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Combined Training for Weight Loss

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Carolyn Smaka: It is my pleasure to welcome back and introduce Dr. Amy Ashmore to PhysicalTherapy.com. Dr. Ashmore holds a Ph.D. in kinesiology from the University of Texas at Austin. She is the author of "timing resistance training -- programming the muscle clock for optimal performance" which was published in 2020. She's also the author of dozens of articles, blogs, training, and continuing education programs recognized by National Strength and Conditioning Association, Collegiate Strength and Conditioning Coaches Association, American Council on Exercise, American College of Sports Medicine, Board of Certification, and most state boards of physical therapy. Amy is a former sports sciences faculty at Florida State University and former program director for Sports Sciences at the American Military University and she's located in Las Vegas, Nevada. Thank you for returning to PhysicalTherapy.com and presenting for us today. And at this time I'm going to turn the microphone over to you.

>> Dr. Ashmore: Okay. Hi, everyone. Quickly, can everyone hear me? That would be number one. Yes, okay. Good. Don't want to be talking in an empty room alone out here in Las Vegas. So thank you very much, you guys, for joining us today. Especially me. One thing I do want to say up front is if you do have a question go ahead at any time during the presentation and type that question into the Q and A box, and I will answer those as we go along. My hope is that this will be interactive, and this will also be fun information that you all can use immediately in your own life as well as with your clients. So our topic today is combined training for weight loss. I am Dr. Amy. We're going to move forward. I will give you a second to read this disclosure. Just in case you have any questions on that. And we'll go ahead and move on forward. So the first thing we want to cover is our learner outcomes. So after this course, my intention is that you will be able to design at least two effective combined training programs. The second objective is that you will be able to suggest at least three modifications using current research about combined training to exercise sessions and program design. The third one is that we'll develop at least two combined training programs using plyometric supersets,

cardio strength supersets and circuits. Those are just training methods. Finally we'll look at suggestions for at least two exercise sessions and programs for a variety of client fitness levels and abilities. One thing to keep in mind throughout this session is that we are talking about general fitness and/or weight loss. A lot of my work centers around performance. So athletes, elite fitness enthusiasts, recreational athletes, those kind of things. Today we're focusing more on strictly general fitness. The some of these things we're going to be thinking about is people over 40, we'll be looking at that, where performance becomes less of the focus and general fitness becomes more of the focus. Another thing I want to mention up front in our vocabulary is the terms "combined training" and "concurrent training" are synonyms. Unfortunately throughout the research and in practice those two words get used interchangeably. So combined and concurrent are the same thing. In terms of our outline and where we're going to go today, we'll start with defining combined training. So what is this combined training, what does it look like in the gym?

We'll look at interference phenomena, because the entire debate around the efficacy of combined or concurrent training and where we get at, okay, we're dealing with fitness, general fitness, and we're dealing with sports performance perhaps. When it comes to combined training, general fit Florida is positively effected and we'll look at why per the interference phenomena. Then we'll get into the practical applications and to designing sessions. We'll go through a step by step simplifying it, making it easy, making it fun, go through suggested exercises, some modifications, variations, that kind of thing. Then we'll look at sample programs. That I developed and use throughout my work. And how you can use those as a template or not, and build some programs. Then we'll look at modifications and the last thing we'll look at is timing considerations. Circadian training is all the rage now, and we'll get into that and spend some time on that, and even have an interactive quiz for you guys to do just for your personal information and enjoyment. So number one, what is combined training? It's imperative to define the mode of training up front. Essentially and very simply, combined training is doing multiple modes of

exercise in one session to achieve fitness goals. Now, if I were going to expand on that a little to be reasonable, multiple modes is typically doing a cardiovascular workout, a strength workout, and a flexibility workout within one session, and that's typically 45 minutes to an hour, and then when we talk about fitness goals, again, this is not a prescribed method of training for sports performance, athletes, elite fitness enthusiasts, this is general fitness and in particular combined training as we'll see, is really effective for weight loss. That tends to be where it shines. So why is there even a debate on -- to do or not to do combined or concurrent training? Interference phenomena is the molecular confusion or competition at the level of the muscle that occurs when you do more than one mode of fitness within a very short time frame. And remember, at the end of this we're going to get nit picky on some timing considerations. But for now, what we're thinking about, is if you were to sit back and go off into space and think about what do you typically see in a general gym like Planet Fitness-typesetting?

You will typically see people come in, check in, get on a treadmill, an elliptical, bike, some mode of cardio from anywhere from five to 20 minutes, after they've done that, they will go and weight train for up to 30 minutes, and then hopefully if we're lucky, they'll do some type of flexibility work. But the two competing modes of exercise that are particularly important to us that relate to the interference phenomena are cardiovascular endurance training in particular, through the en-- I threw the endurance because research shows the longer this cardio is, the worse the effect on strength gains. So at the molecular level, when you think about your muscles, at a molecular level, they have an innate understanding of the difference between cardiovascular exercise and strength exercises, and the adaptations, muscular adaptations to those different modes of exercise. So what happens is they're not helping each other. They're independent and they're conflicting. That's the key. And that's where the interference comes in. This cardiovascular exercise at a molecular level interferes with strength gains. So at a molecular level, different modes of exercise compete. Yes. Skeletal muscles can recognize different modes of training. And again, those adaptations, there's

biochemical, there's physiochemical adaptations within muscle fibers differ between sustained contraction associated with cardiovascular endurance exercise, and short, finite contractions that have a beginning and an end point under tension associated with strength outcomes. Now, timing is the key here. And this research dates back actually to the 1980s when we first figured out, wait a minute, in athletics, if you have an athlete who is doing tremendous amount of cardiovascular exercise, his or her strength is adversely impacted, and why.

So we know the muscles get confused. Then the key becomes when we're talking about concurrent or combined training, well, what's the time frame here? It can be anywhere -- you need to say, if your goal for sports performance was ours or not today, but I do want to review interference theory because it's the premise behind combined or current training, or the dilemma, I should say, you need to leave six to 24 hours no less than three ever between doing cardiovascular exercise and strength exercise if you want to have both adaptations.

So that's for you personally, or if you're working with someone who has more performance-related goals. Refer back to this slide just for those very, very basic timing considerations. So now, what are the mechanisms? So why does interference occur? We've kind of started talking about a couple of these. We won't go into great detail because this is not the focus of our presentation today, but I do want you to be aware of them. Number one is contractility. If you're doing cardiovascular endurance training, you're jogging, cycling, elliptical training, and you're doing the same contraction for, say at least 20 minutes, and then you try and do heavyweight lifting, you're going to have a contractility issue. The muscles won't be as effective at contracting. We all know when we train harder or longer than we're accustomed to, or differently, in fact, we're prone to get delayed onset muscle soreness. Now, at its fiber level, of course, that is the direct result of microscopic tears that of course then in the end repair and lead to those stronger muscles. However, if you experience DOMs and you try and do an immediate

other form of exercise, you're going to have not only your structural deficit, you're also going to have possibly protein substrate deficit as a result of related to that DOMS and other biochemical deficits. So those first two are contractility and DOMS. The second two are hormonal. You have testosterone levels. When a person does prolonged period of endurance training, testosterone levels decrease. Well, that is extremely important because we know we need, especially in men, increased testosterone levels to really see the strength gains that we want to see in the muscle mass improvement gains. The other thing, the other two hormones to really -- are cortisol and blood lactate levels. Cortisol, as you know, is your flight or fight hormone. So if you get into a scary situation, cortisol levels are going to increase exponentially to help you get out of that particular situation. What will happen during exercise is because exercise in and of itself is initially a stressor on the body, cortisol levels increase.

But then what happens is over successive sessions of exercise, cortisol levels will decrease. And that's how you get in the end ultimately the positive benefit of exercise on stress. But initially you have that cortisol and blood lactate levels, the increase, that are actually negative to strength gains. Or muscle mass gains, or power gains. So those are your four mechanisms of interference theory. Again, concurrent training effect, CTE, which remember that's our -- another word for combined training in the literature, in a -- I tend to find CTE more in sports performance literature than other literature, so I think combined training is more likely to be seen in fitness. CTE is higher for conditioned persons and athletes. That's really important. Now we're starting to get at, why is combined training effective for general fitness and weight loss, and not so effective for conditioned persons and athletes? That interference theory, that learning that muscles can incur seems to be greater in training persons verse untrained. Which makes sense, because we know that muscles have a memory for not only the movements, but also for the type of exercise, etc. So we would expect to see in conditioned persons different responses. And that's across the board to most things. So I've said this repeatedly. The bottom line is strength gains are negatively impacted by high-up density cardiovascular

training. It is what it is. Endurance training works against muscle strength. Again, this is 2000, so we've known this for 21 years. We hadn't exactly known why, and we haven't exactly been able to get -- we're just now getting into those molecular mechanisms and into those training sessions. Again, the research, this was I believe a review study showed us that general fitness and weight loss are most positively impacted by combined training. A lot of that is just reality. When most of us go into a gym, we want to get the most bang for our time that we possibly can, and most of us don't have extreme performance goals. So we go in and we want to get a little bit of cardio, a little bit of strength, and a little bit of flexibility. DOMS is delayed onset muscle soreness. Back on this slide I think is what being referred to.

Delayed onset muscle soreness. So going back to combined training, therefore, programming for strength and/or muscle power will look differently than programming for weight loss goals. For sure. And we know that. We know that. And it's two completely different populations. So on designing sessions. On these I'm going to go through some basic steps. And these aren't going to be anything you haven't seen before, or anything like that. They're just -- it's just a template for us to use today. Now, again, this is -- since I started my career, which is a long time ago, pretty typical. We've always done this.

Warm-up and cardiovascular training will last for 5-20 minutes. We'll do strength training, 15-35 minutes, and we'll hopefully do flexibility training, back in the old days you didn't see much flexibility training, but people are getting better at it. Especially understanding of course that a slightly stretched muscle generates greater force than a short muscle, so that was one way we were able to sell it to people who were a little bit apprehensive or just don't want to do that flexibility training. I know you guys are familiar with this, but just for this sake of operationally defining our variables that we work with, I always go through these to make absolutely certain that where I'm at is where you're at. So we have five variables that we work with in any training setting. Those are going to

be your mode, your duration, your frequency, your volume, and your intensity. As rest and recovery have become extremely popular, as of recently, especially, we cover them not as their own entity, but rest is a schedule program variable as a function of frequency, duration, and volume. We'll talk about rest and recovery, but not as its own programming variable. So again, when we look at these general fitness settings, we're looking at our cardiovascular, strength, and flexibility. And they're typically done in that order. Some people, it's always the great dilemma or the great caution I've shown you, cardio or strength first. In general fitness sessions the answer has been cardiovascular first, because we utilize it as a warm-up, but also in most general fitness settings, people are not lifting weight heavy enough that safety is the paramount concern. Now, if we were in a power lifting setting, or even an athletic training facility, where strength and power outcomes were the intended field, we're going to program differently. And we're not going to do that before we get on a weight training floor.

So your duration is your total length, and the paradigm that I work in is 45 minutes -- excuse me, 45 minutes -- that is right -- 45 minutes to 60 minutes. And each session component also has a timing factor as well. The frequency is how many days per week. And also if you were working in -- you would have within days, one or more session a day, and that's why remember when we went on that other slide and we said six to 24 hours, no less than three, that's where you get into those timing considerations to avoid molecular confusion. Your frequency accounts for your rest days and your recovery. Which are paramount to success in training. However, in general fitness settings, rest is important, but it's flu shot going to be the variable that it's going to be in performance settings. So when we talk about strength and we talk about the amount of strength that we're doing, I work in a set and repetition paradigm. That simply means how much weight training the person is actually doing. In cardiovascular, it can be a distance, but for us typically in a gym setting, or a 45-minute time frame it's going to be a time setting, it's not going to necessarily be a distance setting. A lot of people, including myself, will say I'm going to run three miles, or five miles, in whatever time

frame I can. But typically in gym settings we're working in a time paradigm. So the intensity of course is how hard someone is working, and again, when we look at general fitness and we look at weight loss, the intensity tends to be on the low to moderate range versus when we're looking at performance, we're looking at moderate to high. Your external weight and your body weight are your two predominant sources of manipulating that intensity or how you use your body weight, and then your speed or velocity of muscle contraction, or on a cardio machine in that case. But that would mean plyometric strength training. So cardiovascular training, and again, in a lot of my work, my editors will add cardiovascular endurance training in between there. And the typical reason is because typically cardiovascular training is associated with muscle endurance, and with getting some type of endurance parameter or out of it for the cardiovascular system.

So it's typically flu shot a real short, but more of an endurance. Unless we're doing HIIT which is a whole other variable or mode of training. Step one. When you look at designing programs for yourself, or for general fitness and weight loss, one of the things that's -- that you'll see is -- we'll choose a mode, and people may choose to do 20 minutes on the treadmill, elliptical, whatever that may be. A way that we will increase the interest, especially for people who are not that interested in exercise, which I think for a lot of us kind of goes over our head because obviously we like it a great deal, but not everybody else does, and that's fine. Especially gym-based exercise. So a best practice is to use three to five-minute microsessions on two or more machines to vary the mechanics and the loading forces. So if you are in a gym, you would typically have access to these three types of machines. And that would be a bike, or recumbent bike, an elliptical and treadmill. What we'll do is utilize three to five minutes on -- you know, five to 10 on two, however it may be, and what that does is it not only increases the interest, hopefully, but it will vary your mechanics, which varies how the muscles work, and it can vary your loading forces. If especially you have someone who is struggling with weight, where you don't want to load the joints for 20 minutes, walking, which of

course if someone is obese, walking mechanics have changed, and the loading forces are heavily acting on the ankles, for example. So you might want to do just the recumbent bike, and the elliptical training. Something along those lines. But there's no harm, no foul. In playing with this and keeping that level of interest there. Set your goals for your duration up front. Have a game plan when you come in of, you know, are we doing a warm-up, which is five to eight, to maybe 10 minutes depending on the client, or are we actually going to do some cardiovascular training and go for the 20 minutes? And remember always that your duration is inversely related to your intensity and your frequency.

But in particular, within a session, it's that duration is inversely related to that intensity. And that's going to be based strictly on for general fitness, participant fit Florida level. I would say three to five minutes is enough for warming up. Now, there's some caveats on that. A lot of that goes with time of day, so we know that muscles are their body temperature peaks around 4:00 p.m. and muscles are the most pliable 4:00 to 6:00 p.m. What that would mean is if I'm in a gym at 4:00, I can get away with way less warm-up time than I can at 5:00 to 6:00 a.m. Where I would recommend because body temperature's low, muscles are not at their peak viability, we need to induce that, that you had a longer warm-up time.

Now, the other caveat is related to outside or ambient air temperature. So we know for those of us who live in Las Vegas where it's 110 and just to get from the vehicle into the gym is a feat of physical fitness, we don't need to warm up as much as persons who are in cooler weather climates. So I would say three to five minutes late afternoon in warmer climates, take it eight to 10, colder weather climates, and earlier in the day. Sorry, Pamela. She says we can't see the questions asked, so please read the question aloud before answering. I will make absolutely certain that I do that. In the last question was just simply do we think three to five minutes is an adequate warm-up time. Again, so step three, you're going to establish that intensity goal up front. When we get into

modifications we'll look at the suggested intensity for different populations. But I know in the gym this is not perfect or down to science. But we will be able to at least have some idea, even using rate of perceived exertion, breathing or talking test, something. Set the goal for volume. And again, that's going to be -- that's your duration, if you're doing cardio. If you're doing strength, the volume is going to be a little different. So that was just a brief overview of your cardiovascular programming. Here we're going to look more at strength programming, which of course opens up an entire universe of possibilities for programming. So to keep that universe small for our purposes of a two-hour event, what I do is, especially because we're talking about general fitness. So when we're talking about general fitness, we're going to want to stick predominantly when we're talking about strength training, with one or two paradigms.

The first paradigm is simple movements that are appropriate for most persons. However, I'm going to move past that and stick with a second paradigm, which is foundation lifts. And these are typically large muscle or muscle group exercises that essentially get the biggest bang for your buck while you're in the gym. So having said that, these types of lifts are also going to have the greatest effect on cardiovascular output as well, because they're going to be large muscle groups, so you're going to have a cardiovascular component there as well. For our purposes, what I do is I break these into four large groups.

Bilateral lower body lifts, unilateral lower body lifts, upper body lifts, and plyometrics. And remember, these are just suggestions. So examples of bilateral lower body lifts that are really good for general fitness settings and for weight loss, because remember, one of the things about strength training for weight loss is to increase metabolic rate over a life span, or just in general. You need to increase muscle mass. Well, those big muscles are the ones that are going to be the most effective at doing that. So we sit with weight -- excuse me, lifts like squats, front means that bar is loaded on the front of the body. A back means the body that's the bar is loaded on the back of the shoulders. And

overhead is an advanced movement where the bar is actually overhead with the arms and elbows in extended position. That's a very actually an advanced squat, and what happens unfortunately in overhead squat is the amount of weight that the lower body is subjected to is limited to what the shoulders can hold over the head. The modified dead lift, another word for that is a Romanian dead lift, so that's not your power lift. Your full dead lift. That's a modified just from the hip, that part of the deadlift. Another one is the seated leg press, which has a lot of great variations that we'll get into as well. So again, these are just suggestions. The possibilities are endless.

So here we have a sled leg press. I like this picture, but one of the things that I wanted to talk about here, if you look -- if you wanted to increase the efficacy of this leg press to its maximum and full potential, always make sure that your heels are in align with your knee. What that does is that makes sure that the force starts the press force starts at the heel, comes back down behind the knee and back down to the glutes. Otherwise, what happens, if you push from that knee -- excuse me, from that toe, that force comes back to that knee.

And that's just a very small thing I saw with this picture, and I did want to bring up, because it is something that I see a lot in gyms. Sled leg presses are magnificent for the muscles that originate at the hips. And since we know that the gluteus maximum is the single largest muscle in the body, and the quadricep, single largest group, to be able to isolate them in a relatively mechanically controlled environment where we can increase the weight according of course to fitness level, this is a magnificent exercise. But we do want to make sure that that force originates in that heel versus in that toe. Another thing that's -- that I like to do and that you can do to modify a leg press is turn -- once you get those heels where you want them and they're up in alignment with those knees, so you got that direct line of force, is turn your toes out a little bit and you will be able to innervate the adductors or inner thighs. Another thing is I tend to have people lean farther back, so I will have the sled back so that the sled has -- the seat backs or the

sled is coming down on them to really target the muscles of the -- that originate in the hip. So a lot you can do with a sled press. The only other recommendation I have is once you get a client, a fitness client in there, maybe somebody that's new, you're going to keep your weight pretty low and focused of course on your mechanics. But always ask them to press their low back against the seat. I've noticed that in doing so, it provides that lumbar support, and if they press back against it, they're less likely to use those lumbar muscles to press forward. Because you want this, and this, and this pressing forward. So I like that picture, obviously. So when we talk about unilateral lower body lifts, we're talking about lunges, this here, this can be a forward, static, or back. In that plane. Front, back plane. Now, the side lunge is literally stepping out back to center, stepping out, back to center. A Bulgarian split squat to me is a lunge with an elevated back leg.

On a bench. I think I have a picture. I'm not absolutely 100% certain, but I think I have a picture. We also can do one legged squats. These can be done under a Smith machine, which is my recommendation because the balance is controlled. If you do choose to do them free seating, I would recommend standing next to something that you can hold like a bench or a bar, a wall, if necessary, starting with no weight, getting your mechanics first, because these are really, really, really hard. They're also called pistol squats. And those are almost impossible, I think. But -- and then working your weight up. To including weights. So Doug asks, I am in my 50s, would like to work on weight training to lose weight, but I'm concerned about wearing out the cartilage in my knees. I don't know if I have -- do I see the rest of this, Doug? So we'll go with that part. Consider about the cartilage in my knees. Well, there are ways for people over 50, anyone, to utilize weight training that doesn't necessarily load the knees. Those are going to be seated exercises, this is if you're just starting out in weight training, or you have a client just starting out in weight training, I would recommend utilizing machines to start with. That's going to be -- remember when we first went into strength training and I said we can start with simple movements, I was referring to single-joint isolation movements for

the most part. So those are going to be things like leg -- leg extensions, so seated leg extensions for the quadriceps, knee flexion, so that's lying for the hamstrings. So lying prone, machine, knee flexion. You're also going to want to, if you're just starting out for weight training, you're going to want to do a single-joint exercise for most joints. So that's going to also include tricep pushdowns, bicep curls. If you are new to weight training, and you are worried about joint health, which I think most of us are, machines that take your body weight off of your joints are going to be a good place to start. You can also start with something like a leg press. But again, you're going to be doing that with lower weight, and the rule of thumb is always, if it hurts, especially a joint, then you stop.

The other thing that I suggest is you don't necessarily have to use weights. You can use bands, strength band training is wonderful if you're just starting. You can use body weight exercises until you get your mechanics down. So there's a lot of ways that we can utilize strength training but still not load joints. We also have lying exercises where you can do a lot of core, you can do a lot of low back, you can do a lot of hip. Just lying down.

Step up, if we go back to our unilateral lower body lift slide, a step-up is simply literally, stepping up on a bench, lifting the leg, back down. I have a picture of it. Again, these are just a few of the thousands of choices that we have. So this is somewhere between a weighted lunge, static lunge, and if we elevated that back leg, now we have Bulgarian split squat. You'll see that done, utilized on a bench, that kind of thing. Now, on the sled leg press, I saw some issues with knee and ankle alignment, on this one it's really magnificent. The ankle is right under that knee. And that's -- the heel is right under that knee. That's really what I want. This is the number one mechanics error that you will see with a lunge. Any lunge. Static, moving, any front or back lunge. Probably 70% of the time you see the knee push beyond the toe. Or you see the toe is visibly -- the point of force production. And that's just not what you want. You want those forces acting

opposite. So your ground reaction force, acting opposite of the force from the heel. Pushing right back into that hopefully not into the knee, but hopefully pushing back into the working musculature of those muscles that insert into that knee. The other thing that's really good here is her hips are completely facing forward. You don't want any rotation from the hip going backwards. That's actually a different exercise. But that's not what this is. And then that back leg, to be far enough back that you do have a little bit of stretch in that quadricep, that centric contraction is great. Here's that step-up. On this one I cannot ascertain off the top of my head if this is the actual exercise, or if he was caught right before that foot came off the ground or off the bench and that became a plyometric exercise.

Either way, to us, that doesn't matter. The key here is that this is a step up. And his is a really big exaggerated, clean step up. Some of them you're going to have the heel remain flat, the knee may not be as elevated as it is here. This is obviously an extremely fit person. So some really basic upper body foundation lifts are going to be barbell or dumbbell bench press, of course. Your cable machine row, which is a little bit more tough to handle your mechanics. Barbell or dumbbell bent-over row, and/or dips. Dips are going to be on the upper end of difficulty to control that mechanic. A lot of it is going to be shoulder flexibility, pectoralis major/minor flexibility if they can do that exercise correctly.

So these are some common plyometric jumps. We know that we need to build muscle fibers to really build the physique and the muscle structure that we want, and to completely round out a workout. Now, plyometrics are not going to always be feasible, especially for persons who are just starting exercise, for people who have osteoarthritis, for people who have weight issues that may compound loading joints. But these are some of the ones that are popular and the bi, or U, means bilateral or unilateral or the upper body is the UB as well. The squat jumps, the box jumps, the tuck jumps, the lateral pushoff, the Bulgarian jump split, that's really advanced, cycled split jumps, death

or plyometric push-ups and the Smith machine explosive press. All of these are pretty advanced. If you were going to start something with plyometrics, just start with a squat jump. That's on the ground, add a jump to a squat, don't load it. Box jumps are where I see people get twisted up. They don't get the height right, they don't land on the box and it can become really dangerous. So those I don't use too much unless a person has a really super high keen kinesthetic awareness so they know where their feet are in space, they know -- they're able to find the box easily. Let me see. So I'm asked, with combined machine and free weights, should we start with machines for safety then progress with free weights, or it doesn't matter?

My answer to that question would all be based upon the level of experience that a person has with physical activity in general. Machines are magnificent to control mechanics. However, they're not the end all, be all, because in some cases machines can put people in positions that are uncomfortable. Now, the other thing machines take out of the equation is the balance, the core work parameter, where free weights, of course, require inherently some degree of balance, some degree of interlimb coordination, so -- and some degree of kinesthetic awareness that you absolutely know when your mechanics are correct or they're not correct.

So if you are just starting out, I do believe that free weights are not the place to start. My two primary suggestions would be to start with machines and if possible to work a couple of times with a personal fitness trainer to help you choose the right exercises, get the right machine settings for you, because that's another thing, machines get complicated in the number of settings that are required for each person. To make sure that it's the correct seat height for you, for example. Etc. So you want to make sure that these are individualized. So working with a trainer is also a good place to start if you can. But in the end, your free weights will always have a degree of benefit due to that balance, due to that core work, due to that range of motion that's allowed, due to that ability to do plyometrics that machines will not have. So one of the things we also want

to make sure when we're adding -- we have strength work that we're always adding core work in there. It doesn't have to be the old-school thing where people work doing -- thought you were doing abdominals every day and assigning different qualities to the core muscles than they were to other skeletal muscles. But we do want to make sure that we're including them, we're focusing on them, plank is always a great exercise, so long as it's done mechanically correct. If a regular toe plank is too much the modified knee plank is always a good suggestion.

The bicycle crunch, the reverse crunch or leg raise, a Swiss ball crunch, a traditional crunch. If you notice, I added front squats here. The reason is because once you get that bar, this is obviously not a beginning exercise, but once you get that bar on that front part of the body, you increase the work that the core has to do during that squat. It changes the mechanics enough that even in some circles a front squat is considered core work. Here we have a side plank, I would just recommend on this where she is looking forward, which I understand it's a picture, that the neck and the head stay in the spine in alignment. For this exercise. Overall, this is a really good example of an advanced exercise.

You can also increase the level of difficulty, which most people do is put that back leg over that bottom leg so that you just have that one point of contact, and then you have so much more work in those obliques in those side obliques. Also, one of the things about yoga that people tend not to underestimate or tend to underestimate is the degree of shoulder strength that is required for a lot of the exercises that are done in yoga, and then are also included in something like a plank. So you want to make sure that if you're including these types of exercises where the only two points of contact are going to be the outside of the foot and the hand, that the shoulder would have that degree of strength to actually support that core exercise. So when we're starting out, we would probably drop down to knee on the ground for this particular exercise. But it's a good one. Now, this is a physioball crunch. They're popular in those beginning fits in

environments. Now, for me, oddly enough, I've always found that they strain for whatever reasons, my low back. And so be aware of that, but they are good for controlling those mechanics, the only thing that you do want to do here is just make absolutely certain, because beginning exercisers especially love to pull on their necks. So we have to make sure the head is resting versus being controlled and pulled. Let me go back, Gretchen, for side plank, did you say increased difficulty would be putting upper leg behind lower leg? Let me look. On this, Gretchen, take this leg, and put it on top of this leg. Because that's the point of contact there. So wherever you have those increased points of contact, you're decreasing the level of difficulty for the target musculature. Typically in an advanced setting we would take this leg or take this foot and rest it on top of that foot to decrease those points of contact. But again, that's all coming back to this. How strong is that shoulder? Umatilla always amazed at how many people come out of yoga with shoulder injuries, especially in the rotator cuff. We just can't underestimate.

You're quite welcome. So the crunch. This is a magnificent exercise that I truly believe does not get its due credit. When we consider a crunch, yes, is it basic? Yes. Is it beginner? Can be. Can you advance it? Absolutely. But can you more importantly include a ton of variation in this one -- in this one simple exercise? Absolutely. But what I really like it for, and I don't really know why the hands are here, although I know that I'll do that sometimes, but if you really want to do the correct mechanics, get those hands behind that head. And if you even wanted to increase the level of difficulty, you can extend the arms overhead, because that increases your lever arm, which is your distance from point of rotation to the end. Of the lever. So, again, that's just manipulating that -- those hands, that hand placement. Now, one thing I will always do in a crunch is tilt that pelvis up. And the reason that I do that or have people do that is to increase the workload in the muscles of the pelvic floor, because remember, when you're taking a beginning level exerciser, and you're saying, we want to ultimately advance them to free weight training, one of our limitations, of course, is core strength.

So by increasing the strength in an easy way, and increasing the cognizance of the exerciser and the aware Florida of that pelvic floor, you will help them to build that core stability, build that core strength, and be able to advance to those more difficult exercises. Because essentially, advanced or even moderate level difficulty strength training exercises are impossible to unsafe without that core strength. I think you're right, Nancy says perhaps the model could not resist putting her -- pulling on her neck when her hands were placed behind her head. So thumbs were placed on her temples. There's a lot of truth to that.

Like I said earlier, a lot of early on exercisers, they love to pull on their necks, if you tell them put your hands, but -- and there's nothing really wrong per se with this mechanic. It's just for me easier to see the full torso elevation if the hands are behind the head. So this can be advanced, and one of the things I like about crunches is you can teach people about muscles of the pelvic floor, you can increase the strength in that area, you can increase the strength in rectus abdominus but you have this great capability to build upon a crunch. It teaches people about their bodies, and it teaches people about variation and size. With a typical crunch, just working from the hip, you can do -- you can add alternating knee lifts. Chest-to-knee. You can extend the leg out and do leg lifts. You can do bicycle crunches.

So there's a lot of variation that you can include, you can do reverse crunches. There's just -- you can do elbow-to-knee crunches. So there's a lot of variability that you can include in a basic crunch, and also improve the -- the word I'm looking for -- the belief or the self-efficacy that a client has in themselves by showing them different exercises that they are capable of doing. So when you are designing a strength training program, you want to look for combined training, just choose one to two lower body exercises. Don't go crazy. Choose one to two upper body exercises, because that's one of the things about combined training and about general fitness. When we get people in the gym, it's typically maybe two to three days per week, it's not on consecutive days, so the most

popular mode of training is total body training. It's not these hard core splits, or only doing biceps and triceps on one day, and -- this is not that type of training. One to two core exercises. Where appropriate, you're going to choose one plyometric exercise. And I say with great caution where appropriate, because I don't, first I don't believe that it's necessary to get the benefit of any type of training program that you have to have a plyometric. I also think it's where the client wants it. Do they enjoy it? If they don't, that's it. If it's somebody who is older, has osteoarthritis, who has degenerative joint disease, who has -- who might be overweight, just leave it out. No harm, no foul. Do two to three sets of each exercise. 10 to 18.

Now, you're going to say 10 to 18 reps, you're going to say, wow, that's pretty high. Yeah, it is. So some of the new research over in sports performance we're looking at 36 repetitions all broken into equal rest between each repetition. Okay? Redistributed rest training. It's shown to be now the most effective way to improve strength. And power. And muscles. So what I did, what I have done for my own workouts is I've extrapolated that sports performance data and I use it in general fit settings. I use it differently. I'm not necessarily resting equal length between each repetition, but I am allowing up to 18 repetitions where appropriate.

So where the person maintains the mechanics. And is not reporting any undue difficulty because volume, especially in women over 40, is emerging as the key programming parameter to get the results that you want. So more time under tension, but moderate tension. Because remember, sports performance, fitness, two different groups of people, loads of training, and certainly outcomes. So we're looking at sample programs. Plyometric supersets. Remember, I'm starting off with the one that I say is no harm, no foul if you don't do. But here it is in the event you want to do it or you do have somebody else that wants to do it. So you pair a foundation lift with a plyometric exercise. So what that will look like, because I think I've got -- there it is. So what that will look like is a back squat with a jump squat. But the way that I do these sample

programs is I've got a plyometric superset, so I'll have my title here for what kind of workout this is. This is your exercise. Your reps. Your sets. Your load, or your resistance. And your rest between sets. This is between sets. This is not between, like I just talked about, between each repetition. This is between each group of repetition. And that's really key now, because we're getting down to the nitty gritty in resistance training data. We're getting down to milliseconds at this point in terms of rest. So this is between sets. In this case the two exercises that I have, I chose the two most basic ever, the back squat and the jump squat.

So they're biomechanically similar, they're working, they utilize the same joints and they utilize the same muscles. Therefore, in a similar way. Your reps, you can play with these. This is not written in stone. It's just when I program, I just try and choose something that would be on average appropriate. You're going to go two to four sets, and remember, that's why I said choose one to two exercises because for general fitness, you're wanting to increase your volume of similar muscle contractions, especially for large muscle groups, versus doing all sorts of different types of movements and exercises.

Increase that similar time under tension. Let that muscle know what you're doing, and what you expect the outcome to be. Now, on the resistance, of course, I leave that open. Because this could be as also as just your body weight to increasing under on this back squat, a Smith bar with, say, 50 pounds on each side, plus the 90-pound bar. It just doesn't -- this is just an example. So that resistance is going to be highly modifiable. Your rest between sets is going to be related to this primarily this second. Because the higher your intensity, the longer your rest period. So Michelle asks, does three rounds shown on slide one equals one session? Doing the math, 12 to 24 sets -- I'd have to go -- 12 sets sounds about right, up to even 24 can sound right. I'd have to go back and look exactly which slide, I'm not sure. But in general fitness, that would sound about right. Depending on how many reps you're doing. And so, again, on this rep, this can

actually go down to six for example. And this could stay at two or it could go up to four, so it's just -- when you're programming, you want to focus on the person. So it's going to be highly verbal. I don't -- Michelle, I don't see in terms of this slide exactly which one you're talking about. Let me see. You're talking about step one? Let me go back. I'm trying to get back to the superset. There we go. Michelle, that would be my error in terms of where I listed. So Michelle asks, why are back squat and jump squat listed three times each? This would be if I left this out. I would just be showing a superset of back squat, jump squat, back squat, and left this out. So for you can either take out the sets, or you can take out the three -- the two remaining supersets. So that's just an error and a redundancy on my part.

No problem. That's was a good catch. Just make sure you guys recognize that, that this is just a redundancy. A lot of times I'll show full supersets, but in this one I added the sets and forgot to take off the remaining superset shown. So the trainer's tips. Because the intensity is higher for the explosive lift, the reps are lower. There's a question, are you saying cycles and then sets? They're not either/or. So to cycle is a superset. So I do one set of back squats, and one set of jump squats. And then I do immediately another set of back squats. That's a set, each one's a set and that's the superset training method. I hope that helps.

Remember on this rest between sets, at 30 and 60. >> That's because typically your rest period is going to be longer for your explosive set versus your nonexplosive lift. A back squat is probably not going to get your heart rate up unless the weight is super, super heavy, as a jump squat. Where appropriate, and again, this is what caution you can add wait to the list, but it's advised against until you know okays certain you have your fitness level intact, and you have your mechanics intact. And those are usually handheld, some people do it with a barbell on the back, but typically handheld, I would think. So when talking about general fitness, we get a lot of people over 55 who come in to a gym and of course performance is not the goal. They're like, I just want to feel

better, and maintain the quality of life that I have now. Or improve it. So one of the things that we struggle with aging is, I think it's after 40, we start to lose those fast twitch muscle fibers. And those are those fibers that are associated with strength, power, explosive Florida, size, or muscle mass, and that's a negative. Now, we do know that one of the most effective ways to maintain those fast twitch fibers associated with things like sprinting and jumping, is to do plyometric exercises. We've been faced in fitness with the dilemma, of course, of okay, well, we want to increase that fast-twitch fiber mass, but people over 55 jumping is probably not what I personally want to take responsibility for. So we do have some new research in the area with some training suggestions that are quite helpful, actually. So the key here, though, is the research methods.

They're not very real world. The equipment that was used to -- in the study was a leg press on an incline where the user bounces off a mini-trampoline. So kind of think about somebody sitting in a chair that's tilted downward, coming down on it and bouncing off a mini-trampoline. Obviously not the most real world piece of equipment. So the exercise was highly specific to this study only. Six weeks, how does it affect strength and power, two groups, both groups train three times per week. One was young, one was mature. The volume was pretty much the same for each. Hold on. I thought I had it written down -- except -- all right. I have to read the whole thing. The young group did four sets of 30 repetitions each for the first four weeks, followed by five sets of 30 repetitions for the final two weeks.

The older set did three -- hold on. Did three versus four, the first four weeks, followed by four versus five for the final two weeks. So overall, it was less. And the reason was the pilot study showed that in the mature group, the degree of fatigue was too great. So think reduced the volume. So muscle mass, strength, and power improved in both groups. Changes in type two fibers which are preferably lost during aging and those -- the programming should include three days per week, following a similar volume

paradigm. Hold on. Can one of the modulators please put Jill's question in the presenter and host chat so I can see the whole thing on strength training for women over 40? So you asked about in your course about strength training in women over 40 related to estrogen loss and its impact on exercise, I thought you indicated that plyometrics are not a good choice. Did I misunderstand? No. One thing is I'm guessing if I had to go back and look, in this study here that we're talking about with men, just guessing, most of this stuff includes men, unless it's very highly specific to women. Now, when we start to talk about the changes that occur in bone density with women over 40, my personal recommendation would be you're on point, take extra precautions when including plyometric training with women over 40, due to estrogen loss and the changes that occur in bone density.

Especially if women have reported any osteoarthritis, any -- any osteoporosis. In my personal practice, would I do plyometric training for myself? Yes. Would I bring a woman into the gym and immediately start plyometric training? Absolutely not. But as we're going to see in the programming suggestions here, we're going to have some modifications. So Jill, I hope that answers your question. Unfortunately there's not going to be a clear-cut yes or no, it's going to be based on a lot of individual factors. Deborah asked, did they specify age ranges for young and mature in the study? I'm sure they did, I believe they would be -- it was up to 62 years of age for the mature, for my purposes I probably just broke it down into young and mature versus being specific on the ages. However, that reference will be included in your slides, and you will be able to find it very quickly. So when we are talking about programming, we want to make sure that we start slow. Make sure you strengthen the muscles that originate in the hips like the glutes, quads, hamstrings, and hip abductors first. These are the largest muscles in the body and those that will be used for the large muscle plyometric drills. Also we always want to make sure we strengthen that core once we add plyo we add balance. You're going to start with upper body plyo. Pledge ball, chest pass training, these types of exercises where you're not impacting the lower body and your balance is not hugely

significant. So this would be just a basic sample program, three sets, 15 reps, 60 seconds to two minutes on the recovery. Remember, when you utilize rest in training you're giving muscles a very small window upon which to regain contractility, regain strength. So in this case I would say more rest is better than less. When you choose that medicine ball weight, you want to make sure that the medicine ball must be heavy enough to slow the exercise, but not so heavy as to reduce the range of motion or make it difficult for the client to comfortably control the ball for at least five repetitions. So that's where you start, is with five, can they do it comfortably. You're going to want to work up to 15 ultimately, or hopefully within that session, even, if they can't, decrease that weight. To progress, add a fourth set.

After about two weeks. So cardio and strength supersets are just what they say. Going between a cardio exercise and a strength exercise. It would look like this. Pick your cardio exercise, you pick your strength exercise, you've got your time of your reps, because remember here are volume -- our volume is going to be our time. You pick your resistance and then you rest between your sets. Now, my recommendation is if you -- in a general fitness you have a relatively health Leigh client -- healthy client, keep that rest as little as possible. Also, don't do a cardio exercise, a lying exercise or something like that. Keep them on their feet. I would also recommend staying with large muscle foundation lifts to keep that heart rate up, keep working that targeted large musculature.

And then here we just have some trainer's tips on, we've covered most of. This I'm not going to tell you -- take the time to read all that. Circuit sets, this is more of a cycle. So you take three or more exercises in succession, and you repeat them. You do 10 to 18 repetitions each station, and you complete the circuit three to four times. This is a great beginning exerciser programming mode. So a suggested circuit would look like a lunge, a bent-over row, dips, a jump squat. And again, if you were doing beginning, you'd probably change all the dips or the jump squats, but the key here is you keep them moving and you keep a lot of variability of the muscles that are worked. So they get a

full-body workout. This is a picture I like, this is called a plie squat. This would be mainly for women. Men typically don't like the exercise and they're limited to typically by the flexibility in the hip. This is a really great exercise for the hip abductors and the deep hip rotators. The caveat is in order to do those exercise correctly, you do need to have a certain degree of flexibility at the hip because if not, you're going to rotate from the knee. What struck me about this picture, that's about the cleanest mechanics I've ever seen on a plie squat, because her heel, her knee is a perfect line, and that's just no rotation. Most people will tweak their knee in order to get this leg back here. But that rotation has got to come from -- you can't see that hip, but it's got to come back over here and then the workload to maintain the stability has got to come here. This is an outstanding exercise for those hip abductors, deep hip rotators, gluteus min muss, and medius. Great starting exercise.

This is a modified push-up. Almost like a dip. I would just always remember on these to have that elbow in better alignment with that shoulder, not splayed out like that. I think you're going to increase your risk of injury. Flexibility programming, bottom line, you're going to do that one to two static stretches for the major muscle groups, this is general fitness. You need more, obviously you're going to want to be in yoga or something like that. One to two sets of each stretch, 20 to 60 seconds each. And again, this is at the end, static stretching prior to exercise, leave a 5-minute window for muscle contractility to recover. Modifications, based on fitness training on that cardiovascular. 60-80% for healthy adults, max heart rate. New exercisers, 50-60 initially, things are going well, you can increase it. Deconditioned persons, you're going to want to stay around that 40%, I would say for two to three weeks. There's no reason to push it. No reason to risk it. Low to moderate level intensity exercise. Certainly an admirable start point. Your intensity to progress and to increase 5-10% per week. That's going to be pretty large. You know, most people are going to stay within the same, once you find an ideal weight for them are going to stay with that for a pretty good period of time. And I find that more people in general fitness will increase volume, not necessarily intensity. Although you're going to

want to do it, but volume doing more, changing exercises seems to be more commonplace. Volume is the same. Volume is a daily thing, based on how people feel too. So is intensity. How much you're going to do is based on how much weight they're lifting. It's based on how do they feel, it's based on are these exercises new, how long are our rest and recovery periods? Those types of things. Always vary your sources of strength, because when you vary your source of strength, you vary how muscles are loaded.

You use dumbbells, bars, cables, medicine balls, kettle bells, and more. And more. Whatever fits the client need, whatever fits your training style, what you're comfortable with as the trainer, another big one, I'm not particularly comfortable with kettle bell so you're not going to see me instructing other people on kettlebells, I'm hard-core Smith machines, racks, barbells, dumbbells. And that's typically in some cable, that's what I stick with, and machines, of course. But that's what I know, what I stick with for my clients. So whatever you feel comfortable instructing others on. Modify the time. We had that five-minute warm-up to 20-minute cardio session. So you can modify the time you spend, because you also in terms of strength, you can modify the time you spend on different muscles.

Typically we start with large muscles, we go to small. Let's say our goal is we need to increase the strength of the tricep, because it's limit -- it's a limiting factor in another exercise. In that case we're going to start the session with the tricep. One of the mod -- will one of the moderators please add -- let me see if I can see. Would you -- Chris asks, would you consider an inactive person, deconditioned person new to exercise? Yes. I would. If somebody came in and asked me to train them and they said they have been physically inactive, my instinct right off the bat would be to treat them as a deconditioned person, of course never saying that, I would treat them as a new exerciser, so I would start them where I would start someone that I'm unsure of until we know what their fitness level is based on assessments, based on engine performance,

based on self-report measures, and then you just might be able to move them up quicker because say maybe they're not deconditioned or they're just physically inactive and they're young, age is going to play a huge factor in that as well. Frequency, give that 48 hours, always remember that 48 hours recovery. Timing considerations. So as the industry emerges, circadian programming has become, especially in Europe, this is it. Timing strategies for more effective workouts. We go back to interference theory, we're all about timing at a molecular level. So time your workouts in alignment with your natural 24-hour body cycles.

These are across everybody. Some things like testosterone peaks and muscle pliability are constant. So testosterone peaks are on -- around 8:00 a.m. and levels off by 4:00 and muscle -- decreases. And muscle pliability and peak body temperature is greatest around 4:00 to 6:00. Therefore, strength and flexibility workouts will be most effective at that time. That's when you see most people doing strength and flexibility workouts for that reason. However, it doesn't have to be that way. Those are just in alignment with some really all-inclusive daily fluctuations. However, you as an individual want to time your workout in alignment with your natural sleep-wake cycle or chronotype. Each one of us is going to be a little bit different. So what we're going to do is a very short quiz to determine your chronotype.

So what I want you to do is, quickly, there's going to be seven questions, and you need to write down or have some way to document how you answer each one of these questions. So I'll give you a second, get what you want. And you'll go through these questions, we'll go through them together and we'll come up with your own chronotype. We went to a quiz. I mean, what's it called, a poll. So number one, if you were entirely free to plan your evening and had no commitments the next day, at what time would you choose to go to bed? Jill asks do these time frames still apply to people who work night shift or does this quiz reflect this. >> Jill, the thing about shift work is it's a whole other beast. Where we know that shift work changes your natural circadian rhythm. So

answer these questions not based on what you're forced to do a shift work, but what you would do in an ideal situation. Going back to inactive versus decondition, what intensity would you train each work? I would say your decondition is 40, your healthy is I believe was 40-60, and your conditioned was 60-80. I'd have to go back and look at those and right now I have the poll on my computer, so I can't see. I know deconditioned is 40. I will say how your intensity level is going to be dramatically affected by how that person feels that day, it's going to be affected by your duration, that kind of thing. So -- and your mode -- okay, go ahead, you guys, and move on to the next cues. Here's your next two questions. I'm going to watch the clock and we'll leave them up for about 30 seconds I guess is enough.

Answer these questions on what you would do naturally, not what shift workforces you to do, because that's a whole other beast about shift work affecting negatively your natural circadian rhythm. It looks like we're finished here. Let's move to our next. Remember, there's no right or wrong answers. This is strictly for you to get an idea about your own chronotype and then in the end, our objective is to align your chronotype with your training. And that's how hopefully we'll get the most effective results in the end. These are still moving around, so I'm going to wait a second. Let's move to the last one.

Then after you've answered the question, you can add up your points and then you can see what your circadian or your chronotype indicates. So looks like most of us are morning people. And I know I am and that would make sense, but I'll let you guys finish up. Again, this was for your personal knowledge, because one thing we know about circadian training and we know about internal clocks, muscle clocks, is that if you train at the same time each day, there are molecular reasons and explanations as to why it's more effective be. It's not just a psychological thing. Muscles can learn to anticipate upcoming training sessions. And what they'll do is they'll click on the associated mechanisms of exercise and its positive outcomes, 30 minutes ahead of anticipated

training, but that only works, really, long-term if you can train at a time of day consistently that's based on your own chronotype. For me, trying to train every day at 4:00 is never going to work. I don't like it. I've been doing for 30 years almost, training around late morning. For my whole life. And I'm not going to change it. But I get tremendous value out of that. So let's see -- and I enjoy it, too, there's also that enjoyment factor. So here we are, let's go ahead, we answered this. One thing I do want to mention really quickly, when we talk about circadian rhythms and we say, listen, based on natural fluctuations of all people, we do believe that oxygen levels, we do believe that late morning is a really good time to do cardiovascular training, and strength training, or strength -- where strength and power gains are the outcome, around 4:00 to 6:00 p.m. is ideal.

Those are just general timing recommendations. For most people. Now, recent -- we've started recently to look and we look at circadian training and trying to allow -- align training with these internal clocks, and these natural fluctuations and hormones, and that kind of thing. We started to see, there's changes that occur over the life span that are going to affect the efficacy as well. Circadian shift is basically that after age 50, the circadian rhythm naturally shifts to an earlier schedule. So exercises over 50 need the same amount of sleep as younger adults.

The recommended seven to nine. Now, if you recall, once you get into athletes, that number or sleep hours goes up to 10 for athletes. But for most of us, and especially recreational athletes it's 7:00 to 9:00. What will happen is that the circadian shift occurs, it appears that an earlier sleep schedule from 10:00 to 6:00 a.m. versus 11:00 p.m. to 7:00 a.m., benefits persons over 50. And this is important because it not only benefits their overall quality of life, but if you are over 50 or you have a client over 50 who wants to maintain that fitness schedule, and it's something that I know in the industry we started having dialogue about is, well, what about rest and sleep changes that occur as people age, how do those differ from persons who are younger? And in that is what we

found. We need that seven to nine hours, and we need, as we age, to shift it back. And that is related to a biological circadian rhythm shift. Now, one of the things, you know, that we've talked about a little bit in circadian training is the value of sticking to a regular scheduled exercise program. The mechanism as to why goes beyond the scope of this particular lesson and it essentially relates to the fact that I alluded to a minute ago, that your muscles and this has been shown in race horses and it's also beginning to be shown in humans, but highly trained humans, will click on the molecular events associated with exercise ahead of time, if they've been programmed by being on a consistent schedule. The benefit is that anticipation factor. So if I can anticipate what's coming up versus, you know, if my colleagues just threw a power point on or are like, hey, can you talk about this for a couple hours? I probably would be able to do it, but not with the degree of efficacy I would or the results I would had I known in advance with the topic was and what the PowerPoint looked like. Same with your muscles. They can learn to anticipate. But you gotta give them that regular schedule and that's even more important I believe -- I know it's extremely important in sports performance and the data comes out of sports performance, but when it comes to general fitness, there's that psychological per September as well.

That you can never, ever, ever disregard. Athletes are going to show up because they have to. With general fitness we have a little bit greater challenge in terms of adherence and willingness to participate and enjoyment and those things. I strongly believe that the schedule helps the person get greater results, that translates into a willingness to be more active or proactive in their own fitness schedule. Our own fitness. We talk a lot in fitness now, especially in sports, about rest. And recovery. Because we know that the recovery processes are just as important to building and maintaining muscle health and performance as the actual exercise itself. And that there's nothing more negative than too much exercise, or overtraining. In fact, I venture to say, and I know we're not going to see that in fitness particularly -- in particular it's very rare, to see overtraining, but I venture to say overtraining can have greater negative effects than no training for a

certain period of time. So what we do, I call this intermittent rest. It's just based on the same concept as intermittent fasting. Where you're looking at a period of time where you don't exercise, and a period of time you do, because your body, your natural circadian rhythms are on these 24-hour cycles. They're paying attention to light, night, that's their biggest one.

They're paying attention to hormone fluctuations, like testosterone, human growth hormone, cortisol, they're paying attention to exercise, timing, eating habits, sleep patterns. So they've got a pretty good 24-hour cycle going on, and with all their internal clocks, they prefer to be on a 24-hour schedule. So what you want to do when you're designing exercise programs is always stay on a 24-hour cycle. That would mean if you're training at 11:00 a.m. every day, you do that. Your body is going to have the best results. Now, when it comes to rest, instead of doing that week on, weekend off, you're better off taking two nonconsecutive days off during the week and training on one weekend day. So that keeps you on that consistent 24-hour schedule. And is in alignment with your biological clocks. Just very quickly, I'm talking about clocks and just internal clocks in general, it's really important to recognize you have a master clock in your brain, which we're all familiar with, it's located in the nucleus, that's biological clock, the culprit when you get jet lag. We're accustomed to that. But what's really emerged is exciting, is your muscles have clocks.

And there's one in each of your 600 skeletal muscles. And when you work with that mini-clock, you tell that clock what time a day there's muscles are going to work, that clockworks with the rest of your body to synchronize your muscle performance to the rest of your body. And that gets you the greatest and most positive results without going into gory detail, on the mechanisms of those clocks, just the bottom line is to know that they exist, that they're tiny mechanisms inside each one of your muscles and they essentially, when you speak to them by giving them regular timing cues, especially about exercise, they will work with you. So when we go to wrap up here, there's just a

few very general statements to walk away with at this point. Then I'll open up to any final questions that you guys may have. So remember combined training also concurrent is using multiple modes of exercise in one session to achieve fitness goals. Again, not recommended for sports and athletics, because of that interference. Combined training is great for weight loss and general fitness, but it's not suggested for strength and power goals. Be and that goes back again to those mechanisms of interference. To maximize the effectiveness of combined training, keep clients moving. That's always your general rule.

Utilizing supersets, circuit training methods, keeping your intensity in that moderate range. So that they can keep moving throughout that entire session, which will translate into hopefully improved fitness level. Modify all sessions and exercises based on individual fitness level. You know, I always tell my young students in college, you have no idea, there's no way I can tell you or prepare you for what you're going to face once you've got a human being in front of you. It's just all bets are off. It's going to be totally different. Utilize circadian principles to max mime effectiveness of combined training. We have a question, Joanna, do you recommend starting at three times a week or five? I would recommend as many -- I would say five days a week would be perfect, if you can get somebody in that many times for a low to moderate training session.

Because remember, you don't have to hit it harder moderately, you can be doing flexibility work, you can be doing pelvic floor work. I would say the more times the better, and also because with flexibility, those begin within 24 hours, so -- but in a perfect world we probably won't see them but maybe three. So get them in if you can, if you can't, it's not your fault, and work with what you -- what days of week you have. So that was Joanna. Do we have any other additional questions? Jill, can one of the moderators answer Jill's question please? About the photos? Juliet is going to answer that question for you, Jill. Anything else? I'm here for a couple minutes, I'll answer any question you guys have about anything related to resistance training, especially that's my baby, that's

what I love. Anything. So Gretchen, if you need 48 hours to recover, should you not work out only every other day or just vary muscle group? Every other day beginning moderate level general fitness, vary muscle groups if you're that advanced. We're going to see athletes, five, six times a week twice a day. So you know, if you're advanced, you're going to a split that's going to look like tris, and bis, quads and hams and you can train every other day making sure -- every day making sure you have those adequate rest days and recovery days. That's going to come down to fitness level. Julia asked about diet. I defer all diet and eating questions to persons who have been trained in that area. That is by far and away not my area of expertise.

I highly regard those persons, and Julia, I respectfully decline to answer diet questions, it's just not my area of expertise. You know, Betty is asking a question on the quiz. I don't have it right in front of me, Betty. I don't know if one of the moderators can put a question up for me. I don't see it, that would be question number three. An example of a bilateral lower body plyometric exercise. No, there is one in there that is definitely not bilateral. Let me make sure I got everybody. All right do, we have any other questions? This is what I want to say. I want to say thank you guys for joining me. I always enjoy delivering these and enjoy the content.

I love it. Feel free to reach out to me. I'm here, I absolutely love what I do beyond what I can express. And it's people like you who make that possible. So I do appreciate it, and hope to see you in the future at one of our events. Gretchen asks, how can you reach out to me? If I put my email in the box, can one of the moderators post that? I put my Gmail in there, it's Amyashmorephd@gmail.com. Please stay in touch, thank you so much. >> Thank you so much, Dr. Amy for sharing your expertise with us today. We are moving over her contact information right now so you can copy that down. If you'd like to get ahold of her. Like I said, thank you, everyone for attending and hope to see you back in the classroom again real soon. Have a great day, everyone. I'll leave it up for a little bit longer, but if you want to leave the classroom, you can go ahead and leave. >>

Dr. Ashmore: One thing, yes, Gretchen, you absolutely can reach out to me to ask me additional questions. Please do. All right, you guys, I'm going to sign off if that's okay with you, and I'll talk to you guys in the nut. Sounds great. Thanks so much. >> Thank you, everyone. There is a quiz to take, Laurie, after our reports have cleared, it takes about 15 minutes. I just after the recording -- I just stopped the recording, once that happens, you'll go and find this course on your personal account and then hit "take exam." You'll have seven days to do it so you don't need to take it right now if you want to wait. All right, everyone. I'm going to close out the classroom.