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Tim Lightfoot. Hello and welcome to the weekly edition of the Huffines Institute For Sports Medicine and Human Performance Podcast. We're so glad that you took the time to download us and that you're taking the time to listen. Every week we bring you another interesting person in the world of sports medicine and human performance and today we have another one of those interesting individuals. We have Dr. Chris Chesky from the University of North Texas with us. Welcome to the Podcast, Chris.

Chris Chesky. Thank you, Tim.

Tim Lightfoot. We're so glad to have Chris on. I'm going to tell the audience a little bit about you and why we have you on. There's a new initiative in the sports medicine world called Athletes In The Arts and it's actually an initiative by Dr. Randy Dick and Indianapolis and Dr. John Snyder down at Loyala, working to bridge the gap between sports medicine and the performing arts since there are so many similarities between the two. And while we've done here on the podcast performing arts podcast in the past with different folks, we are going to do many more this year and, and recognition of this initiative. And Dr. Chesky kicks us off today. He has his master's and doctorate degree from the University of North Texas, he has studied music therapy extensively in the past and also in the area of hearing loss. He is currently an Associate Professor at University of North Texas College of Music and is the Director of the Texas Center of Music and Medicine. And again we've asked Dr. Chesky to come on to chat a little bit while he's…oh before we go on I should say that really a high accolade for Dr. Chesky, he won the 2010 Safe and Sound Excellence in Hearing Loss Prevention Award from the National Institute For Occupational Safety and Health. So we're really glad to have you on, Dr. Chesky.

Chris Chesky. Thank you. I'm really glad to be here.

Tim Lightfoot. Super. So, so let's start with, let's start with an obvious question that society often has and then we'll jump into some other things, especially relates to music. There's so much concern now about young people in the volume of the music they listen to. Is there a chance that we're going to have an epidemic of these folks when they get a little bit older having hearing loss problems?

Chris Chesky. No that's a good question. Yeah there certainly has been a heightened concern for noise induced hearing loss among youth given the development of various technologies that allow access to loud sounds at a whim. The National Institute Occupational Safety and Health, the CDC in general, has been addressing this. In fact, I think it was in 2008 they hosted the first NIH funded conference on children in noise induced hearing loss as it relates to leisure activities and I attended that on behalf of the sort of the music education sector. So I don't know if it's epidemic but it is a public health concern, it does show up in most agendas that the CDC is pushing as noise induced hearing loss is a widespread serious public health concern. My focus

has been primarily on preparing those people for participation in the career of music or the profession of music either as a teacher or as a performer or as a producer is those folks are, in many cases, at the front line of prevention. So, for instance, if a child is in third grade or fourth grade music class we hope that they'll have at least one experience where they get an opportunity to learn about these issues from their music teacher and hopefully through that mechanism kids will be a little more concerned when they do use their iPods and ear buds or listen to musical activities or any kind of sound related stuff at home whether it's TV or video games or whatever.

Tim Lightfoot. And that's what everybody thinks about is these kids listening to music and it's too loud. But one of the…and one of the things that I didn't say earlier is that you made your living as a professional trumpet player and you are a heck of a trumpet player I can attest to that. And so you really also come at it not only from the music listening side but also from the side of the musicians as well.

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Chris Chesky. That's correct. My performance career is give me all kinds of opportunities to see the reality of the workplace, the occupational workplace of the working musician and unfortunately even though I've been educated in excellent music education programs from grade school all the way through the doctoral level in music, never during those years was I introduced to the idea that this should be a concern for me or introduced to the idea that I need to be, as a musician, aware of the effects of my music making on the hearing health of audiences. And then maybe more importantly never told that I need to understand and be competent in managing sound levels as a music educator. Somebody who's actually teaching kids perhaps in an ensemble in a public school so that, you know, and talk about the athletes in the arts initiative so the analogy would be having a coach manage a team in a way that reduces hazards to the muscoskeletal system, for instance. Well that kind of thing is just now starting to emerge in the music education world where we can think the music teacher should be aware and competent to manage music related activities so kids aren't put into risky situations and particularly as it relates to excessive noise exposure. Yeah.

Tim Lightfoot. Well you just brought up a whole ton of things that we could, I guess, unpack. I guess the first one that I'd like to really I guess unpack in this case is the idea that musicians are putting themselves at risk. I think many of us, especially during music…and you're talking about music lessons and music education…I think many of us think of the one-on-one music lessons where it's a piano or just one instrument. And many people may be scratching their heads going wow I'm at risk of hearing loss from that. But you're really talking about the ensemble, the group setting, aren't you?

Chris Chesky. That's correct. So I'll give you some example of what we're talking about. The research literature on this is very scant by the way. Even though there are companies that market products directly to music schools and music education programs in the public schools, products

being hearing protection that's supposedly designed specifically for kids, even though these are marketed heavily with the idea that kids are at risk, very little, if any, Dosimeter studies have been done to establish the level of risk. So it's a little bit the cart before the horse kind of scenario. The National Institute of Occupational Safety and Health have very clear guidelines for establishing risk, even though they're not that suitable for musical context, the idea is that the first assess the hazard and if the hazard is sufficient for a concern than the…like if you were at a factory, try to modify the acoustics of the noise generating apparatus or administrate workers in an out of a hot spot on a factory floor and then the last resort put things over or inside of people's ears to protect them from the sound. So in the case of music schools or in music education scenarios in the public schools, very little has been done to actually document the level of noise generated in the ensemble experience for these kids. Until…I think it was in 2007 and 2008, I did a massive research project here at the University of North Texas in our college of music. Over the course of an academic year we measured sound levels generated in over 630 different ensemble scenarios. So these are classes. These are not performances and not rehearsals. These are those classes that a child takes or college student takes to get credit and the whole idea is that inside of these ensemble based educational activities the kid would learn how to perform their instrument. So when we measured noise levels in these environments, over 40 percent of these situations, mostly 50 minutes in length, exceeded 100 percent of allowable noise exposure deemed appropriate by the National Institute's Occupational Safety and Health. So that was the first time that we had a large data set showing that this was a major exposure concern that if it was in a factory or some other OSHA regulated environment would be deemed as in need of a response for sure.

Tim Lightfoot. Wow. And they'd be exposed to that to about 15, 20 times a semester.

Chris Chesky. Oh no. Maybe…we need to think about it at a daily basis. So this is going into jazz band for 50 minutes and then you might have orchestra and you might have marching band. You might have a sectional, you might have your independent practice time, you might have a gig at night, you might have some music listening obligations for your theory class.

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All of this is cumulative over the day. But the point that we're really focused on is that when that kid goes into that ensemble class, the responsibility for those levels resides in the teacher or the conductor. Just as if a kid goes out onto the athletic field and is told to do something, the responsibility to prevent an injury, all right, rests with the teacher. And so our field is such that we haven't acknowledged these risks historically and we certainly haven't yet prepared our teachers or our maestros or our conductors or our ensemble directors, whatever you want to call them, we haven't prepared them to not only be aware that these things happen, but also understand how it happens and then to develop a competency so they can manage the risks so that the kids can learn in a safe environment.

Tim Lightfoot. Wow. So let's talk about some quantization here. Most people are somewhat familiar with volume levels or sound pressure levels in decibels. So what are the limits and what kind of volumes were you all seeing in the ensembles?

Chris Chesky. So if you were to take out your app on your iPhone or a sound level meter you might be able to determine what in any one instance the decibel level is but that's not really that useful for determining whether or not it's hazardous. The hazard index which is considered based on what's called the equal energy hypothesis, meaning that regardless of the type of ordering of sound. In, of course, music we have huge variations over time, it's the ultimate or the overall exposure that a person was exposed to over time and this index is a time weighted averaging of sound pressure levels and the rule of thumb or the widely applied metrics for threshold of exposure is the equivalent of sound to an 85 dB level over an eight hour period. And so if somebody was going into an environment and was 85 decibels sustained for eight hours they would reach 100 percent of allowable noise exposure for a full eight hour day.

Tim Lightfoot. Wow. So that seems like a lot.

Chris Chesky. Well it's not that much.

Tim Lightfoot. Okay.

Chris Chesky. Eighty-five decibels might be equivalent to your home blender on your kitchen counter.

Tim Lightfoot. Okay.

Chris Chesky. But the thing that people don't understand is that every three decibel increase on the decibel scale the intensity level is doubled. So if you were to exposure yourself for 88 dB for four hours you would get the same amount as 85 over eight hours so half of the time because of the doubling of the intensity level.

Tim Lightfoot. Right. I know you've done some work looking at hearing protection and does some of the hearing protection that's touted by some of the companies out there from musicians, did they actually work and that's a fascinating story that involves threats of lawsuits and a variety of other things. Do you care to share that with people?

Chris Chesky. Sure. I'm delighted to talk a little bit about this. One of the interesting phenomena historically is that patents and trademarks and products were developed prior to the general awareness within the music community of these concerns. There's a company called [??? 00:13:42] Research and its President, Mead Killian and others had patented what they call the ER-15, 20…oh actually ER-15 and 9 and 25 which are a custom fitted so called musician plug. They did this over 20 years ago and there was another patent with Mead Killian and Elliot Burger, who's a researcher on hearing plugs and they developed a non-custom plug and labeled it as appropriate for musicians. These products are again highly adopted by the audiology

community and in many cases considered a first line defense for musicians seeking some kind of audiologic assistance or they may go to the clinic and say gee I'm a musician at school and I need something. I'm worried about my hearing. The audiology community, because they've been exposed to this for so long, believe that these products do something special for the musicians and therefore the cost is justified.

Tim Lightfoot. Right. I mean one of the claims is that there's no distortion when you use these things, right?

Chris Chesky. Right. So over the years and particularly after the European union instituted a regulatory statute that covered music, which it does.

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That came into play in 2008. It's sort of like if the United States did that OSHA would all of a sudden start regulating all musical activities, concert halls, music schools, etcetera, etcetera. Well they do that in European union. When that regulation was being developed several scientists across the European union were interested in the use and adoption of hearing protection. So if several very large EPI studies were done questioning musicians about these products and there's a general conclusion that came from these studies which is to say that musicians do not like wearing these and, in fact, wearing them is quoted in one paper as being more…the problems with wearing these kinds of plugs are more problematic than the fear of having hearing loss. And because of that I started thinking a little more about this and started to wonder why or if we should tell music students to spend $200-$300 on these products as opposed to pennies on other types of hearing protection. Are these things really that much more valuable? And the primary claim that's made is that these provide a lowering of the sound levels in a way that the music sounds normal. So we did some studies here at U&T. We did a large study on the ER-20 plug. It was published in the International Journal of Audiology a few years ago. But we had subjective responses from many, many students across instrumental type and the outcome of that study was consistent with what the European studies reported which is that these things are not comfortable, they cause the music to sound different, the musicians have a hard time communicating musically, etcetera, etcetera. And then we really were interested in this idea of what actually happens to music when it's processed through these plugs? So a colleague of mine here in audiology, [Amen Emlony? 00:17:11] and I set up a research lab specifically to objectively evaluate the acoustic thru-put of musical source materials inside of a [kemar? 00:17:22] artificial mannequin head designed to make these kind of measurements and we found out that the music is, in fact, very distorted from a spectral standpoint inside of this particular research paradigm. So we used music that our students have generated on assembles and measured the sounds inside of this fake ear canal with and without these different plugs and when we put in the ER-20 plug we noticed that much of the low frequency was going through the plug unattenuated resulting in a much different attenuation level that's marketed…that's showcased on the marketing materials.

Tim Lightfoot. So it's like somebody turned the bass up.

Chris Chesky. Yeah. There was hardly no…any attenuation into low frequency. And then we did the custom footed plugs. And the custom footed plugs are custom in that the size and shape of the piece of plastic that goes in your ear canal is designed or it's made from a mold of your ear canal. But the critical feature that used to make the claim that these things provide a flat attenuation is the boar inside of this plastic piece which is not custom to each individual so everybody has a resident frequency that's unique to them and there's generalities about that. So the boar is a generality so it could be different than your normal frequency response of your canal. So anyway we studied these plugs. We found out that they were providing the protection consisting with what the rating of these things is noted as on the marketing materials but the feature that would cause a musician to pay this much money for this product, which is to have this normally sounding music, was not found. Found great distortion in the music and we found that across the different filter types. So anyway, over the 20 year history of this product only a few people have been involved and it's those people who are either patent or trademark holders of these products. And then a couple people who have been funded by the companies are pushing these products and nobody's come along and actually measured them using these kinds of techniques. And one of the problems is that the measurement protocol for attenuation labeling of an earplug is used to claim that these things sound normal when music is going through. But it's got nothing to do with music. This test protocol was never intended or validated to be used for this particular purpose.

Tim Lightfoot. Right, right.

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Yeah. So it's opening up a little bit of a controversy in the hearing conservation world and it's certainly showcasing the need to have more accountability within these products, more aggressive research protocols to help us understand what works for musicians and hopefully regardless of being threatened with lawsuits as you said, universities will pursue this kind of work because it's very much needed.

Tim Lightfoot. Because you all have been threatened by the company with lawsuits if you continue this research and continue presenting it.

Chris Chesky. That's correct. We, after I presented our initial findings at the National Hearing Conservation Association meeting we were sent…actually the chancellor and dean of the college of music and myself were sent a cease and desist notice by a law firm and told not to present this, including upcoming presentations that we did do at the American Academy Audiology Conferences and Performing Arts Medicine Association conferences, so we've been out there trying to inform people and preparing publications on this and our university is standing behind the credibility of our research and believes that this type of corporate bullying is inappropriate at this particular time or any particular time as it has to do with academic research and so hopefully

people will take note of this and consider these products accordingly and hopefully the field takes a turn and starts researching this on behalf of musicians.

Tim Lightfoot. So if you…I'm going to ask you about your recommendations here and then we're going to talk a little bit about how you got into this whole area. So if you have a parent of a music student that's listening to this, what kind of recommendations would you give them for…is there a good hearing protection device or devices that they can use or should they be more concerned about making sure the sound pressure levels are down at appropriate levels when they're performing or in ensembles or what do we do? How do we take this home and apply this?

Chris Chesky. Well in the music school sector I think the emphasis should be on ensuring that the teacher understands what the levels are. One of the agendas that we have ongoing here, in fact it's now an accreditation standard to inform all music students at the college level, including those who go on to teaching professions, that they, upon exiting their degree have a level of knowledge and competency to manage sound levels in an environment, in educational environment. So we hope that sort of takes hold as a cultural shift in the music education community, but at the same time, there are situations where sound levels, excessive sound levels are maybe hard to mitigate, for instance, in a marching band situation. And in those cases as I tell all our students here, it's always beneficial to have some hearing protection in your pocket or in your gig bag or your instrument and it's easy enough to take out your iPhone and get a sound level app and just get some ideas to what the levels are and if it seems to be excessive, reach into your pocket and grab a nice, comfortable foam earplug that you can buy at CVS or Wal-Mart in bulk and dispose of when you're done in the soft nature of these make it much easier for especially a wind instrument or a singer whose jaws moving, to feel comfortable with this thing in their ear canal. The custom fitted plugs are really stiff so if you take a big breath and you're playing a trombone and you open up your mouth your ear canal shape changes and it really hurts. So the nice, soft, comfortable roll up ones that you can put in your ear canal with probably a minimal amount of protection so you still get some sense of what the sound is like, I think that would be good advice. And then of course when a student is practicing or doing whatever else that they're serious about music, they should consider all the other noise generating activities as potential harming agents to their hearing, like mowing the lawn or riding a motorcycle or going to a car race or a monster truck show or going to an athletic event where you have a big dB meter up on the ceiling telling everybody to scream and yell. These kinds of scenarios should be important to any budding musician or a parent with a child and they should have hearing protection available for that.

Tim Lightfoot. And like you said, it's really cheap. Those little foam plugs are cheap.

Chris Chesky. Very, very cheap. You can get them for pennies. You can buy them in bulk and after you use them if you've been on a sweaty gig or whatever, your hands are dirty you pull it

out and put it in you don't have to worry about reintroducing that bacteria or the stuff from the dirt back into your ear canal. Just throw it away.

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Tim Lightfoot. Yeah. So let's shift gears just a minute here and the last few minutes that we have. You had and you still have a successful career as a performing musician. What made you think about get into the medical side?

Chris Chesky. When I was a…in high school actually I was very interested in physics and acoustics and started off my college career at the University of Hartford as a dual engineering music major and that point in my life it's a pretty extreme exposures to health issues particularly with one of my brothers who was diagnosed with cancer in his leg and within a week of knowing this was going on lost his leg. He's a survivor and…but just to see that for the first time in my life made me wake up to a lot of issues and sort of way those years I moved into music exclusively. It was such a passion for me and such a draw and I think to help me deal with the emotionality of experiencing my brother go through this. And as a musician I've been out there doing pretty much every kind of gig one could imagine and through that lens I've experienced all kinds of hardship among my peers just due to the lack of preparing for a career in music, the realities of the economics and the career trajectories are just very, very difficult things to witness when somebody's not fully prepared. So I've had a heart to address that issue. So when I got to U&T and I started getting serious about my graduate research I was exposed to the research process and I started working in some very large churches here and I saw another way that music had a very serious impact on people outside of entertainment which was most of what I was exposed to. This was something different and I started thinking about the power in music and exposed myself to music therapy and very involved with that. And for my dissertation I was studying the effects of vibratory stimulus generated from music on pain processing at the spinal cord patients with rheumatoid arthritis so in those years I was…I had a lab at the medical school at U&T and I was working with neurologists and physiologists and engineers and just a very multi-disciplinary experience which I truly loved and still do today, and started seeing how music had a very positive effect on people who have serious health conditions. And around those days one of my former professors at U&T asked if I would come in and start teaching research to graduate students and at that point in time the university asked me to come in and start developing a new agenda which is to focus on health problems related to music learning and performing. And they gave me the green light to start this center in 1999 and we got some initial funding from the Grammy's and early in the past decade was part of the center. We got some funding from National Endowment for the Arts and some other organizations to really launch a national dialogue about how we should be preparing our music professionals to deal with this stuff. Bring us to where we're at today.

Tim Lightfoot. And you all are…I think your center is probably one of the few in the world that's focused on health of musicians, isn't it?

Chris Chesky. That's correct. Yes. And specifically on the prevention side of it. There are places that have resources for responding to existing injuries for instance, whereas, we're really trying to focus on the life cycle of the person involved with music and just trying to intervene as soon as possible through good education and prevention tactics. Sort of like a health promotion, health education approach.

Tim Lightfoot. Yeah. We're finding that we're running out of time here Chris. It's been great talking with you. And as we do every week, we're going to ask you to give a take home message for the audience.

Chris Chesky. Well the take home message is that the general public needs to understand that musicians, at all levels, are highly understudied and unfortunately very underserved. So unlike many professions and occupations out there where people have thought about opportunities for the profession to understand its unique occupational health and safety issues, the music profession has not done a good job at all where it's at historically. We value the music that we make, the traditions that we have, but we have not really focused on the well being of those involved in this profession and that's very unfortunate.

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So the take home message is to think about these people who get engaged in music and just try to encourage the local school boards, the band directors to start thinking about these issues and to be connected with the national trends towards accountability and competency to manage music activities so that they're just better off and have less injury rates and so on and so forth.

Tim Lightfoot. Great take home message. Musicians are people too, right?

Chris Chesky. That's right. That's right.

Tim Lightfoot. Well Chris thank you so much for being with us today and we're going to take just a moment and give everybody our podcast question of the week.

Kelly. What every day home appliance produces a sound level of 85 decibels?

Tim Lightfoot. Be the first person to email us with the right answer and you'll get one of our new nifty third edition podcast tee shirts. That email address is Huffinespodcast@hlkn.tamu.edu. Again be the first one to send us an email to that and you'll get that nifty podcast tee shirt. So again Chris let me thank you on behalf of the audience for being with us today and taking time out of your business schedule.

Chris Chesky. My pleasure Tim. Thank you.

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