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| |  |  |  | | --- | --- | --- | | |  | | --- | | American Society of Exercise Physiologists | | | | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  | | --- | | **In This Issue** | | [**Editor's Corner**](https://mail.google.com/mail/?ui=2&view=bsp&ver=ohhl4rw8mbn4#130fa64e4cd26e83_LETTER.BLOCK7) | | [**Ask the EP**](https://mail.google.com/mail/?ui=2&view=bsp&ver=ohhl4rw8mbn4#130fa64e4cd26e83_LETTER.BLOCK8) | | [**Ads & Employment**](https://mail.google.com/mail/?ui=2&view=bsp&ver=ohhl4rw8mbn4#130fa64e4cd26e83_LETTER.BLOCK9) |  |  | | --- | | **Quick Links** | | [**Journal of Exercise Physiology-online**](http://r20.rs6.net/tn.jsp?llr=rfwe9acab&et=1106396329474&s=2&e=001-d06Cae_5Uq25A9qS6LQOtklOwZ1zDrpdr44NxUy4qx4dTqmb22V_VNRUk4uoBXFTQlwhgKE7e5HK0XtKONEURD-kMIiCvvD67k4N09xaIkpLgP1NsO2PEjmcoTlz4pg)    [**Professionalization of Exercise Physiology-online**](http://r20.rs6.net/tn.jsp?llr=rfwe9acab&et=1106396329474&s=2&e=001-d06Cae_5UrtVbLG3QU1684xJ40_0SPoevA-tWPnvZsXPs92MAD0_Z5VBt109uaHDCg8-OAzQup11T3QDcrdXKrWaSTIwQDgCWKkoBoc5b40Y-2TsHJ0fuapZs46nfXB)    [**More On Us**](http://r20.rs6.net/tn.jsp?llr=rfwe9acab&et=1106396329474&s=2&e=001-d06Cae_5UpzQ_e7R82Sm5cliRwKd29YFJ1KM-ei1wy2Cmxqv2Hg4Q3a0qz5tjB3tZ11De4AZzlr1R_A9LzSzh20ZH0qQFOqC39R1YEtp8g=)    [**PhDs can now petition for Board Certification**](http://r20.rs6.net/tn.jsp?llr=rfwe9acab&et=1106396329474&s=2&e=001-d06Cae_5UoE9pze_aRyl_W4JygejU6mfnQnuB9fXJsyocY1SEND3klaWPLgo5SShSVeSIQLFxeXeIWJJ24pfBocq3s2rUF3blDh2hcnhLZHFMXrvYGRmmNq1wf0-Lgs3M192QmGyX8R8a2fom0hlQ==) |  |  | | --- | | **Join Our List** | | [Join Our Mailing List](http://visitor.constantcontact.com/email.jsp?m=1101686528177) | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | |  |  |  | | --- | --- | --- | | **Issue: #7** | **July 2011** |  |  |  | | --- | | **Dear Exercise Physiologist,**  Thank you for being part of our community. **ASEP is the specific voice for (historically under-represented) Exercise Physiologists.** Please use this Newsletter as a link to ASEP resources from scientific journals to professional papers, to employment and related opportunities. And be sure to click on "More On Us" at the left for the ASEP-Newsletter's parent web site.  Yours in health,  -Lonnie Lowery and Jonathan Mike, ASEP-Newsletter Editors |      |  |  | | --- | --- | | **Editor's Corner** |  | | editorial **Are We Losing Rigor in EP Preparation?**  An old professor I used to have would often pontificate about how standards had fallen in Exercise Physiologist (EP) preparation. "We were made to become physiologists, first!" he would say. "Only after we mastered the anatomy, physiology, research design and lab work - even learning multiple languages - could we then specialize in exercise as a subgenre of physiology." He was making the point that it was not in the best interest of our field to have students identify themselves from the start as EPs, as opposed to what he felt was a more rigorous path.    In many ways, I agree. There is a risk in creating new, condensed courses that, as another professor used to say, "cater" to the lowest common denominator of student". Instead of studying physiology with the Biology majors or biochemistry with Chemistry majors, some universities create "service courses" in which EP majors take classes with a simpler textbook, sometimes with a title that specifies "for the health professions" or some such. Instead of four full chemistry courses or whole courses in mammalian physiology, cardiac or muscle physiology, endocrinology, and statistics, a new breed of students may instead take a single semester of chemistry covering smatterings of inorganic, organic and biochem., or take a general physiology course that spends just a week or two on hormones, cardiovascular function or muscle function. These new age students may not get to calculate t-tests and ANOVA by hand as they come to grips with what these formulae really do. In addition to their brief service courses in the sciences (taught within their department or from a department across campus as an easier alternative to their in-house fare), the new EP students could have classes that jump quickly into the "how" of applying their profession, or pleases an accrediting body with practical experiences. The science and the "why" get back-burnered.    But perhaps this assessment is too harsh. Many EP students are not biologists, nor do they plan to work in a laboratory or go all the way through school to become a professor themselves. They may have no intention of performing research. Do they need to take the full-depth science and mathematics courses in these other fields? Does a strength coach or a personal trainer ever actually use knowledge of say, oxidative phosphorylation or transcription and translation or the stress trajectories of Wolff's Law or the Newman-Keuls post hoc test? Many would say no.    Obviously, perhaps, the rigor and depth of training depends upon the individual student's goals. I think that, in any case, the balance of wonder and skepticism that science provides should be enthusiastically introduced to every developing EP. Curiosity should be rewarded. Credulity should be cautioned against. By understanding the "why" and not just the "how" of our field, and by setting our bar high, we become far better - able to create new knowledge and protocols when faced with new challenges and deserving of respect from other professions. This is just my opinion.    Where do YOU fall on the spectrum of depth and rigor versus practical training?    Yours in Health,  Lonnie Lowery, PhD | | |  |  |      |  |  | | --- | --- | | **Ask the EP** |  | | **Q: This month, we change pace and offer another personal essay from our ASEP Newsletter Co-Editor..**    **Squatology 101!**    Still today, many will state that "squats are the single worst exercise ever invented for sports performance". Or perhaps even better, that "squats are bad for the knees", or the ridiculous claim that if you "roll your knee too far forward, you will BLOW OUT YOUR PATELLA TENDON" and causes as much damage as it does, etc, etc" - Are you serious? I hope that individuals making these preposterous statements are joking. Let's examine this more closely.    In Squatting, the bar has to remain over the mid-foot. Knees too far forward would shift the bar to a position vertically forward of the mid-foot; too horizontal of a back would do the same thing. Too vertical a back would shift the bar behind the mid-foot, as would insufficiently forward knees.    The problem with knees too far forward is not only more torque on knees, but MORE IMPORTANTLY, it has a detrimental effect on hip extension. This produces a more acute knee angle and decreases the contribution of the hamstrings contraction to hip extension.    Some people talk about loading the heels. Although this statement alone is not specific enough to understand what can occur during the execution of the lift. Many people try to load all the weight on their heels. As result, this shifts the weight way too much on the heels and therefore they start to fall back, although stance, and bar position may be correct. Or the opposite can occur, they shift too far forward on the toes, which shifts weight forward on the knee and take away from hip extension, which is vital to the overall lift. They must learn to distribute the weight on the entire foot, while shoving the knees out upon the concentric and eccentric phases.    Now, some well known coaches and trainers discuss how the back tends to be the weakest link in the squat and posterior chain. I tend to agree with this position, but it also depends on the amount of weight used, and amount of volume, etc. If the back is the limiting factor/can be a limiting factor/weakest link, then simply do the things that enhance low back strength and core strength. Besides additional core exercises, heavy SLDL's (stiff leg deadlifts) or heavy DB SLDL's, Glute- Ham Raise and reverse Glute-Ham raise are excellent assistance exercises for increasing low back strength, not to mention Good-Mornings, which are more specific to squats (deadlifts too) Rotating these exercises are tremendously helpful to squatting, especially when heavy loads are involved.    It is important to understand the role of the erector spinae muscles as well. They serve to lock the pelvis and lower back together into rigid structures, to protect the vertebral column from movement under load and prevent the intervertebral column from excessive damage. As squat depth increases, and the torso assumes a more forward tilt, the bottom of the pelvis, locked into the rigid spine, tilts away from the back of the knee. If the hamstrings lack adequate extensibility, they will exert enough tension on the bottom of the pelvis to pull it out of its locked position in the lower back, breaking muscular tension, thus this is one way the "rounding" will occur. If the knees move forward at the bottom of the squat, then hamstring relaxation has occured because they pull the knee back. They insert on the tibia and provide posterior tension, which has to increase (or at least should) with the squat depth as the other attachment points on the pelvis tilts away. If the tension is inadequate to keep the knees from sliding forward as the bottom position, reexamination and thorough assessments have to be made. In addition, when the knees travel forward at the bottom, tension is put on the hip flexors as they insert of on the anterior superior iliac spine. So the big muscles, rectus femoris, sartorius, and TFL cross both the hip and knee joints and produce movement around each. So, in the squat, their knee extensor function is the main concern, since active hip flexion does not occur (hopefully). At the bottom position though, if the knees move forward, tension is increased on these muscles and their attachment at the hip and the knee angle is shortened (more acute). Then the anterior superior iliac spine is therefore pulled on tremendously and can produce tendinitis. Moreover, this is why some people feel tension or perhaps uncomfortable pain in the hip flexor area during or even after squatting.    Squat depth is also critical. Deep squats MAY increase susceptibility to patella-femoral degeneration given the high amount of patella-femoral stress that arises from contact of the underside of the patella with the articulating aspect of he femur during high flexion (Escamilla 2001). However, there is little evidence to show a cause-effect relationship implicating an increased squat depth with injury to these structures in healthy subjects. Squat depth has been shown to have a significant effect on muscular development at the hip and knee joints, particularly with respect to the gluteus maximus.  Research from Caterisano (2002) demonstrated that while average muscle activity of the GM was not significantly different in both the partial squat (16.92 ± 8.78%) and parallel squat (28.00 ± 10.29%), it increased significantly during the full squat (35.47 ± 1.45%). Similar results were shown for peak values, which displayed significantly greater activity during performance of the full squat as compared to lesser squat depths.    What most people do when squatting is "drive their chest up". Driving the chest instead of the hips destroys hamstring power, and adductor (if stance is right and wider than normal) power in the middle of the squat. In addition raising the chest tends to pull the knees forward. **When/if the knee angle closes, the hamstrings shorten.**Sometimes, many will tend to fall into the limbo of the good-morning upon the concentric phase of the correctly preformed full squat. Maintaining torso tightness (keeping the chest up) but **NOT RAISING THE CHEST** will assist those in this situation. Through experience however, when heavier loads are used, "Hip drive" becomes less pronounced, and can possibly cause a more forward tilt on the concentric phase. **Therefore, it is critically important individuals are anatomically and kinestically aware of what they are doing.**    If the stance is more "bodybuilding style" with a narrow stance, biomechanically and possibly physiologically (i.e. motor unit recruitment) hamstring activity would be minimal, or less than optimal. For example, any time the knee angle closes, the hamstrings have shortened from the distal end, and if they shorten with little movement, they have been removed/contribute less from the source of power. Also, a narrow stance does not involve the adductor musculature to the same extent as a wider stance. Moreover, it's very difficult for everyday people with normal flexibility to go deep, or deep as possible with a narrow stance, and thus the hamstring are never engaged fully as with a wider stance.    One of the reasons many people don't squat is that it's hard. It's very difficult to balance hundreds of pounds of one's back. **However, in the realm of performance, or regardless of one's goal's, the hard things give individuals the best results. Remember, stick to the basics, and SQUAT**!    **References**    Caterisano A, Moss RF, Pellinger TK, Woodruff K, Lewis VC, Booth W, and Khadra T. The effect of back squat depth on the EMG activity of 4 superficial hip and thigh muscles. Journal of Strength and Conditioning Research. 16(3):428 - 432. 2002    Escamilla RF, Fleisig GS, Zheng N, Lander JE, Barrentine SW, Andrews JR, Bergemann BW, and Moorman CT. Effects of technique variationson knee biomechanics during the squat and leg press. Medicine and Science in Sports and Exercise. 33:1,552 - 1,566. 2001.        Jonathan Mike, MS, CSCS, USAW, NSCA-CPT  Doctorate Student  Co Editor, ASEP Newsletter | | | | |  | | --- | |  |  |  | | --- | | Thank you for perusing our opinions, facts and opportunities in this edition of the ASEP-Newsletter.    **Sincerely,**  Lonnie Lowery American Society of Exercise Physiologists | | | |
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