Just Using Forensic Art and Anthropology for Identification

Introduction [00:00:05] Now this is recording RTI International Center for Forensic Science presents Just Science.

Voiceover [00:00:18] Welcome to Just Science, a podcast for justice professionals and anyone interested in learning more about forensic science, innovative technology, current research, and actionable strategies to improve the criminal justice system. In episode four of our Applications of Forensic Science for Human Identification Season, Just Science sat down with Katharine Pope, a Research Public Health Analyst at RTI International, Dr. Bruce Anderson, a forensic anthropologist with the Pima County Office of the Medical Examiner, and Joe Mullins, an instructor at the New York Academy of Art, to discuss human identification using forensic anthropology and facial approximations. From skeletal remains found in the woods to mass casualty events, forensic anthropologist use their knowledge and expertise of biological profile estimation and skeletal trauma analysis to help establish identities for unknown individuals. Forensic artists who are trained in facial approximations use skulls and other identifying information to recreate victim's faces. Listen along as Katharine, Dr. Anderson and Joe discuss how their disciplines interact, coordination with various entities to resolve cases, and how to get in touch with local forensic anthropologist and forensic artists. This episode is funded by the National Institute of Justice's Forensic Technology Center of Excellence. Here's your host, Jaclynn McKay.

Jaclynn McKay [00:01:34] Hello and welcome to Just Science. I'm your host, Jaclynn McKay, with the Forensic Technology Center of Excellence, a program of the National Institute of Justice. Today, we will be discussing forensic anthropology and facial reconstruction. Here to guide us in our discussion is Katharine Pope, Dr. Bruce Anderson and Joe Mullins. Welcome, everyone. Thank you for being here.

Joe Mullins [00:01:55] Thanks for having us.

Jaclynn McKay [00:01:56] Kat, would you mind providing our listeners with an overview of what forensic anthropology is?

Katharine Pope [00:02:01] Anthropology overall is the study of man, which can include anything from our hominid ancestors to our language to the artifacts we leave behind. So in particular, a forensic anthropologist specialize in physical anthropology by focusing on human osteology or the human skeletal system, and that can be from microscopic cells to the largest bony elements in our body. And practitioners are trained to recognize normal human variation, disease, pathology, trauma and also taphonomic changes which are how our bodies change after we die. So you ask what a forensic anthropologist is, forensic anthropologists use their experience in all of that and their knowledge and the context of the scene to help resolve unidentified human remains cases by estimating identifiable features such as age, sex, population, affinity, height and other things that might help identify people.

Jaclynn McKay [00:03:04] So would forensic anthropologists only get involved in cases where the remains found are bones?

Katharine Pope [00:03:09] Not necessarily. I mean, on TV, we usually see forensic anthropologist going out to the woods and helping with skeletal remains. But more often than not, what we're doing is helping out in the lab and during autopsy. So forensic pathologists, the folks that are doing the autopsies are trained in working with muscle,

tissue, organs, and they're there to establish cause and manner of death. And they do that by looking at disease processes and trauma, taking photographs and taking measurements, things like that. So an anthropologist can really get involved when there are disease processes found on bone or trauma to bone and help them identify those features and describe them.

Jaclynn McKay [00:03:55] Thank you for that clarification. So would forensic anthropologists be involved in large disaster events and mass fatality events?

Katharine Pope [00:04:04] Yeah, for sure. We definitely participate in large scale fatalities. Some things that you may not necessarily consider a crisis like our missing and unidentified persons cases around the country, I consider a mass fatality. It's kind of a silent mass disaster crisis. But we can assist in establishing minimum number of individuals that are deceased because we have the ability to tell exactly who is where and when. And I think Bruce can definitely talk a little bit more about this mass casualty event we're experiencing in the United States with our unidentified persons caseload.

Jaclynn McKay [00:04:45] Kat, you worked for the Disaster Mortuary Operational Response Team, also known as DMORT. Can you talk a little bit more about how they operate and how forensic anthropologists are involved in their response?

Katharine Pope [00:04:57] The Disaster Mortuary Operational Response Team, DMORT, is a group of individuals; funeral directors, forensic anthropologist, medicolegal death investigators, radiologists, forensic odontologists. Anybody that's comfortable and familiar with working on unidentified human remains to help establish positive scientific identification. They would be called out in these mass fatality events. So this could be a train accident or an aircraft accident that has caused more than five individuals dying in one event. And this could also be hurricanes. And it’s generally cases that are here in the United States. And it's whenever a medical examiner kind of gets overwhelmed that a lot of medical examiners and coroner offices are set up to handle their normal workflow. You know, the normal natural deaths without primary care doctors or drug overdoses, suicides, homicides. That normal standard is what they handle daily and if there's an influx, they will call DMORT for assistance in those events. But what we're worried about is establishing positive scientific identification.

Jaclynn McKay [00:06:15] I really like that you hit on disaster fatality, that it's about cooperation and all these entities are trying to work together in order to help establish identities. So switching gears a little bit, Bruce, you're a forensic anthropologist that works for a medical examiner's office. Can you explain how you would get involved with a case when remains are found?

Dr. Bruce Anderson [00:06:37] Typically, those of us who work in a medical examiner coroner's office, we get requests from the forensic pathologist after the autopsy is completed. And that could be a traditional autopsy on flesh remains or that could be a single sun-bleached bone that was found out in the desert. But almost always, it's the forensic pathologist who needs another question or a couple of questions addressed that can't be easily addressed from a standard autopsy. And that can be everything from a single bone identification to a personal identification of an individual to a trauma analysis to how long the person's been dead. So there's a variety of determinations a forensic anthropologist can make that is based on training that most forensic pathologists never receive.

Jaclynn McKay [00:07:28] Would there ever be a case where you might respond to a crime scene in order to help properly collect the bones that are found? Or are you mostly coming in after the autopsy has already been performed?

Dr. Bruce Anderson [00:07:40] We assist law enforcement at, I don't know if it's a crime scene per say, but at the burial site. We've been training in our jurisdiction here in southern Arizona, we've been training law enforcement and continue to train law enforcement on proper archeological techniques to remove flesh remains from clandestine graves. And then when those flesh remains become partially skeletal or totally skeletal, we try to impress upon them during this training that they might want to get a forensic anthropologist involved. So depending on the agency here in southern Arizona, some will call us for a body. Some will only call us when the bones are loose in a grave. But we assist regularly, several times a year on clandestine graves or surface scatter where a body has been dumped ostensibly out in the wilderness and then it's taken weeks or months to find now the partial skeletal remains.

Jaclynn McKay [00:08:39] Thank you for that distinction between crime scenes and the actual place where the remains are found, because as we know, they're not necessarily always the same. And I know that training that you are providing law enforcement is greatly appreciated. I know Kat already mentioned that anthropologists can help determine age and sex, but are there any other insights that a forensic anthropologist can glean from the bones in order to help add to a death investigation or help to identify an individual?

Dr. Bruce Anderson [00:09:13] Well, increasingly, especially with cell phone technology, with cameras built into the cell phone, we're asked to determine whether a single bone found out in the desert, out in the wilderness. And a lot of times the finder, the discoverer, can tell. Sometimes they can't. They know that they can always call us, text us, send us an email with the photographs, and we can make a determination, typically from a photograph or two. So right off the bat, a forensic anthropologist, much more than a forensic pathologist, are able to make that determination from a single bone, especially a bone that's been weathered and maybe been gnawed on by animals. And then we go down, if it's a whole skeleton or a whole body, you know, we go down the list of sex, biological sex, age within five, ten, 15 years is usually doable from the skeleton. A lot of times ancestry is important, a stature within three or four inches. If we can measure a long bone, we can typically get out the mean stature. Here in Arizona, we don't have a forensic odontologist on staff. So we actually examine the dentition as well. So if we have a missing person’s report with a description of the teeth then we'll do a full dental description on the postmortem side and then compare those descriptions with any missing persons reports that contains a dental description. So everything from is that human is a non-human to has the child been abused in the past? It's a fresh break in the skeletal system, is that consistent with events that might have took the person's life? Or is it maybe more consistent with events that have to do with animal scavenging?

Jaclynn McKay [00:10:58] For some of our listeners that are interested in possibly pursuing a career in forensic anthropology, what kind of background would you suggest that they have?

Dr. Bruce Anderson [00:11:08] Where you need to become expert in the human skeleton and typically that's the main study anthropology and study physical anthropology or biological anthropology with an emphasis on the human skeleton. Not just at a bachelor's degree level. You need to go to graduate school and get a graduate degree and you to keep practicing on whole skeletons and partial skeletons, skeletons that have been left out

in the in the elements for a long time. You need to know more about the human skeleton than the pathologists that are going to ask you to assist. And if you can demonstrate that, then you probably can probably find a job. After that, you need to know how to apply skeletal analysis to the medical legal world. There's really at least two different ways to write a skeletal report. One traditional one that we used to write for archeologist with an archeologist in mind and or maybe an academic journal, maybe we're trying to publish something, so we write reports and descriptions that are flowery and maybe full of jargon. But in the world of medicolegal death investigation, that's not what the pathologist want. That's not what the police want. If that's not what the courts want, they want a clear, concise description of what you did and what your findings are. To get back to the initial question, how do you become a forensic anthropologist? In my opinion, first, you learn as much as you can about your human skeleton, and then you learn how to apply that knowledge to report writing and verbal communication with pathologists, the courts, and sometimes with the families of the victims.

Katharine Pope [00:12:49] I think that was so interesting, Bruce, because in my experience, gaining the trust of the forensic pathologist, the medical examiner or coroner that you're working for is critical. There are not a lot of jobs for forensic anthropologists, full-time forensic anthropologist in the world. And so many of us pursued that career using the dual role and we became death investigators first. And then we were able to show our medical examiners what we could do for them. And all of these things that Bruce described were like icing on the cake. You know, I can handle the typical run of the mill stuff that happens in a medical examiner, but I can also do a trauma report for you. And the doctors really appreciated that. Being able to apply yourself above and beyond the normal scope of duty is a way to use that experience and education in a medicolegal setting.

Jaclynn McKay [00:13:45] Bruce, one more question for you. If investigators do not have a forensic anthropologist assigned to their medicolegal death investigation office in their jurisdiction, how would you recommend they get in touch with one?

Dr. Bruce Anderson [00:13:59] Well, there's likely a college or university nearby, maybe a junior college that has an anthropologist, so they probably know of somebody. But increasingly, the better way to go is to try to retain a board-certified forensic anthropologist. So my advice would be to go to our website, the website of the American Board of Forensic Apology. That website is theABFA.org and you'll find somebody in your neck of the woods that can help you. Additionally, NamUs, the NamUs program used to offer anthropology services. With the new organization of NamUs I think probably they'll also be an anthropology service. So if it hasn't been announced yet, it will be shortly. But you're going to find a qualified and probably experienced forensic anthropologist to help you.

Jaclynn McKay [00:14:48] Perfect. Thank you for that. We'll make sure links to those resources will be on our website. Okay. Switching gears, a bit to forensic art and facial reconstruction, Kat brought up the mass disaster of unidentified remains throughout the United States. So, Joe, can you walk us through your work as a forensic artist and how you can use skulls to recreate the faces of decedents and hopefully help get these individuals identified?

Joe Mullins [00:15:16] I'm always excited to explain the process of what exactly a role that forensic artist plays in assisting law enforcement and the medical examiner's office, investigators, everybody across the board. I think just a misconception on the process as a whole and as a profession. So what Bruce and Kat, everything that they do is I feel like they've done all the hard work for me. I just come in and based on information provided by

them, my only concern is that I want a fully intact skull. So the cranium and the mandible is the parts that I need to do the facial approximation process and get that victim identified. As a forensic artist I'm not exactly on the front lines. This is - the cases usually come to us when everything else has been exhausted. All the investigative tools have not hit any significant find. So it's one of those things that's a necessary tool that's proven useful. So when the skull comes to us, Kat and Bruce have done their assessment to get me the information. So I need an outline drawn basically for what this victim looked like in life. So looking at the skull, they're able to tell remarkable details of what this person looked like in life. You know their age range, the ancestry, male or female, the condition of the bones and everything about this skull is the foundation that our faces are built on. So we're able to go through the process and put a face back on these skeletal remains in hopes to get them identified. Now, misconception as we're doing these images, we're never - we're never going to come up with the exact likeness or portrait of what these victims looked like in life. It's kind of based on majority rules as far as what the anthropologists are supplying, the information they're giving us, and we're applying that to these skulls. Now, each skull just as unique as a face. And there's - it would be impossible to come up with a portrait of exact likeness, I guess, of what these people look like in life. But we found that we don't have to come up with an exact likeness with these images. As the case information goes out on our Missingkids.com site, NamUs, any and all social media, any outlet possible because the only way these images that we create work is that the right person sees it. So we want as many eyes as possible on this. And when they see it, it's not necessarily like, hey, I know, I know exactly who that is. It's typically a response like a that sort of looks like my cousin. I haven't seen him in six years. I think that could be him. Basically, I've done my job successfully if it generates a phone call and says, hey, I think I know who that is.

Jaclynn McKay [00:17:57] So Joe, you mentioned that you obviously need a fully intact skull and mandible, and you also receive information from the anthropologist. Can you maybe describe a little bit about what that information actually entails and what specific information you need in order to create the reconstruction of the face.

Joe Mullins [00:18:18] The bare essentials? I guess what I need really depends on the case. Sometimes there's fragmented skulls, scatter remains, or there's a case that we only find a cranium and but no mandible because they're scavenged, and they can't find all the other bones. But the information that provided us is the age range, male or female and ancestry. So that could be, you know, black, white or Asian or admixture of any of the three, the ancestry components. And those ingredients are really the three main that I can move forward with. The more information that I'm provided, the better. There is clothing found with the skeletal remains or hair is found with the skeletal remains or all those added details because it's a dry skeleton, unless there's extreme situations, we have no idea about stature, for example. We have no idea if somebody was 150 pounds or 300 pounds and as a forensic artists have a very limited artistic license. The faces that a forensic artist create can only come from the foundation of the skull that you're - the information you're given, and you have to work within those parameters, painted very strictly by the forensic anthropologist that has given you those guidelines to work with then. You start going one way or the other off the rails, that's using artistic license, and that's not going to help get that victim identified.

Jaclynn McKay [00:19:40] Joe, as you've said, basic anatomy practically dictates how the muscles lay over the bones in the face. But for features like the nose and the ears that are built from cartilage, is there a lot of wiggle room in their approximation, and what techniques to use to try to help rebuild those features?

Joe Mullins [00:20:01] Now, there's variations with the, you know, the soft tissue. And as I mentioned, it's kind of a majority rules where forensic anthropology is applied to putting these faces back on, especially in the realm of you mentioned, you know, noses and ears. So for the nose, for example, you get information on the projection of the nose, the width of the nose, you can see kind of where the nostrils, the top of the nostrils start. So you do get some information. As far as ears, very limited information on ears. You get basic, you know, height angle, some information where they have, you know, attached or detached earlobes. But ears, for example, since you mentioned that, are not crucial for doing a facial approximation. When I you know the classes and courses, I teach as we're doing this, you have to assume that this victim has ears. You have to represent them with the limited information we have from the skull. And the ears just shouldn't be a focal point. So when you see a facial approximation that we've created from a skeletal remains, the first thing that somebody says is, oh, look at the ears on that. That means I've done something wrong. That should not be the case. It should focus on the you know, on the face and what we know.

Jaclynn McKay [00:21:12] So in regards to sparking the recognition and getting the reconstruction out to the right person, what are some ways that the renderings are distributed in order to try to make sure as many people as possible can see these renderings?

Joe Mullins [00:21:29] We live in a wonderful time with social media seems to be a huge venue for us, for investigative purposes to get these images out to as many eyes as possible. Now you want a case from Kat and Bruce over the years, say it's one of Bruce case you want to focus the area where the remains were found. But sometimes just because the body was - remains were found in Arizona, that doesn't mean that person, that victim is from Arizona. So that in mind you want the world's population to see it. So last I checked, I think there was like 7.8 billion people on the planet. Be great if everybody saw it. Because as I've - I can't stress enough that these images, they don't work unless the right person sees it. It's a collaborative effort and it's a wonderful world where art and science work together. You don't get that in many other disciplines.

Dr. Bruce Anderson [00:22:18] We've come a long way, haven't we, Joe, from the 70s, when sometimes the artist would work with an anthropologist, sometimes not. The technique was called facial reproduction, which was a misnomer because what it's called today, and this is only maybe 10 years old, I think we all decided facial approximation would be a better description of what you guys are doing. But I can think of where a facial approximation was extremely beneficial. A former colleague of mine here in Tucson, Dr. Angela Soler, who works in the Manhattan office of the chief medical examiner, was featured in an AP story about a woman who went missing in New York City, I think, about 30 years ago. And the family saw a facial approximation and the family called Angela and her cold case forensic science team in Manhattan and started to exchange information and it turned out that this particular instance wasn't going to be the missing woman, but the family member gave enough information to the anthropologist, Dr. Soler, to where she remembered, we have another unidentified woman from the same time period. And lo and behold, by the time they got the DNA done, they now have an identification. And it was the facial approximation that was realistic, looking enough to have a family member or friend contact the authorities and give more information. So I'm a big believer in it because especially when you only have a skeleton, there's not a whole lot we can show the family or the public when we have a skeleton. But if Joe and people like Joe can put a face on it, then we're going to get more people interested and there's an image we can show. And it could be like this recent case in New York City. It could lead to an identification, even

though the facial approximation didn't really fit what the missing person looked like. So kudos, Joe.

Joe Mullins [00:24:17] Just this morning when I got here a supervisor shared with me, there was a case that I had done that was a direct result from the investigative tool, looking at the scene, the facial approximation that we had done from a skull before and then reinvestigated a cold case and remembering, I guess he was - the investigator was taken with the image he'd seen and he remembered it and went back and turned out to be a match. So it was a 30, 39 year old case that was now - that family now has the answer. It was the daughter that was looking for a mother, now has those answers to what happened as a result of the facial approximation and all the work that the anthropologists, the investigator, you know, the collaborative effort that goes into this just justifies for me that I think I got the coolest job in the world that I helped to answer those questions so that family's been frozen in uncertainty for 39 years.

Jaclynn McKay [00:25:07] Thank you both so much for those case examples. I think it's so important to not only describe how the science works and what all goes into the process, but also show positive case results of this actually working and helping people and giving people their names back. So, Joe, in your facial approximations, how do you know when you're finished?

Joe Mullins [00:25:30] I have, so I've been doing this for 23 years, and that is a question that has popped up repeatedly. And I came up with a soundbites type of response. So when I'm working, particularly working with clay, you got your - your hands are very - you know, hands on type of process. You can't help it get, I guess, emotionally attached to the case that you're working on and you're filling in the blanks or trying to come up with answers to what happened to this person, who they were, what they were doing, and those types of things. But it comes a point when you're just like day one, when you started, it's a skull. And as you slowly start to build it up, it's not a skull anymore. It's a person. So say I stop when I see somebody staring back at me. The class that I teach, that's where collaboration with both Kat and Bruce, with the class I teach up in New York, where I give the students, art students an opportunity to work on actual cases. By day three, it's usually Wednesday, as students are involved with the face is coming in. At 100%, everybody says I know I understand exactly what you were talking about. That is exactly what's happening. That it's not a skull anymore, it's a person. They get emotionally attached to the work. And you can't help but have that emotional response to this type of work. And I guess that's what drives us to - it's why we love what we do is because we feel like we're making a difference and answering those questions.

Jaclynn McKay [00:26:53] Joe when your students are doing the sculptures to make the facial approximation, are they actually working with the real skull?

Joe Mullins [00:27:01] No, that was one of the big hurdles to get over when I first came up with the idea with Dr. Brad Adams up at the New York City Medical Examiner's Office. Maybe the first thing out of Brad's mouth was absolutely not. I'm giving you 15 skulls to turn loose with a bunch of artists. So, you know, fast forward with technology. Now we can do scans of the skulls. So all the students are working with 3D prints of the actual skulls so the actual skulls stay with the medical examiner or investigator wherever they're at.

Dr. Bruce Anderson [00:27:36] And let me just say to our office, the Pima County Office of the Medical Examiner greatly values our long term relationship with NCMEC founded, I believe in around about 1980, the National Center for Missing and Exploited Children, and

just about a year ago, a year and a half ago, they offered to do a facial approximation on a young homicide victim, a teenage girl who we didn't know who she was. We now know through this new tool of investigative genetic genealogy, who she is. The NCMEC produced a very nice image, and I took the skull of this teenage girl over to their imaging department, and then they put the CT data on a disk. We got the disk back; the skull never left my eyesight. We brought her back here to our office, set NCMEC the CT data, and then they reconstructed a skull and put that very believable face on that skull. So technology has certainly helped us.

Jaclynn McKay [00:28:46] Joe. If someone wanted to get involved with forensic art and possibly become a forensic artist, how would you recommend they become involved in the field?

Joe Mullins [00:28:56] It is a tough, tough job to get because there's not a lot of us out there that do the facial approximations as a full-time job. We have four full time artists here at the National Center for Missing Exploited Children Forensic Services, Unit where we are really the envy of the forensic art world because that's what we do all day every day is forensic arts. Whether it be age progression of a long-term missing child's fugitive updates, the age progression of adults, morgue photos and all the facial approximations with skeletal remains. So it's what we do all day, every day. Most larger law enforcement agencies have a composite artist, but necessarily not a forensic artist. So if you want to do this from my perspective, after 23 years and it's behooves you to be a fine artist first. You can specialize in composite sketches. You can specialize in facial approximation; you can specialize in a few different disciplines in the forensic arts field. But so get a degree in fine art. So like painting, drawing, sculpting, that's where my background came from, a degree in fine art to graphic design so that included learning Adobe Photoshop, for example.

Jaclynn McKay [00:30:15] Thank you, everyone, for your insight. Before we close is there anything else you'd like to tell our listeners or any closing remarks you'd like to leave them with?

Katharine Pope [00:30:24] I guess if there are people listening out there that have a loved one missing that they haven't seen them, please go to your local police department and report them missing.

Jaclynn McKay [00:30:33] Kat, Bruce and Joe, it has truly been a pleasure speaking with you today. Thank you so much for your time and for sharing your knowledge with all of us.

Katharine Pope [00:30:41] Thanks a lot.

Dr. Bruce Anderson [00:30:42] My pleasure. Thank you.

Joe Mullins [00:30:43] Mine. I appreciate the opportunity.

Jaclynn McKay [00:30:45] If you enjoyed today's episode, be sure to like and follow Just Science on your platform of choice. For more information on today's topic and resources in the forensics field, visit ForensicCOE.org. I'm Jaclynn McKay and this has been another episode of Just Science.

Voiceover [00:31:04] This episode concludes our 2022 Applications of Forensic Science for Human Identification Season. Tune in for the next season of Just Science, which will cover various topics on human trafficking. Opinions or points of views expressed in this

podcast represent a consensus of the authors and do not necessarily represent the official position or policies of its funding.