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Back Pain Prevention

EVIDENCE-BASED PREVENTION OF LOWER BACK DISORDERS

Each year 40% to 60% of American adult suffer from chronic back pain at a cost that's exponentially growing, might we work harder at preventing back problem. You are listening to ReachMD, the Channel for Medical Professionals. Welcome to The Clinician's Roundtable. I am Dr. Leslie Lundt, your host, and with me today is Dr. Stuart McGill. Dr. McGill is the professor of spine biomechanics and is the Chair of the Department of Kinesiology at the University of Waterloo in Ontario, Canada. He has been the author of over 200 scientific journal papers that address the issues of low back function, injury prevention, and rehab, and performance training. Collectively, this work has received numerous scientific awards. He sits on the editorial boards of the journals Spine, Clinical Biomechanics, and the Journal of Applied Biomechanics.

DR. LESLIE LUNDT:

Welcome to ReachMD, Dr. McGill.

DR. STUART MCGILL:

Well, thank you Leslie.

DR. LESLIE LUNDT:

You have done so much work on how to prevent back problems, tell us some.

DR. STUART MCGILL:

Well, I was originally trained as a biomechanist and I would for some reason or another docs would begin to send patients to me, ask me for an opinion, and I would assess the patients and speak with some and find out what they have been told about preventing their own back troubles and was either absent or they were told a couple of things, one was oh if I am going to lift, bend the knees and keep the back straight or if I am going to lift something, lift it slowly and smoothly, but as a biomechanist, these didn't make sense. For example, you would never tell an athlete to do something slowly and smoothly to preserve their joints. They use all kinds of athletic skills to spare their joints. They transfer momentum from one part of the body to another and use very sound Newtonian principles like this and yet we were telling people never lift, only lift slowly and smoothly. Well, you can imagine reaching across the table and lifting 40

pounds slowly and smoothly, it would be very stupid to do. So, I started to systematically try and formalize the mechanical principles after we have done about 20 years of trying to understand what the injury mechanisms were. So, the primary mechanism for diskogenic back pain is spine bending. So, then the instruction would be, be careful about how you are bending your back, bend your hips instead. So, let's replace that idea of bend your knees and keep the back straight. You might want to stoop over, you might want to squat depending on the external mechanics of the task. If it's a heavy dense object, of course, get it between your legs and squat, but if it's a large object like a television set, you can't squat down over, you might stoop over, but flex at the hips and not your back. Another phenomenon is that we and several other groups have found by the way is you realize there is a diurnal variation to disk hydration. You are taller in the morning than when you went to bed at night. Well, Mike Adams, colleague and biomechanist in Britain measured the stresses on the disk when you first wake up in the morning and bend your spine to put your socks on. Those stresses are 3 times higher than when you took your socks off the night before, it is just like a water balloon ready to burst you know if you fill a balloon with water. So, the super hydrated disks are particularly vulnerable to bend early in the morning. So, don't get up in the morning and do your sit-ups and some of these bending regimens, although it feels good, there is a great paradox. When you bend in the morning and pull her knees to your chest and what not, it fires off the stretch receptors in the erector spinae muscle, which gives immediate feedback to your proprio system, which says aha that feels good, not realizing that you are replicating the mechanism of injury creating those hydraulic stresses to increase the disk bulge even more underneath which was causing the muscles to spasm in the first place. So, you would see how what your body perceives isn't really addressing the underlying mechanism of injury. So, that would be another instruction. Be very careful how you bend your back early in the morning. There are all sorts of thoughts on stabilizing your spine. Patients will say I bend over and tied my shoe, I heard it pop, and now I am here to see you in the office and I have had to explain that as a mechanism of injury to different compensation boards and what not, it's certainly a real injury, but usually it's an instability. If we have time to paint this one visual image, you can imagine a fishing rod upright with the butt on the ground, if you place a couple of ounces on the tip of the fishing rod, it would bend and buckle very quickly. But, if you could attach guide wires to that fishing rod and attach them to the ground all around the rod and tighten them, then you could apply hundreds of pounds to that tip of the fishing rod and it wouldn't bend or buckle. Why I am saying that is your spine will buckle with 20 pounds of compressive load on it. In another words, it can't even support your upper body weight until you activate the muscles around your spine acting like those guide wires to give it stiffness and stability. So, people when they bend over to pick up a pencil or tie their shoe, they need a certain amount of muscular and ligamentous stiffness to prevent that buckling injury that I am describing. Twisting has been given a really bad rap shall we say. I know many medical colleagues when they are filling out medical report forms, they are sometimes little unsure what the mechanism is, but somehow it gets written down oh twisting caused this bad back and yet there is a great distinction between twisting, which is the physical act of twisting your spine around and creating twisting torque. An example of that might be as your spine is not twisted, but you are at work and you are opening up a big round of water valve or turning a wheel without power steering. Do you know what I mean? You are creating twisting torque and effort, but you are not twisted. Those are 2 entirely different things. Creating twisting torque when you are neutral and with proper muscle buttressing that torque, if not a problem, for the back many times. Likewise, light twisting is not really problematic for the back. What's problematic is when you add those two together. So, when you are twisted, which weakens the disk, then you apply a large twisting torque, that's the one that damages the disk. So, avoid the combination of twisting and twisting torque. Another one is simply avoid prolonged sitting, which causes prolonged flexion to the low back and will bend the disks overtime and you will have diskogenic back problems.

DR. LESLIE LUNDT:

If you are just joining our discussion, you are listening to The Clinician's Roundtable on ReachMD, The Channel for Medical Professionals. I am Dr. Leslie Lundt, your host, and with me today is Dr. Stuart McGill, author of Ultimate Back Fitness and Performance. We are discussing the prevention of back pain.

Dr. McGill, you have done some very interesting work with NBA players. Tell us about that.

DR. STUART MCGILL:

I think my work with other types of athletes is much more interesting, but here was the situation obviously, basketballers are tall and I was asked to see if you who had clearly flexion intolerant diskogenic back pain and they were sitting on benches and chairs made for

people my size, a normal size and basically they were sitting with their knees in the air and their spine fully flexed. They would warm up for the game and then the first team would play for 15, 12, 18 minutes or so while the second team would sit on the bench. During the time that they sat on the bench, their spines stiffened into that flexed posture and actually caused the hydraulic scenario for more disk damage and then they would stand up right away and have some awful task like having to box out Shaquille O'Neal or some dominant player like that. So, again it wasn't rocket science, but what we learned there is you cannot expose a player to that type of damaging stress. So, obviously a chair much, much taller, angled seat, bend forward which opens up the hips and allows the preservation of a more neutral low back or neutral lordosis in their spine avoids these damaging hydraulic stressors and then prior to them jumping back into the game if they are flexion intolerant, certainly get up and pace little bit and try and precondition the disks so they can get going on their particular shift.

DR. LESLIE LUNDT:

Now, how about those of us that aren't in the NBA, but we spent most of our day sitting. What should we think about in our own lives in terms of choice of chair or any other sitting postural dynamics?

DR. STUART MCGILL:

Yeah, well, a lot of issues there, but first and foremost, try and plan your day to break up the prolonged sitting if you have to speak on the phone. Are you sitting or standing right now?

DR. LESLIE LUNDT:

I am sitting.

DR. STUART MCGILL:

Need to. But we both should be standing. Actually, when the phone rings in my office that's my cue to stand. So, to get out of the chair, there is nothing better. Having said that people often ask me what's a good chair, what should we buy and my answer to that is a chair that is very adjustable. There is no ideal sitting posture. There is an ideal sitting posture for 10 minutes, but that's it. Because no matter what posture you sit in, you are loading specific tissues in your back and the only way you migrate the load from one tissue to another is through posture change. So, we can talk about sitting cross-legged and that sort of thing with what it does is tightens the pelvic ring, it tends to reduce the abdominal wall activity. There is no substitute either for most kinds of backs. I am not talking about the stenotic extension intolerant back, but again the more common working back of a younger population. Many of them would do better if they had a lumbar support in their lumbar region to avoid those hydraulic stressors that lead to disk bulges.

DR. LESLIE LUNDT:

What about options like the big exercise balls to sit on or those backless chairs where you sort of kneel, are those any better?

DR. STUART MCGILL:

Well, we have certainly measured both of those and the chairs where you kneel in if you wear a skirt, they are rather hard to get in and

out of. There is a whole psychological overlay in that the height of your chair back signifies your status within an organization. So, a chair with no back has no status. So, I was told by my psychological colleagues, the front of your shins, which bear load in the kneeling chairs aren't made to bear load and people's shins were starting to complain and the other thing is without the back rest, you did adopt a more neutral spine, which was perceived as comfortable by many types of flexion-intolerant backs initially, but it requires much more static muscle activity, and after an hour or two, they were getting worn out. So, can I summarize that whole thing by saying it might be a nice option for a temporary respite sitting one for half an hour and then go back to your regular chair. The same thing with sitting on a gym ball by the way, but interestingly enough, I have been asked now, I think, to be an expert witness and I can immediately recall 2 cases where workers have rolled off their gym ball, one had quite heavy neurological damage and the another tore off a rotator cuff. So, things that you don't think about, but again they will give some relief as a temporary option, but I would certainly not recommend someone sit on a ball all day.

DR. LESLIE LUNDT:

Well, thank you so much for enlightening us today.

This is Dr. Leslie Lundt. I am sitting while interviewing Dr. Stuart McGill who has been talking about evidence-based prevention of lower back disorders. You can find more information on his website www.backfitpro.com.

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