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Recommendations for Selection Areas for the Collection of Sexual Assault Evidence from the Oral Cavity

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Abstract

This study on oral swabbing for sexual assault evidence collection offers several insights pertinent to forensic nursing practice, evidence collection protocols, and considerations for forensic nurses. In this study, female to male oral sex occurred between seven participating couples to determine an efficient collection method for male cellular material located in the oral cavity. One cotton and one nylon swab were simultaneously used to swab two areas of the oral cavity at 1, 6, 12, and 24 hours post-fellatio respectively. These areas included the lips (utilizing both moist and dry swabs) and the inside of the mouth with volunteers receiving specific instructions on how to swab. YSTR profiling was performed on each swab with the subsequent profile compared to the reference profile of the male. Full YSTR profiles (defined as profiles with at least 22 of 23 alleles matching the male) were obtained in 81% of swabs collected at the 1-hour time interval, 67% of swabs at the 6-hour time interval, 62% of swabs at the 12-hour time interval, and 53% of swabs at the twenty four-hour time interval. A higher percentage of full profiles were obtained with lip swabs over all time periods (79% for moistened lip swabs and 71% for dry lip swabs as compared to 46% for inside the mouth swabs). No observable difference in the ability to obtain YSTR profiles was found between

the use of cotton and nylon swabs. The study yielded DNA success rates typically higher than other similar published studies which typically rely on laboratory data from sexual assault evidence. Recommendations from the study include swabbing both the lips and inside of the mouth of victims of oral sexual assault in a manner consistent with the study at a time frame up to at least 24 hours post-incident.

Keywords: oral sexual assault, evidence collection, YSTR profiling

Recommendations for Selection Areas for the Collection of Sexual Assault Evidence from the Oral Cavity

In 2013, the Federal Bureau of Investigation changed the 80-year definition of sexual assault to include oral penetration. Sexual assault is now defined as "penetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim" (Federal Bureau of Investigation, 2015). Finding meaningful evidence of oral sexual assault, however, is often a daunting task for medical professionals and forensic scientists. Research cited below indicates that the success rate of finding DNA evidence associated with a person of interest is low and is greatly impacted by the amount of time between incident and evidence collection. The ability to obtain meaningful DNA results also seems to be strongly correlated with the ability to identify sperm cells in swabs taken of the victim's oral cavity and lips or in oral rinses, as observed in the following studies. An Australian study (Nittis et al, 2016) found that of 554 oral swabs examined by the New South Wales Forensic Laboratory between 2010–2015, only 4.2% (23) were positive for the presence of sperm. Sperm were found at a higher percentage in oral rinses (16.3% of 104 samples) and on lip swabs (18.3% of 80 samples). DNA testing did yield probative results at a high percentage on sperm-positive samples (61% of 23 oral swabs, 71% of 17 oral rinses, and 75% of 12 lip swabs). However, probative DNA results (profiles that matched a person of interest) were found at a much lower percentage in sperm-negative samples (5% of 98 oral swabs, 7% of 42 oral rinses, and 24% of 21 lip swabs). Typically, probative results were only found on samples taken within 12 hours of the assault.

The following studies reported similar findings. A Norwegian study (Fonnelop et al, 2019) found that probative DNA profiles were found on only 11% of 71 sperm positive oral swabs, the vast majority of which were taken less than 12 hours after incident. The study also found that probative DNA profiles could be obtained on swabs of victim's skin (including all parts of the body) 43 hours after deposition. Of skin swabs taken from the lips and around the mouth, 15% of 62 swabs yielded probative DNA results. Gingras et al. (2009) similarly reported that only 8% of 189 oral rinses yielded DNA profiles with 15 hours after assault the maximum limit for good quality profiles.

These studies indicate that any delay in time from assault to collection compromises the quality of DNA results. Therefore, it is essential to maximize the efficiency of sample collection to increase the likelihood of meaningful results in the forensic laboratory. A slight difference in collection techniques could have the potential to affect the quality of subsequent DNA analysis. As per the Forensic Nursing Subsection of the Organization of Scientific Area Committees

(OSAC) for Forensic Science, limited research has been done on the best areas for swabbing (2023).

In 2013, the Federal Bureau of Investigation changed the 80-year definition of sexual assault to include oral penetration. Sexual assault is now defined as "penetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim" (Federal Bureau of Investigation, 2015). Finding meaningful evidence of oral sexual assault, however, is often a daunting task for medical professionals and forensic scientists. Research cited below indicates that the success rate of finding DNA evidence associated with a person of interest is low and is greatly impacted by the amount of time between incident and evidence collection. The ability to obtain meaningful DNA results also seems to be strongly correlated with the ability to identify sperm cells in swabs taken of the victim's oral cavity and lips or in oral rinses, as observed in the following studies. An Australian study (Nittis et al, 2016) found that of 554 oral swabs examined by the New South Wales Forensic Laboratory between 2010–2015, only 4.2% (23) were positive for the presence of sperm. Sperm were found at a higher percentage in oral rinses (16.3% of 104 samples) and on lip swabs (18.3% of 80 samples). DNA testing did yield probative results at a high percentage on sperm-positive samples (61% of 23 oral swabs, 71% of 17 oral rinses, and 75% of 12 lip swabs). However, probative DNA results (profiles that matched a person of interest) were found at a much lower percentage in sperm-negative samples (5% of 98 oral swabs, 7% of 42 oral rinses, and 24% of 21 lip swabs). Typically, probative results were only found on samples taken within 12 hours of the assault.

The protocols for collecting physical evidence in cases of oral sexual assault can vary between jurisdictions. For instance, in comparing the protocols in four states, New Hampshire (State of New Hampshire, Office of the Attorney General, 2018), California (California Office of Criminal Justice Planning, 2001), Ohio (Ohio Department of Health, 2018), and Massachusetts (Massachusetts SANE Program, 2022), similarities exist. All four states utilize two swabs during the evidence collection process, either used simultaneously or sequentially, and each focuses on anatomical areas where semen is likely to persist. Common target areas include the lips, gums, and cheeks. Massachusetts, in particular, also emphasizes swabbing along the tooth and gum lines, while Ohio includes the back of the tongue, taking care to avoid triggering the gag reflex. This concern for patient comfort, while explicitly stated only in Ohio's guidelines, is likely a shared consideration across states.

Despite these commonalities, significant differences exist. New Hampshire allows for the widest collection window, permitting oral swabs to be taken up to 24 hours after the assault, and offers specific guidance to focus on areas where semen may remain the longest, such as between the upper and lower lips and gums. In contrast, California enforces the strictest time constraint, allowing oral swab collection only within 12 hours of the incident. Its protocol focuses on swabbing the gums, frenulum, and folds of the cheek. Ohio does not specify a time limit but directs collectors to swab the cheeks and lower gum, and to reach as far back on the tongue as possible without causing discomfort. Massachusetts also does not specify a collection timeframe but provides one of the most comprehensive anatomical guidelines, instructing providers to swab both upper and lower areas between the lips and gums, as well as along the tooth and gum lines.

With many commercial swabs available for use, there should be a determination of the swab type that will produce the most successful DNA results. Benschop et. al. focused on the specific differences between swab types and determined that nylon flocked swabs are better for

the collection of sperm in post-coital samples (2010). Currently in sexual assault collection kits, cotton swabs are used because they are effective, cheap, and easily accessible. With advances in swab development, it is possible that another swab type may offer improvement.

Another factor to consider when collecting oral samples after a sexual assault is the nature of the oral cavity. Constant activity occurs in mouths including saliva production and swallowing, eating, drinking, and teeth brushing which could affect the persistence of male cells found in the mouth after deposit. Therefore, most sexual assault kit recommendation guidelines only allow collection of oral swabs to occur if the sexual assault has occurred within 24 hours and only by swabbing the inside of the oral cavity (United States Department of Justice, 2017) which is consistent with the studies cited in the foregoing.

In this study, female to male oral sex occurred between participants to determine an efficient collection method for male cellular material located in the oral cavity. This information could lead to a recommendation for standardization of sexual assault evidence collection kits. With an increase in delayed reporting, new collection methods could provide a method that increases the chances of obtaining a male DNA profile at extended incident-collection time intervals. The study also investigates if varying collection intervals and different collection techniques have an effect on the quality of the DNA profile recovered. The current study employs methods similar to the Williams (2019) and Marlia (2011) studies, since both studies produced successful outcomes. Using one nylon and one cotton swab simultaneously, collection areas include behind the four molars and along the jaw line to the other side of the mouth, the back of the cheek, and on and under the tongue. The second swab was moistened with polymerase chain reaction grade water and applied over the lips. The third swab (dry) was then applied over the lips, immediately following the moistened swab. Swabbing each area simultaneously allows the comparison of which swab type is more efficient in collecting and releasing cellular material. Overall, the greater the time window for collection using more efficient methods, the more usable information will be obtained from delayed reports of sexual assault.

This study establishes a way to increase the results from sexual assault collection kits by determining optimal collection locations for sample collection within 24 hours after oral sex. Y-chromosomal DNA profiles were utilized to ensure male specific profiles in situations when excess female DNA is expected to the present. Y-STRs are short repetitive sequences (called short tandem repeats) which demonstrate length polymorphism in the population and are found on genes on the Y chromosome. They are considered haplotypes because they are inherited together from a single parent, in this case along a paternal line. The use of YSTRs appears to be widespread. A review of American National Standard Institute National Accreditation Board (ANAB) accredited laboratories reveals that 161 accredited laboratories perform YSTR testing (American National Standard Institute National Accreditation Board, 2025). Additionally, INTERPOL reported that 83 countries reported the use of YSTRs in their forensic science laboratories in 2019 (INTERPOL, 2019). Casey et al. (2016) recommended the use of YSTRs in any oral sample collected over 15 hours after incident. Obtaining successful profiles may encourage sexual assault forensic examiners to revisit policies of oral sex evidence collection.

Materials and Methods

Approval to Work with Human Subjects

This study was reviewed by the institutional review board (IRB) at Cedar Crest College and was approved and deemed suitable to work with human participants.

Sample Collection

Seven male/female couples that were at least 18 years of age or older were participants in this study. Collection packets were sent to each couple containing the swabs and detailed instructions on how to swab, what to document, as well as a hyperlink to a pre-recorded video that demonstrated where to swab and how to store samples after collection. The male participants were asked to submit a buccal swab (cotton) to establish reference DNA Y-STR profiles.

Prior to starting a collection, the couples were asked to abstain from oral sex for a period of at least one week and any acts of kissing for two days prior. Kissing and contact with female's lips also had to be abstained from in between the completion of the act and the collection itself.

Immediately before oral sex, control cotton swabs were taken from two different collection areas (lips were swabbed with moistened, followed by dry, swabs; as well as inside the mouth with a dry swab) from the female. Swabbing the inside of the mouth was done systematically, first by swabbing behind the two molars on one side of the mouth then along the lower jaw to the other side of the mouth, followed by swabbing behind the two molars on the reverse side of the mouth then along the upper jaw to the other side, then swabbing the back of each cheek, and finally swabbing on and under the tongue. All control swabs were allowed to air dry and then packaged separately in the original envelope.

After control swabs were collected, the female performed fellatio on the male, ending with male ejaculation into the female's mouth. After the appropriate time interval elapsed the female participant swabbed each collection area with one nylon and one cotton swab simultaneously (Benschop et al, 2010). Lips were swabbed with moistened, followed by dry, swabs. The inside of the mouth was swabbed with dry swabs in the same manner as the control swabs. A total of four separate acts of fellatio with different collection intervals at one, six, twelve, and twenty-four hours post-fellatio occurred. All experimental swabs were allowed to air dry and then were packaged in the original envelope. All collection kits were kept in a dark, cool, and dry environment until examination.

DNA Workflow

DNA from male buccal swabs were extracted using Chelex-100® (142-1253, Bio-Rad Laboratories, Hercules, CA) (Walsh, 1991).

All experimental and control swabs were extracted using the QIAGEN® QIAamp DNA Investigator Kit (QIAGEN– Catalog #56504) and DNA IQ Spin Baskets (Promega – Catalog #V1225). The manufacture's guidelines were followed with a slightly modified protocol that was designed for the total isolation of DNA from a sexual assault sample to maximize male cells including sperm and epithelial cells (Qiagen, 2020).

Polymerase chain reaction (PCR) of all samples was performed using the Promega Powerplex® Y23 System (Promega, Catalog DC2305, Madison, WI) according to the manufacturer's guidelines (Promega, 2023) using the Life Technologies Veriti 96 Well Thermal Cycler (Life Technologies, Carlsbad, CA). Samples were then analyzed using the ABI 3130XL Genetic Analyzer (Applied Biosystems, Foster City, CA) according to manufacturer's guidelines for Powerplex Y23 (Applied Biosystems 3130, 2010) (Applied Biosystems, 2010) and data analysis was performed after each run using GeneMapper® ID-X Software, Version 1.7 (Applied Biosystems, Foster City, CA). When interpreting DNA profiles, alleles were counted if they

matched the corresponding male reference sample. Analysis parameters were occasionally changed to maximize results on certain samples (e.g. increased sample injection time into genetic analyzer, post-PCR purification).

Results

Of the seven couples who participated in the study, only five couples completed all four-time intervals. All control swabs taken in the study were negative for DNA. Full Y-STR profiles (defined as a profile with at least 22 alleles) were obtained at least once at all four-time intervals post-fellatio (Table 1).

Table 1.

The Number and Percent (%) of Couples that Exhibited Full Profiles (at least 22 alleles) at each Individual Collection Time Interval and Location Regardless of Swab Type.

Collection Method	1 hour	6 hours	12 hours	24 hours
Lips (moistened)	6/7 (86%)	4/5 (80%)	5/7 (71%)	5/5 (100%)
Lips (dry)	6/7 (86%)	4/5 (80%)	5/7 (71%)	2/5 (40%)
Inside mouth	5/7 (71%)	2/5 (40%)	3/7 (43%)	1/5 (20%)

In addition, at some point during the study all participating couples produced a full profile. The number of alleles obtained for each location and time interval was compiled for each couple (Table 2). The table indicates the number of alleles for both swab types, where the nylon flocked swab allele value is recorded in parenthesis.

Table 2.

Overall Comparison of the Performance of Different Collection Areas at Different Time Intervals with Cotton Swab Profiles Where the Performance of the Cotton and Nylon Swabs are Notated if One Swab Outperformed the Other.

Couple		1 hour			6 hour			12 hour			24 hour	
	ML	DL	IM	ML	DL	IM	ML	DL	IM	ML	DL	IM
A	23	23	23	23	23	0	23	23	23	^22 (20)	^20 (13)	*4 (15)
B	23	23	23	NA	NA	NA	^14 (5)	^1 (0)	0	NA	NA	NA
C	23	*18 (23)	23	23	23	23	23	23	^19 (13)	23	*11 (23)	*0 (1)
D	23	23	^23 (0)	23	23	23	*22 (23)	^23 (21)	*19 (20)	^22 (17)	*0 (2)	^6 (4)
E	*ND (23)	23	23	NA	NA	NA	23	23	23	23	23	23
F	23	^23 (12)	^4 (1)	23	23	^3 (0)	23	23	*5 (22)	NA	NA	NA
G	*9 (20)	^10 (0)	*0 (3)	^18 (13)	*1 (3)	0	^4 (0)	^7 (0)	0	^23 (12)	*0 (7)	^16 (1)

ML= moist lips, DL = dry lips, IM = inside mouth, ND = no data due to experimental failure
^ = cotton performed better
*= nylon performed better; nylon % in ( )
NA=no packet received

At the one-hour time interval, six out of the seven couples (86%) were able to obtain a full profile with both cotton (15 of 18 swabs across the six couples) and nylon swabs (15 of 18 swabs across the six couples) while the seventh couple (couple G) obtained a maximum of 20 out of 23 alleles with one nylon flocked swab from the moistened lip swab.

Five couples completed the 6-hour time interval. Four out of the five couples (80%) obtained a full profile with both cotton (10 of 12 swabs across the four couples) and nylon swabs (10 of 12 swabs across the four couples) with the fifth couple (couple G) yielding a maximum of 18 out of 23 alleles with one cotton swab from the lips moistened. One of the four couples (Couple A) yielded a full profile after post-PCR purification.

Seven couples completed the 12-hour post-fellatio collection interval. Five out of the seven couples (71%) obtained a full profile with both cotton (12 of 15 swabs across the five couples) and nylon swabs (12 of 15 swabs across the five couples) whereas couple B yielded a maximum of 14 alleles with one cotton swab from the lips moistened and couple G yielded a maximum of 7 alleles with one cotton swab from the lips dry.

Five couples completed the 24-hour collection interval. All five couples were able to obtain a full profile with both cotton (7 of 15 swabs across the five couples) and nylon swabs (5 of 15 swabs across the five couples). Couple E was able to produce a full YSTR profile with both moist and dry lip swabs as well as with inside the mouth swabs. Full profiles for Couple E were obtained with both cotton and nylon swabs.

Overall, of the three collection methods it was determined that swabbing the lips with a moistened swab or dry swab produced better results than swabbing the inside of the mouth. Over the four time collection intervals, swabbing with a moist swab on the lips produced full profiles in 20 of 24 trials (79%) (a trial is defined as swabbing with both a cotton and nylon swab for one couple at one time interval) and swabbing with a dry swab on the lips produced full profiles in 17 of 24 trials (71%). The major difference was at the 24-hour collection interval, where moist swabbing of the lips produced five full profiles (100%) and dry swabbing of the lips produced two full profiles out of five trials (40%). Conversely, swabbing of the inside of the mouth produced only 10 full profiles out of 24 trials (42%) over the four collection time intervals. Of these ten full profiles, five were from the 1-hour collection interval.

Discussion and Conclusions

The United States Department of Justice created best practice guidelines to try and create national standardization for collection of sexual assault kits. In the guidelines, it recommends that oral swabs be collected within 24 hours of the assault and that two dry swabs are used to swab over the oral cavity (United State Department of Justice, 2017). In this recommendation, the oral cavity is described as the teeth, cheeks and gums. The description of this collection is vague and as mentioned earlier many states have adapted similar but nuanced guidelines. No clear consensus on a standard collection protocol for collecting oral sexual assault evidence appears to exist. In this study, it was decided to swab the inner mouth in a more systematic fashion beginning with swabbing behind the two molars on one side of the mouth then following the lower jaw line to the other side of the mouth and then swabbing behind the two molars on the reverse side and

swabbing along the upper jaw. This was followed by swabbing both sides of the inner cheek and lastly swabbing on and under the tongue. In addition, swabbing of lips was incorporated into the study using both dry and moist swabs. It has been suggested that moistening swabs may increase the likelihood of obtaining a usable DNA profile (Williams et al, 2019).

Although male-specific Y-STRs aren't as discriminating as autosomal DNA analysis (Y STRs are common between people along the same paternal line), they can still provide meaningful levels of discrimination by examining the rarity of the profile through the Y-Chromosome STR Haplotype Reference Database (https://yhrd.org). In addition, Y-STR analysis can help to give an investigative lead for the perpetrators paternal lineage or provide exclusionary information. All profiles obtained were entered into the YHRD database. As of 2024, there were 103,280 YSTR profiles in the database that were determined using the Powerplex® Y23 kit. Of all the profiles found to match male reference profiles in this study (including full and partial profiles), 75% had no matches in the database. As recommended by Casey (2017), results in this study show that Y-STR analysis is a viable option for DNA profiling of oral samples.

DNA results from this study also favorably compare to DNA results from similar studies. Unlike other studies dealing with the evidentiary collection of oral sexual assault evidence which used laboratory data from evidence submittal to forensic science laboratories, this is the first study to use volunteers under controlled conditions. Both Fonnelop et al. (2019) and Gingras et al. (2009) reported probative results on less than 20% of oral sexual assault samples including only 15 % of skin samples (including lips) in the Fonnelop study. Nittis et al. (2016) did report a higher percentage of probative DNA profiles on sperm positive samples (as high as 75% on lip swabs) but found lower DNA success rates on sperm negative oral samples (the most successful were lip swabs which yielded DNA profiles matching a person of interest in 24% of samples). In the vast amount of samples yielding meaningful DNA profiles, sample collection occurred within 12 hours of assault. Although this study did not screen for the presence of sperm, probative DNA results were found in most lip swabs (greater than 70% yielded YSTR profiles with both moistened and dry swabs) and in 42% of inside the mouth swabs for all combined collection time intervals. Of particular note, is that all five couples who submitted swabs for the 24-hour collection time intervals yielded full YSTR profiles with moistened lips swabs. Even without the confirmed presence of sperm in oral assault samples, male DNA can still be found on male deposited skin cells on the victim's lips or in the victim's oral cavity. In this study, the DNA extraction method was designed to remove DNA from both sperm and skin cells. In addition, DNA testing was performed based on manufacturer's guidelines for oral swabs and some parameters (such as PCR cycle number) were not changed to maximize sensitivity. It is possible that changing certain parameters could have produced even better DNA results.

In this study, variation of parameters in between and within couples at different time intervals was expected. There can be many factors associated with this such as how much semen was deposited, how much sperm was present in the semen, ability to deposit skin cells by the male, how long semen was in the mouth, and saliva production of the female. In addition, participant self-collection could have contributed to some instances in the samples where there were a different amount of alleles detected in different locations. Although detailed instructions and videos of proper collection were given to participants, the force of swabbing is variable and could have been altered between each couple's collection as well as between different couples samples sets. Variation with storage could have also impacted the detection of DNA. Participants

were told to keep their samples stored away from the sun and in a temperature controlled environment if possible.

It is likely that each couple also had variance in their hygiene as well as diet. Participants' were asked to document any activity with their oral cavity in between the act of fellatio and collection. Correlating oral activity from each couple's documentation with the subsequent DNA profiles indicated that there was no connection found between the type of food that was eaten compared to the profile percentage. In addition, there seemed to be no correlation with brushing of teeth or using mouthwash compared to the resulting DNA profiles. All of these variables are a reason why the oral cavity is a complicated place to study. The results of this study, however, do indicate that full male DNA profiles can be obtained at a 24-hour collection time interval and therefore these types of samples need to be collected. The success in obtaining DNA profiles show the benefit of using a systematic procedure for collecting samples from the oral cavity.

Although lip swabs outperformed inside the mouth swabs in this study, there are legal ramifications that necessitate the collection of inside the mouth swabs in these types of cases. Defense attorneys can develop plausible theories on how male DNA could be deposited on a victim's lips apart from sexual contact but would have great difficulty offering a similar scenario with DNA positive inside the mouth samples. Given the legal reality, the recommended discontinued use of oral swabbing may not be prudent (Nittas et al, 2016). Collecting oral evidence, especially from the inner mouth, can strengthen the legal integrity of the case, as it is less likely to be contested compared to lip swabs alone.

Based on the results of this study, it was observed that sample collection location is more important than the type of swab used. In both swab types, each swab more often than not achieved the same number of alleles, typically a full profile, rather than one swab outperforming the other (Table 2). Because swab type showed no observable difference, it makes sense to continue using the most cost-efficient tool for collection, which is currently the cotton swab.

Implications for Forensic Nursing Practice

This study provides a structured methodology for collecting oral swabs in cases of sexual assault, emphasizing the importance of a systematic approach. The detailed technique, which includes swabbing specific areas of the oral cavity, ensures comprehensive evidence collection. Forensic nurses can adopt this method to enhance the quality and consistency of evidence gathered during examinations. Additionally, the study highlights the effectiveness of Y-STR analysis in obtaining male DNA profiles from oral samples, reinforcing the need for forensic nurses to be proficient in DNA collection and preservation techniques.

In this study, a total of 144 cotton and nylon swabs were used to collect male DNA from female volunteers at particular time intervals after consensual oral sex. Subsequent YSTR testing yielded full profiles in 67% of 42 swabs at the 1 hour interval, 67% of 30 swabs at the 6 hour interval, 57% of 42 swabs at the 12 hour interval, and 33% of 30 swabs at the 24 hour interval. Although the sample size is small compared to cited large scale studies from laboratories with the ability to gather data from sexual assault samples over a long time period, the sample size is not so small that discernible trends and conclusions cannot be made. Given the challenges in not only recruiting volunteers for this type of study but also having volunteers adhere to the research design, a sample size such as the one reported here may be the best that can be hoped for. The lack of studies of this type using human volunteers illustrates this challenge. There was no

selection criteria used to recruit participants in this study. Couples simply willing to volunteer were used. The design of the research tried to control as many variables as possible.

Data from the study does show that the collection method described has a strong chance of success particularly if sample collection happens soon after assault. The findings suggest that oral swabs collected in the systematic approach described can yield probative DNA profiles up to at least 24 hours post-assault. This extends the window for evidence collection beyond the previously recommended time frames in many protocols. Forensic nurses should be aware of these extended timeframes to ensure timely and effective evidence collection. Recognizing that DNA evidence can be collected potentially past 24 hours post-assault allows forensic nurses to adapt their practices to different scenarios. Furthermore, the study indicates that the location of swabbing is more critical than the type of swab used, allowing for cost-effective and efficient collection methods without compromising the quality of evidence.

In this study, participants were provided with instructional videos demonstrating a comprehensive oral swabbing technique. The method began by swabbing behind the two molars on one side of the mouth, continuing along the lower jaw to the opposite side. This was followed by swabbing behind the molars on the reverse side, moving along the upper jaw to the other side. Participants then swabbed the back of each cheek, followed by the surface and underside of the tongue. Lastly, the lips were swabbed first with a moistened swab and then with a dry swab. Combining multiple sampling areas into a single, continuous swabbing protocol may represent the best collection strategy for collecting DNA evidence in oral sexual assault. Implementing a comprehensive swabbing protocol that covers various areas of the oral cavity can increase the likelihood of obtaining usable DNA profiles. By integrating these findings into their practice, forensic nurses can enhance the effectiveness and efficiency of sexual assault evidence collection, ultimately supporting the legal process and victims of sexual oral assault.

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