Intersecting Lines: Pedigree Collapse Helps Identify an Ancestor's Parents

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Documentary evidence revealed Maria Terwilliger as the wife of Solomon Dunn and placed a woman likely to be her in his New Paltz, New York, household in the early 1800s. Pedigree collapse aided in identifying Maria's correct parents among several candidates.

The DNA Research Process

- Create a research objective.
- Create a timeline.
- Analyze documentary sources and DNA matches.
- Locality research and ethnicity.
- Research planning: documentary sources and DNA tools and methodology.
- Follow your plan; log your research.
- Correlate findings, draw conclusions, and present findings in a research report.[1]

Clustering DNA Matches to Find Relevant Matches

When working with autosomal DNA (atDNA) evidence, it is necessary to find the matches that will be relevant to your research question. You will be able to do this if you have clustered your matches into genetic networks, or groups of matches that likely share a common ancestor. Learn more about methods for clustering matches in the following articles:

Dyer, Nicole. "Creating Gephi Network Graphs." Four-part blog series. *FamilyLocket*. September – November 2022. familylocket.com/?s=gephi.

Elder, Diana. "How to Create Genetic Clusters Manually." Blog post. *FamilyLocket*. 8 May 2021. familylocket.com/how-to-create-genetic-clusters-manually/.

Wirthlin, Robin. "10 Ways to Group Your DNA Matches into Genetic Networks." Blog post. *FamilyLocket*. 11 June 2019. familylocket.com/10-ways-to-group-your-dna-matches-into-genetic-networks/.

[1] Diana Elder, AG, and Nicole Dyer, *Research Like a Pro with DNA: A Genealogist's Guide to Finding and Confirming Ancestors with DNA Evidence* (Highland, UT: Family Locket Genealogists, 2021).

Wirthlin, Robin. "Fast Ways to Cluster your DNA Matches at the Beginning of a Research Project." Blog post. *FamilyLocket*. 8 September 2020. familylocket.com/fast-ways-to-cluster-your-dna-matches-at-the-beginning-of-a-research-project/.

Identify the Most Recent Common Ancestral Couple (MRCAC) for Each Match

There are a few different ways to determine the MRCAC for an atDNA match. Perhaps you know the match, so the common ancestral couple is obvious. If the match's name is not familiar to you, look at the family tree that is linked to their atDNA test. See if you recognize one of your own ancestral couples on their tree. You can also use the **Common Ancestor** feature at *Ancestry* or the **Theory of Family Relativity** at MyHeritage. These companies use algorithms that search for common ancestors between your tree and the DNA matches' trees, fill in gaps by using other family trees in the database, and then suggest who the common ancestors might be.

Trace and Evaluate Relationships

Once you have determined who the most recent common ancestral couple might be, the next step is to hypothesize the test taker's location in the tree, then evaluate the trees of the DNA matches who all descend from that couple and determine the **traced relationships** between the test taker and each match. The traced relationship is the genealogical relationship, based on documentary evidence.

Create a Diagram

It is very helpful to create a diagram of your path back to the common ancestral couple in relation to each of your DNA matches' paths back to that same ancestor. This will help you determine the traced relationships in preparation for analyzing the amount of DNA you share with your matches. Below are two options for diagramming and flowchart applications:

- LucidChart (subscription): lucidchart.com
- Draw.io (free): app.diagrams.net/

Build Quick Trees Where Necessary

If a DNA match in the genetic network has a partial tree that doesn't connect all the way back to the common ancestor, you can work on building a **Quick Tree**. Consider creating a private, unsearchable research tree in *Ancestry* that can be the home for all your quick trees. Enter as much information as the match's tree provides, then build back the lines by accepting hints about new ancestors until you get back to a common ancestor. If it appears that the match descends from the common ancestor, work to verify their tree using documentary evidence.

Contact DNA Matches as Needed

You will find that many DNA matches do not have a family tree linked to their DNA test. Some DNA testing companies don't offer the capability for a family tree to be added. In these instances, you can use the testing company's messaging system to reach out to your DNA matches and ask them to share their family tree with you. Start with something simple like:

> *Hello, my name is Alice Childs. Ancestry shows that we share 358 cM DNA, which puts us in the range of 1st – 2nd cousins. I would love to connect and see if we can figure out who our common ancestor is. I'm looking forward to hearing from you!*

Once you begin a dialog, you can ask more specific questions about your possible common ancestors. As you learn about their family, add them to your diagram and your research tree.

Evaluate the Accuracy of Your DNA Matches' Trees

Once you have determined who the likely common ancestors are and your DNA matches' paths back to those ancestors, it is time to verify your DNA matches' trees. Do this by examining each parent-child link and determining whether there is documentary evidence that corroborates that link. For example, an obituary might name a person's children, a death certificate might name a person's parents, a census might show all family members in the same household, etc. Add each match and the documentation to your research tree so it can be saved and accessed as needed.

Shared DNA Analysis

After you have verified the traced relationships for each of your atDNA matches of interest, use the Shared cM Project at DNA Painter to analyze whether the amount of shared atDNA fits with the traced relationships (see dnapainter.com/tools/sharedcmv4). The amount of shared atDNA for each traced relationship should fall within the range for that relationship. For example, the range for a third cousin once removed (3C1R) is 0-192 cM, with an average of 48 cM.[2]

For more in-depth analysis, click on a traced relationship on the chart. This will bring up a helpful histogram for that relationship. Amounts of shared atDNA that fall at the top or within the middle or "shoulders" of the bell curve (or within one standard deviation of the mean, calculated using the numbers at the bottom of the image) are statistically more likely than those that don't. If the number of shared cM are outside that sweet spot, rule out all other possible relationships before accepting the relationship for that amount of shared atDNA. Possibilities to consider include half relationships, having more than one set of common ancestors between matches, or pedigree collapse. If the match and the test taker share more or less DNA than is statistically possible, you need to do additional work to figure out what is going on.

Form a Conclusion Based on the atDNA Evidence

If a large majority of the shared atDNA between the test taker and the matches whose verified trees show they descend from a common ancestor fit within the parameters set forth by the Shared cM Project for their traced relationship, you can conclude that you have verified that relationship. Fitting an ancestor into a hypothesized family, then using documentary and DNA evidence to verify the probability of the hypothesized relationships can help solidify the identity of unknown ancestors.

Evaluating Matches when Pedigree Collapse is Present

Pedigree collapse happens when a person has one set of ancestors in multiple locations on their family tree. This causes a person to inherit more atDNA than usual from that ancestral couple and can result in DNA matches sharing higher amounts of atDNA than usual with DNA matches who also descend from that couple. The effect of pedigree collapse becomes less and less with each

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[2] Blaine Bettinger and Johnny Perl, "The Shared cM Project 4.0 tool v4," *DNA Painter* (dnapainter.com/tools/sharedcmv4 : accessed 27 July 2023), average and range for third cousin once removed relationship.

succeeding generation.[3] *BanyanDNA* is a new tool designed to help untangle trees with pedigree collapse. Learn more at BanyanDNA.com or join the Facebook group at facebook.com/BanyanDNA.

Resources on the History of New Paltz

Lefevre, Ralph. *History of New Paltz, New York, and its Old Families from 1678-1820*. Albany, New York. Brandow Printing Co., 1903.

New York Digital Heritage. "New Paltz Town Records Digital Collection." nyheritage.org/index.php/collections/new-paltz-town-records-digital-collection.

New York Digital Heritage. "New Paltz Historic Documents." https://nyheritage.org/index.php/collections/new-paltz-historic-documents.

DNA Resources

Books:

Bettinger, Blaine T. and Wayne, Debbie Parker. *Genetic Genealogy in Practice*. Arlington, Virginia. National Genealogical Society, 2016.

Elder, Diana, AG and Nicole Dyer. *Research Like a Pro With DNA: A Genealogist's Guide to Finding and Confirming Ancestors with DNA Evidence*. Highland, Utah: Family Locket Genealogists, 2021.

Southard, Diahan. *Your DNA Guide the Book: Step by Step Plans to Connect You with Your Family Using Your DNA*. United States: Your DNA Guide, 2020.

Wayne, Debbie Parker, editor. *Advanced Genetic Genealogy: Techniques and Case Studies*. Cushing, Texas. Wayne Research, 2019.

Websites:

DNAeXplained (https://dna-explained.com/). A blog by Roberta Estes where she shares "things [she] learns, answers people's questions, and has fun with genetic genealogy."

FamilyLocket (https://familylocket.com). A blog by Diana Elder, AG and Nicole Dyer that includes many helpful articles about using DNA in your research.

International Society of Genetic Genealogy Wiki (https://isogg.org/wiki/Wiki_Welcome_Page). A site created to "advocate for and educate about the use of genetics as a tool for genealogical research."

YourDNAGuide (https://www.yourdnaguide.com/). A blog by Diahan Southard created to "help you decode your DNA and make it fun to find your family and their stories."

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[3] Jayne Ekins, "Pedigree Collapse and Your DNA Matches," blog post, 1 August 2019, *YourDNAGuide* (yourdnaguide.com/ydgblog/pedigree-collapse-and-genetic-relationships : accessed 28 March 2024).