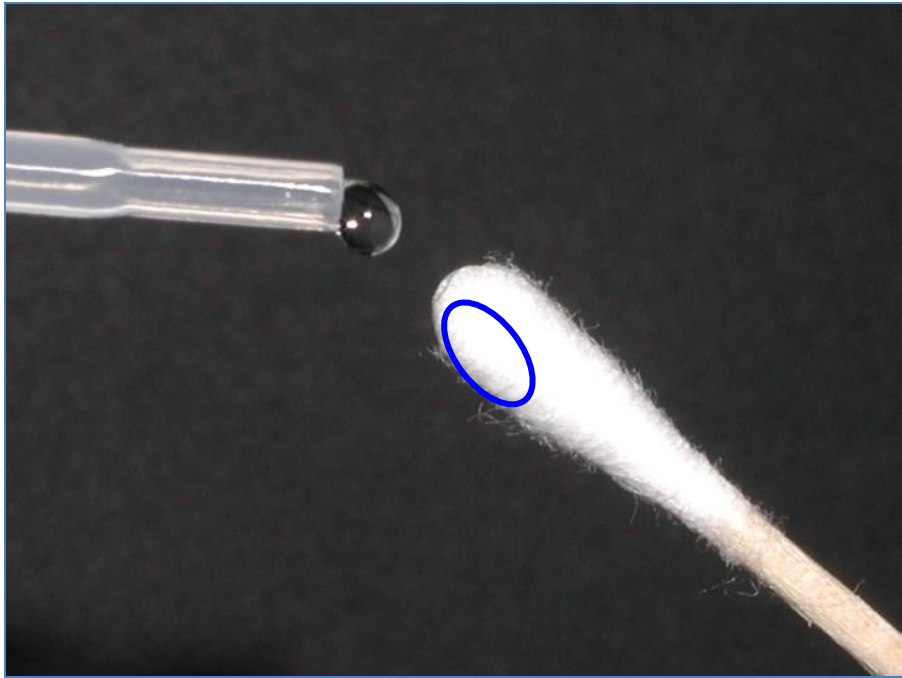


### Dry Stain Collection

- To swab a dry item with a moist swab.
- Very lightly moisten the swab, should not be dripping wet

# Basic Instructions: Collecting From a Dry Stain

**Correct Method**



**2-4 drops of water  
on side of swab**

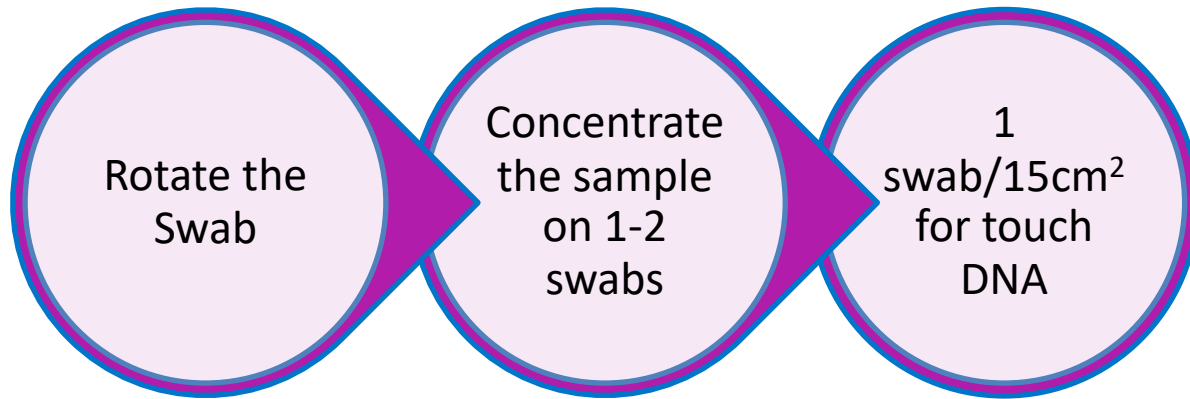
**Too much water**



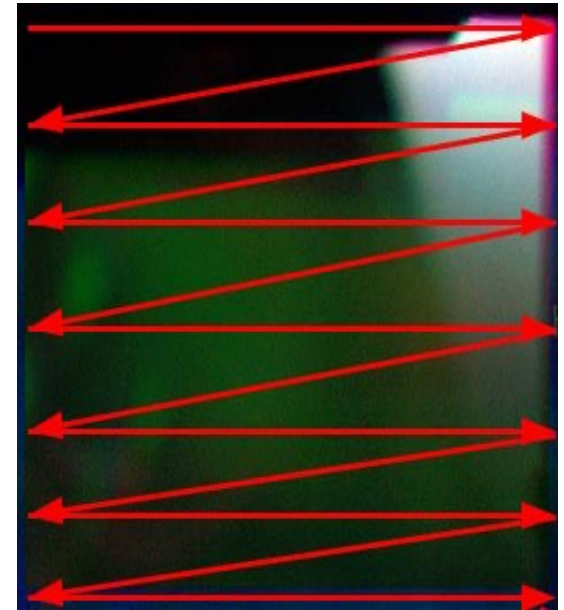
**Too much water**



# Collection Method: Swabbing



## Swabbing Diagram



# DNA Evidence Collection- Next Steps

Swabbing/Collection is only one piece of the puzzle:

## LOGISTICS

- Sample integrity and quality can be impacted up until the point of analysis

Packaging

Transporting

Storage



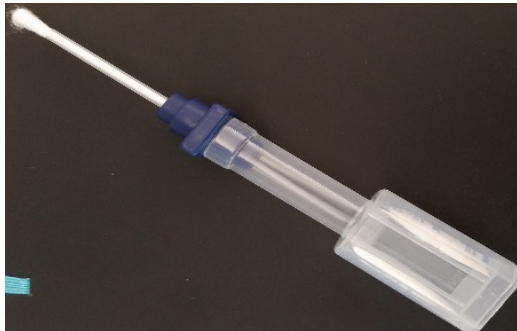
# Bode Technology's Products

## SecurSwab Product Line

### Bode SecurSwab 2

Integrated desiccants to dry the sample quickly

Reinforced protective turbo tube prevents transfer of sample from swab head



### Bode SecurSwab DUO-V

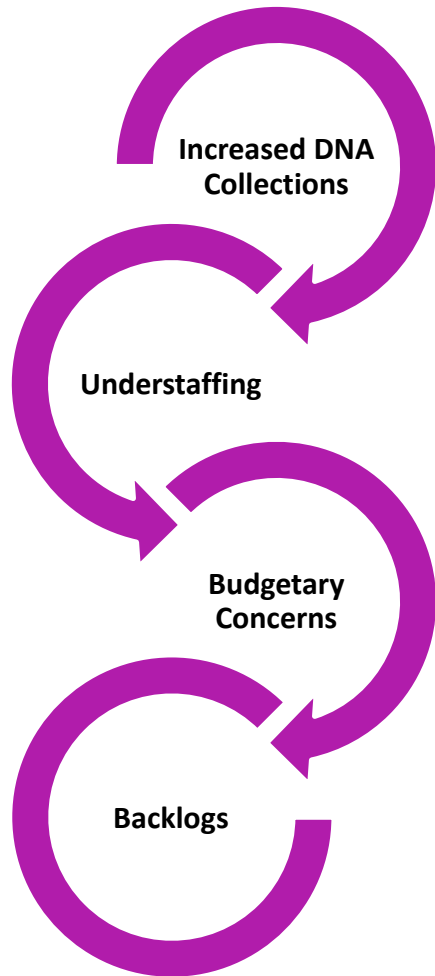
Same benefits as SecurSwab 2

Contains two swabs for collection

Ranked #1 for both small and large volume DNA recovery in a National Forensic Science Technology Center (NFSTC) Study.



# Post Collection Sample Integrity



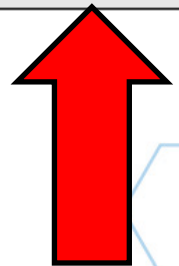
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# Bode BioSafe Swab: Improving DNA Sample Stability

- Utilizes SecurSwab Technology
  - Fast Drying
  - Protects from sample transfer
- Swab head is treated with a chemical preservative
  - Prevents DNA degradation at point of collection
- In mock crime scene studies
  - Over 90% reduction in microbial growth observed
  - Higher DNA yields
  - 30% more complete profiles obtained



| Result           | BioSafe Swab (n=36) | Cotton Swab- Swab Box (n=36) |
|------------------|---------------------|------------------------------|
| Complete Profile | 97.22%              | 66.67%                       |
| Partial Profile  | 2.78%               | 25%                          |
| No Profile       | 0%                  | 8.33%                        |



# 3<sup>rd</sup> Party Testing-Bode BioSafe Swab

- Virginia Commonwealth University Study
  - Collected touch DNA samples from a keyboard and stored the samples at 56°C.
  - Simulated 4 years at Room Temperature
- Results: On Average
  - >80% of alleles were recovered with Bode BioSafe Swabs
  - <20% of alleles were recovered with Traditional Cotton Swabs
- Bode BioSafe Swabs
  - Resulted in higher DNA integrity, better profile success, and retention of low level contributor alleles
  - Significantly maintained DNA integrity for long term storage prior to analysis better than traditional cotton swabs.



# DNA Collection Products:

## Quality Matters



# ISO18385:2016

## ISO 18385 Forensic DNA Grade

- Focused on Forensic DNA Consumables
- Outlines specifications for:
  - Quality Management System
  - Supply Chain and Manufacturing
  - Environmental Monitoring
  - Quality Control Testing

*“Minimizing the risk of human DNA contamination in products used to collect, store and analyze biological material for forensic purposes — Requirements”*



# ISO18385-Why does it matter?

- Technology is getting more sensitive- less than 3 cells can provide enough DNA to create interpretation issues
- Increasing amount of mixture samples make it harder to distinguish low level contaminants.



# Summary

- Collection Products can have a significant impact:
  - Direct Collection devices can increase success rates and decrease operating costs.
  - Advanced Crimes Scene Collection devices can increase success rates and investigative leads.
- Quality Matters
  - ISO18385 Forensic DNA Grade Products ensure the products have been manufactured with utmost care.

# Questions/Contact Information

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