

## Two mothers and two fathers for two half-brothers' pairs



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### ABSTRACT

Here is presented a deficient paternity case requested by a son born out of wedlock. In order to avoid exhumation of the alleged father, the judge demanded to obtain his biological profile from the analysis of his closest living relatives. Paternity testing involved the applicant (Sm), his mother (M2) and two sons born in wedlock of the deceased father (S1 and S2). The analysis of 23 Y-STRs by means of the PowerPlex Y23 System revealed a full sharing of Y-chromosomal profiles between the applicant (Sm) and one son of the deceased father (S2), but no compatibility with the second (S1), thus suggesting the presence of an additional alleged father.

Giving the impossibility to establish which between S1 and S2 was the true biological son and, consequently, which 23 Y-STR profile matched with the deceased father, the judge disposed exhumation of the body.

Full identity of Y-STRs was revealed among the deceased, S2 and Sm, whilst S1 could be excluded from the lineage.

A following calculation of Likelihood Ratios achieved from the analysis with 22 autosomal STRs (PowerPlex Fusion System) allowed complete solving of the paternity case. Sm-S2 were found to be half-brothers with the same father, S1-S2 half-brothers sharing a common mother and Sm-S1 were declared unrelated.

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### 1. Introduction

On 28 December 2013, with the Legislative Decree no. 154/2013, the Italian Government completed the most radical amendment of family law abolishing any discrimination among children replacing the terms “legitimate” and “illegitimate/natural” children by the denominations of “children born in or out of wedlock”. However, this amendment has maintained distincted the rules for granting the status of filiation and the establishment of its title, depending on the marital status

The marriage automatically allocate the state of the child born in wedlock, based on the obligation of faithfulness and mutual exclusivity of parents' sexual relationship (art. 143 civil code). Therefore, according to the art. 231 of civil code, the Court is allowed to establish the presumption of paternity based on the fact “the husband is the father of the child conceived or born during marriage”. Conversely, in the absence of wedlock, the establishment of parentage is a voluntary judicial act, mainly operated

through the recognition (art. 250 cc) or the judicial declaration (art. 269CC). Finally, the law recognises that “. . . the Judicial Declaration of Paternity and Maternity may be provided by any means . . .” therefore, DNA testing remains a probative tool to ensure the fatherhood.

Here is presented a case of judicial declaration of paternity requested by a child born (Sm) out of wedlock brought against the alleged father who was dead ten years ago.

When the alleged father (F1) had an affair with the mother (M2) of the appellant (Sm), he was married with the mother (M1) and had fathered two sons (S1 and S2) (Fig. 1).

In the first instance, the judge demanded to ascertain the biological paternity by indirectly obtaining the alleged father's biological profile from the closest living relatives: his two sons (S1 and S2). In case the paternity could not be proved, it would have been necessary to proceed with the exhumation of the remains of F1.

### 2. Materials and methods

Buccal swabs of the two sons (S1 and S2) of the alleged father (F1), the applicant (Sm) and his mother (M2) were collected after

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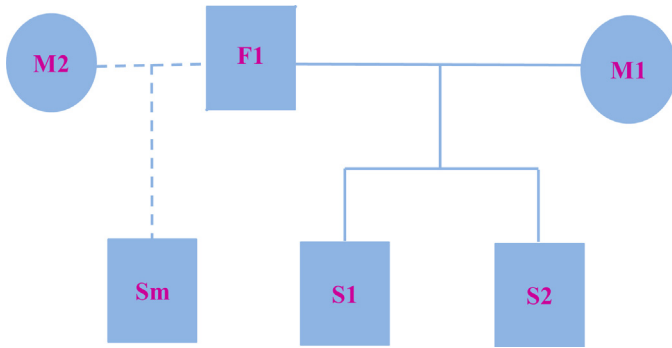


Fig. 1. Family tree reconstruction based on the applicant (Sm) declarations.

informed consent, while the wife (M1) of the alleged father did not give her consent.

Genomic DNA was extracted using QIAamp DNA Mini Kit (Qiagen, Hilden, Germany) following the manufacturer's recommendations [1]. DNA quantification was performed using Quantifiler<sup>®</sup> Duo DNA Quantification Kit (Applied Biosystems) by 7500 Real-Time PCR System with HID Analysis software v1.2.

All DNA samples were amplified using autosomal (PowerPlex<sup>®</sup> Fusion kit, Promega) [2] and gonosomal (PowerPlex<sup>®</sup> Y 23 System, Promega) [3] STRs. PCR products were separated on the ABI Prism 3130 Genetic Analyzer (Applied Biosystems). Data analysis and genotyping were automatically assigned by GeneMapper<sup>®</sup> ID-X Software v.1.2 (Applied Biosystems).

### 3. Results

The analysis with autosomal STRs (Fusion kit) confirmed the allegation of the appellant (Sm) to her mother (M2).

The comparison of Y-STR profiles revealed an unexpected incompatibility between the two sons (S1 and S2) of the deceased father (F1). This suggested that S1 and S2 may be half-brothers, and therefore the presence of an additional man as the alleged father.

At the same time, S2 shared a full Y-chromosomal profile with the appellant (Sm).

Giving the inconclusiveness of the results obtained due to the inability to establish who among the two brothers is the real biological child of F1, it was necessary to proceed with the exhumation of F1.

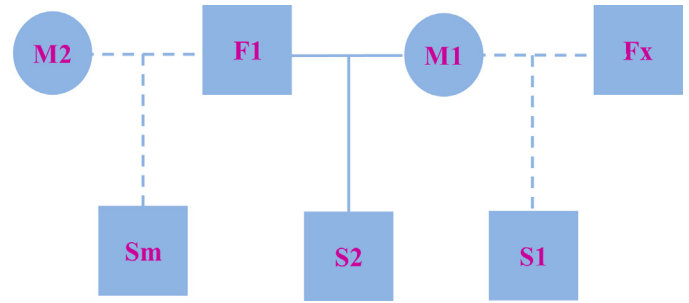


Fig. 2. Family tree following the DNA profiles.

The Y-STR profile of F1 was fully shared by one of his sons (S2) as well as by the appellant (Sm).

Therefore, Sm and S2 were found to be half-brothers with the same father F1, but different mothers (M1 and M2). At the same time, S1 and S2 were half-brothers sharing a common mother (M1), but different fathers (F1 and Fx).

Likelihood Ratios obtained from the analysis with 22 autosomal STRs confirmed the paternity of F1 towards Sm and allowed complete solving of the judicial paternity case.

### 4. Discussion

In conclusion the couple of spouses (F1 and M1) were unfaithful, and both generated a child (Sm and S1) with their own mistress (M2 and Fx) (Fig. 2).

In agreement with the resolution of the paternity case, the evaluation of Y-profiles gave the possibility to identify the sibship, and the key to the solution of the case was provided exclusively by the exhumation of the alleged father.

### Conflict of interest

The authors have disclosed no conflicts of interest.

### References

- [1] Qiagen, QIAamp DNA Mini Kit, 2012 <https://www.qiagen.com>.
- [2] Promega, PowerPlex Fusion System, 2012 <http://www.promega.com>.
- [3] Promega, PowerPlex<sup>®</sup> Y23 System, 2012 <http://ita.promega.com>.