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Stetson Law

Bite Pattern Analysis

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>> Crime same to courtroom crime series forensic evidence essentials current research and trends. This webinar is produced by the national clearinghouse for science technology and the law. The office of professional education at Stetson University College of Law. I am your cohost, Heidi Eldridge. I am a scientist and resident supporting webinar series. Joined by Director of - please be sure you are logged into the meeting using the same email address for your login. Also, please make your Zoom name your first and last name for CLE purposes. At the end of this webinar, I will discuss more webinar regarding CLE and be available to answer any questions you may have. While the webinar is in progress you can use the Q&A feature to ask the speaker questions. Answer as many questions as possible during the Zoom training events, we will leave sometime at the end for questions as well. If you encounter technical difficulties, please feel free to email us at med serve to. This webinar presented by Doctor Raymond Miller American Academy of forensic science and overview of the criticism of two basic premises supporting bite mark analysis and a look at the current landscape and controversy of bite mark thank you Doctor Miller I will hand over control the screen to you.

>>DR. RAYMOND MILLER: Thank you. I will begin that process of sharing the screen. So far there we go. I will move us over here so I can see everything. I think you can see it. Is my screen up?

>> Yes sir.

>>DR. RAYMOND MILLER: Thank you did not hear anything for a second thought I was muted. All I can see is my presentation. We did some bite mark research here. In 2008, nine era. I also serve as a consultant to the medical examiner here and in Buffalo New York. I have been in the forensic field since around the early 90s I will say. I have about 24, 23 years in the field. As most of us do involving victim identification. One of my colleagues here at the University got myself involved with other people and some research. Much-needed research in the field of bite mark analysis. Here is my disclaimer. Obviously, these are my opinions and not the opinions of the department of justice or Bureau of Justice assistance. Anything I say might be controversial is on me and not anybody else. Obviously, it is good to get a little history I find this piece of history this is the 1600s. We know how the Salem witch trials were conducted. All of them is information touted and evil spirits and witches. Things that we know don't exist. There was a piece of this that they thought they could look at bite marks on an individual on some victims that were recruited by this priest or deacon bureaus. He recruited some girls. And that process supposedly bit them. They felt they could look at the bite marks. Look at his teeth. Say those teeth made those marks. Therefore, he was guilty of recruiting witches to serve whatever purpose which

is that at that time. They pried his mouth open and compared his teeth and looked at the injuries on the girls that was a place where bite marks were used. He was paying for his crimes and the witch trials which we know many women lost their lives being accused of witches. His process he had bitten these recruits. After the trial, the governor of Massachusetts declared witchcraft trials no longer needed, they were not appropriate or proper. Innocent people are being accused of things. Bad things were coming out of it. The interesting thing that we probably should have learned from back then. Was after two decades, or 20 years. He was declared innocent by the jury in the county of Massachusetts. His family was compensated for a wrongful conviction and sadly and execution. So, right then and there it was realized that whatever evidence they used against him. Things are used was a wrongful conviction. The execution was wrongful as well. We are seeing that now today and some cases where exonerations are occurring. That was a long time ago. Just an effort to look at somebody's teeth and look at marks. Say these two things created the other we can do that. There have been some cases here and there. There are times that certain things would buy a piece of wax. It would be there sign that they would seal this document or letter. Thereby is what would prove it to be they are the ones that verified that piece of action. So, it really kind of laid quietly for a while. In the

1970s, 80s, even 90s. 80s and 90s were a heyday for this. We are talking about various reasons for this shortly. The one thing, even though it was accepted by courts, admitted in all states. There really was not a lot of research to support the basis for bite mark analysis. If there really was not research behind it. How did he get into the courtroom? Those are the questions that we really need to answer. You as the legal profession had a role in it. Allowed it to be brought forward. Sometimes some misunderstanding about what the bite mark analysis was really all about. If you go back in judicial history. You will find a case in Texas. It was a bite mark in a piece of cheese. Someone had broken into a house. Got hungry. There was a piece of cheese laying around. They bit it and left it there. They had evidence that whoever broke into this house, was the person who bit the cheese. It was brought to court. There was a firearms expert that actually looks at the comparison. They were used to do that with bullets as I went through the gun or rifle. There were things they could be testified to do with pattern matching. They felt comfortable there was a dentist consultants. They really did not challenge whether you could identify an individual and something like food tough enough to do it on skin. Food, cheese is not bad, cheese is a decent substrate when you buy into it. Your teeth marks will be there. Here is what bitten cheese looks like. I am sure you are all too

familiar with foodstuff. It is not a bad substrate for capturing the teeth. You can see little individual teeth. On the bottom you can see smaller teeth. If you found an individual wouldn't that person be the person, could you relink these people to the cheese or the actual cheese. There is a problem with food when you have things like apples or other things that people buy into. The preservation you can make models on scan things. Duplicate, do all sorts of things to capture the bite mark. Can you prove that only one individual would've been the one to make this mark? In a case like this you do see a little space between the teeth may be. The size would be captured. You can testify to that. The reality of a case like that is this guy has cheese in his teeth. There is detail. Again, you will see why a piece of cheese is probably better than arm, back, or some other body part that is bitten. We will review that shortly. That was 20 years later or so there was a case in California peaceful versus mark. It was challenge whether or not you could look at a wound caused by teeth, and could you say that one individual made that mark? They looked at it from admissibility standpoint. We take pictures of teeth. We make models of teeth. We take x-rays of teeth. We do all that stuff. It is nothing unusual. Nothing on novel. Therefore, we can look at teeth and compare them to pictures or compare them to scans. The problem is they overlook the fundamental of

principle by people are different. Is every person an individual when it comes to other teeth arranged is the population variability approvable that everybody is different. I was never established. If everybody is different. Does that difference transfer to the level of exactness you are measuring or analyzing teeth. Does a little twist does it show up in the skin? All the variables I looked at a thousand models of thousand teeth. There is always something different. It could be a little nuance. I want difference tells you that everybody is different. Does that differ actually transfer and you see it in duplicate the differences that exist with people. If everyone is different as theoretically believed by people doing bite mark analysis. This is a bite mark in someone's nose you can start to see some troubles. Not all the teeth are captured in a bite mark. You are limited to the upper 628 teeth. The lower 6 to 18. This one probably captured for teeth. It is really not getting the whole evidence of somebody's dentition. You're saying that somebody is unique. All the variations. The bite mark does not capture all those teeth and the different nuances that might exist in someone's dentition. We only capturing three or four in this case front teeth. It is a good bite mark from the standpoint we can definitely see individual characteristic of teeth. Another aspect that makes it a good bite mark there is actually some dimensionality to it. It is not just



a bruise. There is actually indentation. If you had a model of the subject's teeth which they do or did have. You can see almost how those teeth can fit into the indentation or mark on the nose.

Problem again, it is a line. Now that I look at it, we really only captured three teeth. Can we get enough evidence there to say those three teeth are the only person that could have made that mark. It was admitted, it was allowed. It was loud based on we are taking pictures models all things that are not novel or unique. They got through presidents that it was able to be admitted. Another case shortly thereafter in Illinois people versus Malone. Look at bike marks and see whether they be admissible. We looked at it numerous times in the last decade. Should the bite marks in the case be admissible or is it not valid science in certain cases we are looking at admissibility in evidence. In the evidence itself brought numerous times and never disallowed in most cases. This one, they misunderstood the judiciary just said people are identified by their teeth or x-rays when there is an airplane crash, a drowning, we do identify people by their teeth. There is unique patterns by the fillings they have the arrangement or missing teeth all of the factors that go into making someone's dental profile allows us to identify victims of disaster. They extended that. If you can do that you can take somebody's teeth and print them to tissue, we can identify it that way. They are two

totally different things. That was an erroneous application of a principal. It is just not true or proper. An issue that always comes up in these cases we have experts on either side. Up to five experts and support this was the biter and six is that it was not the biter. You get in a situation where the experts they can even decide for themselves if 1/3 mark is attributed to an individual. How can it be a valid science or a valid process if it is not repeatable like a scientific method where you do an experiment. When you do it comes out this way every single time. There proving whatever method you have such a disparity. We see that all too often. Battle of the expert witnesses. It is always going to be who is the most believable. Not who has the best science behind them. Who is more articulate. More forceful in their opinion. Overstating the validity of what they see. It is a type of evidence, physical evidence, that a jury can look at. They can see it. Let them hold the model. Let them hold the picture. Let them put the model right on top of the picture. Or some type of the notes we can make an impression of the nose. The jury can hold that suspect teeth put it on that nose. Say it fits perfectly. I was going to say fits like a glove reminiscent of the O.J. Simpson trial with a DNA experts talking about DNA. Most of the jury did not want to hear about base pairs and how it is done. The whole science about it. When I told OJ to put

the glove on they could see that glove did not fit him. Therefore, he could not be the person with DNA. All the different theories that they had. Such as trying on a glove or bite mark is very powerful. The jury does utilize it very much. There was a goofy case a woman was accused of biting her neighbor and throwing cake at her. It came down to she was having a party for her son. She was accused of biting her neighbor. But several hours of drinking hard liquor and beer she went to her neighbor's house through a piece of cake at her and bit her. But the officers that responded arrested this Tina Gonzales because she was the only one at the party that had teeth. The rest of the people only did not have teeth that they only had a few teeth. It can work. If there is nobody in the room with a weapon, she is still on the could have done it. She was whatever charged with some crime whatever. Whatever you get from biting somebody and throwing cake at them. I don't know what that is. Being from Florida, many of you are across the country. Does not matter I'm sure everybody is all too familiar with the case of Ted Bundy. Very high profile case. Ted was a horrible person. We know he was guilty of murders. He admitted to it. Washington state, Utah, Colorado, Utah. The number of red I don't even know he did confess to many. Little ploy he would be put to death. I have another one for you I did this one I did that. They finally got sick of hearing all the stories put him

to death. Whatever your opinion of the death penalty is. Maybe Ted should have been killed. There was a mark left on the breast and the buttocks of one of the sorority members in the house that he broke into. He was a lawyer. Supposedly a good looking man. Very friendly. That was his MO. Pretend he broke his leg walk around the cast. Someone would help them carry books. He would club them over the head and throw them in the Volkswagen. He was described as charismatic. He was not a creepy guy you at that would not get within 10 feet of him. He was good at what he did, his teeth were described as unique. When you show somebody his teeth. Are those chips on the upper teeth are they going to transfer? Are we going to see that in a bite? These guys are crooked down here you would look at these teeth and say they are unique I don't know if I know too many people with teeth like that. Not really that unique of a profile. If you have him bite into a piece of wax which captures the fidelity and the depth and shape and size of teeth. A nice material you can look at and say this is what Ted Bundy's teeth look like when they imprint to something. There were marks on the left buttocks of Lisa. You can see a mark. It is not as pretty with this you cannot see as much detail. How can you really look at this and look at this and say they are similar. When you blow it up when you blow up the picture and got a good glimpse of the bruise pattern that existed on her behind there. You can

start to see there is some kind of relationship. Is it a lot of information? The upper teeth you really don't see a lot there. Even though you do make an attempt to analyze them. Are you going to see that chip in here somewhere? I don't think so you will see this positional change. I am simplifying it is much more complicated than this. We look at the height of the teeth not just to dimension Ted this is exactly what the jury sees they are not going to get too much into detail. I can relate those two together enough said. Interesting thing we will compare to this mark this is a double bite mark. It does not give the little one to set back a little bit. If you're trying to be Ted Bundy's lawyers. Two people bite this person. Why do these look different. These are questions that should have been asked. They hopefully were. They did have a defense expert they was in orthodontist braces person. Trying to tell you why these teeth may not be unique. Really the story is if you are a little crowded. They come in behind those teeth. This is not unusual. These teeth come in last usually. When they come in, they are looking for space. They will rotate and turn sideways. I have a niece that looks like this there is people that just have teeth that looks like this. This is the way teeth grow and develop. I will play a little clip for you. I may stop a couple of times. It's from a Netflix series you may have seen it. We have some points in here that I find interesting. When I was watching

it. You do get condemning bite marks and junk science. The things I like about this it is a very proud man a opinionated got a strong presence. Great for a court room. If there was an expert. Little earlier he seems a little sheepish or does not hammer home the fact that he believes Ted bit the sorority girl. He is confident Ted himself looks at the evidence he tries to see he was a lawyer that would try to refute it. He thought his defense team could work harder if there was no DNA nothing like that. Other evidence of him doing other crimes, the bite mark put him in the sorority house at that time you can see some of the descriptors. Make a little comment and let me run it for you. Little jumpy. [No Audio] obviously in investigator sharing it is a little overstatement. As hard as the person if the person bit as hard as they possibly could they could've taken a chunk of tissue off. This is Doctor.[Name].

>> Excuse me Doctor Miller. We are unable to hear the audio in this.

>>DR. RAYMOND MILLER: Okay. Julian, is there anything I thought we heard this the other day? I have it up all the way. Is Julian still with us? Am I doing anything or is not coming?

>>JULIAN: Were not getting the audio Doctor Miller I'm trying to see if Julian can troubleshoot it.

>>DR. RAYMOND MILLER: I have another option him to do something.

>> When you share the screen did you click the box

to share your audio?

>>DR. RAYMOND MILLER: Let me see is there a box to share audio?

>> If you want to share your screen and then re-share it and click the box.

>>DR. RAYMOND MILLER: Where will I see this?

>> Down the bottom left corner, it should say share audio when you click share screen.

>>DR. RAYMOND MILLER: I click share screen there you go you are the best. We did go through this the other day you are correct.

>> The piece of evidence will be the centerpiece of the prosecution. That would be used for the first time in a court setting was the bite marks. There was a very and printed double bite mark. The person that I with Drew and that bit again as hard as the person could. The question became whether or not there was any way the suspect could be identified from the bite mark.

>> Star witness Richard [Name] Showed the park the peculiarity of Bundy's teeth a slightly crooked upper front teeth with instinct incisors and chip marks. Whoever made this mark preventing.

>> I believe it was the canine teeth that was very distinct that really were different. It was obvious that the jury was obvious by living show put on by the prosecution. We really concentrated hard on trying to limit the scope of that testimony.

>> My came down to Miami and handle the bite mark analysis. First time I kind of tool mark has been

used to use expert legally speaking on Pat.

>> Bite mark evidence is not like DNA. It is pretty much considered junk science.

>> You could positively identify someone from the bruise pattern they would leave on human flesh. It was gross speculation. It did not change what happened.

>> [ Indiscernible]

>> Yes sir.

>>DR. RAYMOND MILLER: The part you will hear next is actually Ted speaking about how he was not happy that his defense thing did not refute that. He knows there is holes in bite mark evidence. He could see there were things that could possibly be refuted from a defense standpoint. After that he went under hunger strike, he was mad about things. He is paying close attention listening to testimony is something to say of course they let someone else handle that aspect. This is him talking now.

>> In the state's case up until.[indiscernible]

>>DR. RAYMOND MILLER: It looks like a creepy scary guy to me. Looks like something I would be concerned about making him mad. He was obviously a horrible person. Pretty sure the police arrested the right man for therefore linking his teeth if it was an open population, it could've been anyone in the world who made that mark it may have been a different story. Doctor Levine, who is from New York State it works with the state police here in New York State. Both of them were predominant in



the field on ontology. Since 1976. Was it an actual forensic specialty? Both of them were asked that question what is the possibility that someone in the world having teeth that could have left that mark? Statistical number two a. Some have overstated a number with regard to that. In court, we were able to get away with saying things like finding a needle in a haystack. That would never survive today. Even Doctor Levine called it a practical impossibility. That is not a statistic. Not like the numbers we see with DNA how many people have that profile. At that time, they were able to make those statements. It was accepted that the state of this and of itself would be a reason to object, what does that mean? What is the odds of finding document I don't know the number. The husbands and sons. There will be more of your children dead tomorrow. Chilling. He was a different character. At the same time, I'm a graduate of 1985. This was even before I was in dental school. When I showed up in dental school some of my professors here were working on a bite mark case in Buffalo. This was the cheek of a woman you could see right above her ear and below her nose. With respect to the upper teeth, it was refused. As a crookedness tip at the ruler is not in proper orientation it looks like a ruler that was stuck under a door for doorjamb. They presented this evidence. The biter was supposedly had a little crooked area down in the front you could see

and wax. It looks like it is depicted in this bite mark. I am oversimplifying. For a jury they see this type of thing. They are going to look at it. There is a look at it I see how those fit right in there. Again, I know that is an oversimplification from what forensic old ontology is due. This is what the jury sees they are pretty convinces person is the biter. The police probably arrested the correct person. We can make a relationship. When I saw this in 1981 answer dental school. I thought this is really neat stuff. I want to learn how to do this. Start taking some courses and become an expert in this field. It is interesting. I find that is true today. There were things that showed up in the newspaper back in those days. The medical examiner for this case said that bite mark was made by a black person. She pretty much said she left a distinct impression with angular narrow job. This is never been studied never been proven. Are there racial differences, ethnic differences in people's teeth. Sure, there are to make a statement based on a bite mark growth over there is confusion here they are talking about teeth versus the bite mark. You could not look at those lives as a black person, white person. That is the type of stuff that showed up in the trials. Here in Buffalo these gentlemen about a dozen dentists everyone has his claim to fame rate murder case the person the bite mark evidence it again was very high profile talked about Buffalo being the center for University we have a

hospital, please involve looking at this they thought Buffalo would become the world's center and bite mark evidence. If I could be part of that that would be a wonderful thing. Even Doctor.[Name] Knew enough to say a statement each person's bite is unique that is not necessarily a true statement it depends on the shape, size, angulation of the biting surface bite marks are like thumbprints in Jell-O. There is all sorts of variables that come into play. Is it really as reliable and accurate? Ted Bundy they almost got away with murder they both left back the same grisly calling card. Levine says that in this case as well. The police probably arrested the right person. His he did match that mark. He was convicted pre-DNA. This kind of stuff is going on. Skin does not record the details necessary they have a great degree of - to identify everybody else how different everybody is that is not been tested either. There is a paper written by Doctor Ross and that incorrectly some principles. He came up with numbers mentioned in another case a million to 1 billion to 1. There was a study they gave them the information. There is no current data that was useful to talk about how frequent certain people were. How crooked people's teeth were things we don't really that are unproven assumptions is that the biting services of teeth are unique everyone would leave a different imprint. This can capture that uniqueness. We dentists can reliably associate people with a bite mark. None of that is been

proven. Another study that came out that was refuted or argued against can actually look at someone and say that is a bite mark. There are other things that look like bite marks identified as bite marks overnight, even bite marks. Comparisons were made. All sorts of stuff. When it comes to a bite mark this happened in Buffalo Chicago Blackhawks, he is a person that came up here Penn had a sexual assault case brought up against him. The press talked about the woman accusing Patrick had bite marks. Therefore, it was nonconsensual. All these things were complicated cases on the come to you. Bite marks indicated for whoever that the woman had a bite mark scratch. Therefore, it was nonconsensual it was guilty. This was thrown out of court. The defense lawyer for the accuser resigned because there was suspicious activity. He was not charged with this case. Once we mentioned bite marks people start seeing something negative. Something negative. I cannot even tell you if I see the bite mark on this case. There is the arm of the person that was bitten my colleagues try to identify I can even see our marks are people who use different lights different imaging to try to bring them out. Not necessarily a positive application of the application. Great papers from a legal standpoint. This one by Erica and 2009 before the research before the NES report very opinionated bite marks and the delusion of science that was there. Another Adam.[Name] Wrote a legal article about how

inadmissible it is as junk science. These are great references. I know you have them in your folder or paper. It talks about death penalty cases. Gets into other junk science case is not so much bite marks. People incarcerated for 30, 40 years. Having somebody put to death with evidence that may not be as strong as it should be is a horrible thing. This was a nice article where there were numerous people who contributed to this article. Again, talks about the weak principles and all the exaggerated claims that came out of it. The gentleman from the ABF oh put an article out that said epidermis of enamel. They were trying to argue the criticism you see all these people that came out. They felt like they needed to write a paper. For the most part they say they are learning from their mistakes were trying to do this and do that. Is the basis the principles that support bite market analysis even worth doing on those are the questions. The NES report that came out. They looked at pattern injuries. Different forensic techniques. Having these things condoned by the court looked at with a good science behind them. We talked about this. No one knows how unique the dentition is. If it is unique, it transferred, and can you analyze it? Some minimal threshold to value. Being able to identify a bite mark would be helpful. Studies that say it is not as easy as some might think. You can look this up there is reference to this in your paperwork. They were

going to allow bite mark in Texas unless they met a certain threshold that you can do this. Can you identify it as being a bite mark for my proficiency testing. There needs to be how often we are wrong error rates. People have gotten out of prison based on bite mark testimony. All of these scientific science and technology scientifically invalid method to be used in court. It probably is not going to help. That is true and bite marks how valuable they are to determine by judiciary not science which I disagree with. The jury must have the ability to determine how valuable it is. I know I'm getting right to my 145 I will take some more time and hopefully not steal from your question time. We looked at the University of Buffalo. We looked at multiple bites. If you bid somebody with the same set of teeth, why did the bite all look different? How does that affect with the bite looks like were properties of skin that make them useful or not. The second dabber model criticized for that because it does not show the same complexity that bruises show. That is the point. We can determine the bite mark like cadavers skin how can you do it in a bruise. If the oversimplify to show it can be done in a simple model. Therefore, can't be done in a more complex model. These are bite marks and I cadavers skin. We don't have the same indented pattern, they're pretty detailed in respect to things they would probably have AV in their lower front teeth because of the appearance there the bite

mark to the right is the one that did it. This is the mark. Why did it leave that the it had to do with dimensionality. These are things we studied and learned. Why mistakes are made. Pinch your arm with retention lines when you go against the retention lines you can grab it as well it has a different pole. Depending on which way the orientation of the bite is these things will be a problem. It looks differently the similarity of the human dentition or how unique it is what they did determine various studies there are similar bites and arrangement of teeth. Similar looking temptations will cause similar looking Mary wrote a paper to the Journal of the American dental Association talking about junk science. It was refuted. Every time I talk about, they want more research but if you put on the research paper that does not say that junk science. The some people that talk this is [Name], [Name], [Name] They left the board in disagreement over to bite mark science were trying to exonerate certain individuals. Unfortunately, Doctor Bardsley, who was a lawyer passed away. One of the biggest advocates the person that came out as the most anytime a paper comes I he refutes in challenges that. There is a chapter in the book when you look at the studies that we did. They're criticizing them saying they are too simple defrosted human cadavers. Like that is a bad thing. You not supposed let cadavers hang around pinched by a Home Depot by scripted it is a

simple model. The job mandible is so complicated you can't replicate that. If it is complicated, you will make it worse. They did not have a great handle if you say this in front of a jury, they can't be real scientists. It was adequate of what was needed to demonstrate. As Mary Bush and Peter Bush of course Dave Benson and from the taxes to say how silly or how scientific it was. It was them demonstrating we are taking tissue biting and leaving a mark it was simple like that he was convicted of biting the wife of a man he murdered. Those statements expert testified to a very very high degree of probability those teeth left a bite mark that is what Keith went in and came out. Very different 30 years later. Why am I seeing this? I don't know if you saw that, but it is a little pop up. Again, this is simplification. Look at the bite on this woman's leg. They are all kind of different. Some detailed not so much detail. When you take Keith teeth and lined them up with the bite mark. You can say it looks like a possibility that he made that mark. They all look different. He was found innocent by DNA analysis and release from prison. Another guy on the ship he was on was the person who actually did it. One of the experts say we need more scientific research and investigation. These are the problems we will see people will, the court suing dentists doing whoever a million-dollar lawsuit after spending 32 years in prison after he was wrongly convicted. 2.1 billion to 1 that



someone else made that mark exaggerated claims I am forgetting this one now really court rock strategies. This bite mark was identified a year later after the case we exhume the body this minor itself. Reading all the different statements, read things that struck me was experts themselves you will never find another we found that skin captures the unique individual characteristics with excellent fidelity that is not true. The experts on the other side. I don't think we can substantiate that we have a bite mark. If we give a bite mark it does not look like the bite mark that I have seen. Skips over from California. If there were bite marks in 19 them at all satisfying. These are the top ones in the game. One of Doctor.[Name] On her there at odds with each other they are supposed to be the experts added. This is my own case of my dogs. They like to playfully bite one of them got a hold of my credit card and bit it can Bailey the bulldog had really bad teeth, so I do not think it was Bailey, like the cake story. Ollie had tremendous teeth. Ollie was the guilty dog. Most recently came out with the scientific review very damning of bite mark evidence. Again, the bite mark groups came and refuted that report is saying they're making changes doing things differently. An individual created a mark when we exclude people it really if anybody has an argument and never seems to be looked at objectively. It always is how are we going to argue against this like a legal debate.

The bite mark groups of updated standards trying to do better. We know we made mistakes. We don't wanted to go away. So many problems it's hard to open the door a little bit once you open the door a little bit it comes flooding forward. Currently this is what they would say I can tell you this person did not make that mark, or I could tell you they could have made the mark. Not exclusively. They exclude people or include people with such distortion. It is difficult to be able to exclude somebody you might let a guilty person go free. Then on get to identifying individuals to our mark. They will look at marks and say this person could not have possibly made it. Is that really valuable to the legal profession? Did they make it? Did this person leave the mark? I can't say he didn't. That is not going to be too helpful. I'm not sure how much longer this will be useful as a tool in court. In this report they did talk about bite mark studies. When they talk about the bite mark studies. The one thing he said about them was that the cadaver base resource were highly controlled which is exactly what we want. From the analysis of that we did not overestimate at all we pretty much said you're going to make mistakes if you do this stuff because the controls are not there. We talked about bike market and elsewhere they are not prone to higher levels. That is true. We are scientists. That is a bang against them from the bite mark group why did she have bite mark people. We are the ones

I can do this. It should be asked trying to do it. Of course, I did go over little time for questions. I can hang around. Hopefully you can too. I know there may be some I saw one question pop up. Of course, you can email me I will try to answer some now in the next few minutes remaining. I apologize for going on I have so much to say and so little time to say it.

>> Thank you so much for sharing that with us. We are open if people have questions they would like to put in the Q&A we would be happy to let Doctor Miller take a stab we have one question to go there. The question is are dental experts ever call to testify on bite marks in cases of abuse such as child abuse on terms of identification but evidence of potential abuse.

>>DR. RAYMOND MILLER: Yes. This is one of the things so my colleagues to do bite mark caseworker want the bite mark to be available. If you can identify it which comes into question as a child if they have a mark on them from an adult. It is good evidence. Proof that something or maybe this woman has bite marks. It is a whole other ballgame. One of my colleagues in a tremendous case said there was a limited population mom, dad, sibling someone that this child she fell down the stairs fell off the dressing table. What about these bite marks they tried incidental. Mom and dad were so different with respect to their teeth. I was comfortable my colleagues think this that you tell me mom or dad

I'm going to tell you dad is the biter. That helps them the abuse aspect they could do so my fear as if we opened the door it gets in there like the other cases. While they are tried doing a good job trying to police themselves there is so much damage that is been done so much and type bite mark, I'm sure you're familiar with the innocence Project. He is a staunch anti-bite mark person. He makes some valid points. If a child had a dull bite marks on them victim of abuse even if they cannot say who it was let the jury or court figure out that this child is being abused and get it out of that circumstance.

>> Do you have any other questions I don't see any in the Q&A we are getting short on time. I will pause for a moment if anyone has any other questions. If not, I will go to the closing remarks.

>> There is some chat stuff I don't know that is just informational. No problem. That was all about my missing audio. Which fortunately, Julian was here to straighten me out. You and I appreciate that.

>> Thank you again Doctor Miller for your presentation. I want to take a moment to thank everyone else for joining us on today's live zoom session. We hope you enjoy this webinar you can get our past webinars at the.[website] As an additional step learning planning step we will complete an evaluation of this training. An email will be sent to you with a direct link to complete the

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