Aging and Muscle Performance

To the Editor:

I read the recent article by Dr LaDora Thompson on aging (January 1994) with great interest. Research on the effects of aging on skeletal muscle has been increasing in recent years, and there is now a large body of literature to synthesize. The author has done an admirable job of blending animal and human data. However, I would like to add one more piece of information. With respect to humans, on page 76, she discussed the possible role of the central nervous system in affecting measurement of maximal isometric strength (volitional contractions). The last sentence of the relevant paragraph concludes, "Thus, many factors, including motivation, could affect measurements of maximal isometric force."

In our study of the relationship between age and isometric strength of the human ankle musculature,1 we used the technique of percutaneous motor nerve stimulation to assess descending volitional drive.2-5 Our results indicated that a large majority of even the oldest subjects (up to age 100 years) could achieve an optimal activation of their motor units voluntarily, and the electrical stimulus did not increase their force output. Therefore, we concluded that at least for a simple isometric strength test involving an isolated muscle group, the lower strength values observed in the older subjects could not be attributed to inadequate motivation. This conclusion, although adding insight to the issue of strength measurement in elderly persons, should not be generalized to more complex movements involving coordinated action of several muscle groups (eg, one repetition maximum).

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References


Response:

Dr Vandervoort begins his letter by stating, "Research on the effects of aging on skeletal muscle has been increasing in recent years, and there is now a large body of literature to synthesize." Because of this extensive body of literature, it was necessary to identify a specific purpose of my review article and select literature that directly investigated the stated purpose. The purpose of my review was "to examine the age-related alterations of muscle function with respect to muscle morphology, strength, and performance." Therefore, studies that were beyond the scope of these topics were not included. The articles cited in the letter by Dr Vandervoort were not included because their purpose and findings were not within the scope of the review article. My statement that "many factors, including motivation, could affect measurements of maximal isometric force" is well documented in the literature.

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References


Spurious Identification of Patient Problems

To the Editor:

The intent of this letter is to illustrate why the routine application of clinical diagnostic tests often results in identifying patient problems that do not exist. Two data-gathering strategies used frequently by physical therapists are the exhaustive approach and the hypothetico-deductive method.1,2 In order to illustrate these two strategies and their potential impact, the following scenario is presented:

A 12-year-old male basketball player with anterior knee pain (patient SS) is referred to you for assessment and treatment. The lad tells you he has had intermittent anterior knee discomfort for the past 6 weeks, and there is no history of an injury in either the immediate or distant past. His discomfort increases with running, jumping, kneeling, kicking objects, and going up and down stairs. The knee does not lock, nor does it give way. He tells you the discomfort subsides with rest.

At this point, you may wish to generate several hypotheses for this patient and consider all tests you would apply during the physical examination. Clinicians who choose to apply only those tests relevant to the hypotheses are using the hypothetico-deductive approach, whereas, those clinicians who painstakingly apply every test that can possibly be performed on the knee demonstrate the exhaustive approach. For example, based on patient SS's history, principal hypotheses would likely include: (1) chondromalacia patellae, (2) patella tendinitis, (3) Osgood-Schlatter's disease, (4) bursitis (take your pick of location), (5) quadriceps tendinitis, (6) coronary ligament sprain, and perhaps (7) meniscal lesion (anterior horn). Secondary problems may include muscle weakness and, possibly, restricted range of motion. Ac-