



Young Forensic Scientists Forum— 2019

Y20 The Detection of Male DNA Using Y-Chromosomal Short Tandem Repeats (Y-STRs) in Post-Coital Samples of Vasectomized Males

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Learning Overview: After attending this presentation, attendees will be more knowledgeable about the potential Y-STR DNA results from extended collection intervals.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by becoming assisting attendees in becoming more knowledgeable and aware of the results of collecting azoospermic sexual assault samples at extended intervals.

In the United States, one in six women will be raped. The perpetrators of these crimes are male 94% of the time.¹ In the case of a male perpetrator and female victim, there is the potential for deposition of semen in the vaginal cavity; however, not all cases with semen present will contain sperm. A study reported that approximately one-third of men that commit sexual crimes suffer from some form of sexual dysfunction, which can result in a decrease or complete lack of sperm.² Ejaculate with a reduced amount of sperm vastly decreases the amount of DNA present for subsequent testing. This study sought to establish how long after an assault a viable DNA profile may be obtained from samples without sperm.

Semen without sperm was simulated using vasectomized male participants. A total of five vasectomized couples participated in the study by completing a collection packet. Each couple participated in four different trials using post-coital intervals of one, three, five, and seven days. In each trial, the female swabbed the vaginal cavity twice. During each insertion, two swabs were used simultaneously for a total of four swabs for each interval. The two swabs inserted together were extracted together using a solid phase extraction kit. Low Copy Number (LCN) procedures were utilized to help detect any low-level amount of DNA in the sample. Quantitation was performed using a commercial kit that detects the total DNA concentration as well as male DNA. No quantitation results were obtained; however, the samples were amplified with a commercial Y-STR kit. The resulting DNA profiles were analyzed to determine the total number of male-specific alleles present for each time interval. After one day, the results from five couples contained an average of 20.6 of 23 alleles (89.5%), ranging from 13 to 23 alleles present. The average number of alleles found after three days was 4.4 (19.1%) with a range of 0 to 10 alleles present. An average of 3.2 (13.9%) alleles were present after five days with a range of 0 to 8 alleles. After seven days, the average number of alleles identified was 0.8 (3.4%) with a range of 0 to 2 alleles present. Thus, the time frame to detect nearly full DNA profiles from samples without the presence of sperm is approximately one day post-coitus based on the current results. Though full profiles may not be obtained, the presence of alleles can aid in suspect elimination. Future work utilizing LCN methods may increase the amount of alleles obtained from longer intervals.

Reference(s):

1. NIBRS. Sex Offenses Reported via NIBRS in 2013. *National Incident Based Reporting System*.
2. A Nicholas Groth and Ann Wolbert Burgess. Rape: A Pseudosexual Act. *International Journal of Women's Studies* 2 (1978): 207-10.

Sexual Assault, DNA, Y-Chromosome Short Tandem Repeat