

## GUEST EDITORIAL

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### Aesthetics of walking

I teach physical medicine and rehabilitation resident physicians to consider the following functional aspects when evaluating a person's walking: efficiency, comfort, risk of falling, and risk of biomechanical injury.

But then there's the outward appearance, cosmesis, or the aesthetics of walking—an unsaid societal, functional aspect that we (patient, family, and clinicians) may wish did not exist, but which often is the one that we, often unconsciously, respect a great deal. Who would think the study of walking could be so philosophical? Although I'm no philosopher, I do have some thoughts on this. The problem is we often deny that aesthetics of walking is an issue and without knowing it, intertwine aesthetics of walking with the other functional aspects. As rehabilitation clinicians and researchers, I think it is our responsibility to distinguish aesthetics from these other functional aspects. This is a challenge, but once accomplished, I believe we can begin to change the perception of what is an aesthetically acceptable or pleasing gait. In fact, we should be able to change the perception of what is an aesthetically acceptable on the basis of the other functional aspects themselves.

I believe aesthetics of walking is now unknowingly imbedded in each of the other functional aspects of walking. For example, efficiency of walking appears to be a discrete functional aspect and improving efficiency of walking is a seemingly inarguable goal of rehabilitation. We are impressed with improvements in efficiency of walking, assessed with comfortable walking speed, various biomechanical efficiency quotients, and oxygen consumption measurements during walking. Hidden, however, is our concern for aesthetics. If we were not concerned with aesthetics, why do we not just prescribe a wheeled prosthesis for a person with a leg amputation or a skateboard for a person with a stroke? These modalities would certainly improve efficiency of walking. Saunders and Inman described critical factors during walking that are essential to reducing the displacement of the center of mass during walking so as to maximize efficiency of walking (1). While Gard and Childress recently dismissed two of these key "Six Determinants of Gait" (2,3) and we subsequently dismissed another (4) and introduced a new determinant (5), we still accept that minimizing the vertical translation of the center of mass relates to efficiency of walking. But kangaroos hop and they seem to be



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efficient. But then again, how attractive is hopping? Perhaps our rehabilitation goal to reduce center of mass displacement during walking has more to do with aesthetics than we think.

Generally, no one likes to admit that an "atypical" or "abnormal" gait pattern in and of itself is necessarily bad unless it adversely affects efficiency, comfort, risk of falling, or biomechanical injury. We all realize that an atypical gait pattern may be directly compensatory for underlying impairments (or another underlying atypical gait pattern). So the thought of altering an atypical gait pattern just because it is not aesthetically normal in appearance is not something we really like admitting to have as a rehabilitation goal. By not admitting that aesthetics is the key issue, I think we often delude ourselves into thinking that the other functional aspects are compromised and that altering the aesthetics will improve these other

aspects. In fact we might actually be compromising these other functional aspects.

Once we recognize aesthetics for what it is, separate from the other functional aspects of walking, we should be able to change our perception of what is aesthetically acceptable. I am optimistic in predicting that we can change our perception of what is aesthetically acceptable on the basis of the other functional aspects. In the press wake of two articles implicating high-heeled shoes to knee osteoarthritis (6,7), I have been asked to advise women about what shoes to wear. Here we have shoes that not only adversely affect each functional aspect of walking, they likely contribute to a disease (knee osteoarthritis) that causes more disability with respect to mobility in the elderly than any other singular disease. Clearly in this case, aesthetics is separate from other functional aspects. "I advise flat shoes." "But, Dr. Kerrigan, that sounds extreme. Isn't it okay to wear high-heeled shoes just once in awhile? What do you recommend a woman wear when she goes to a party?" I won't give an inch (literally) and as far as advice for a party, I want to say "soccer shoes." I don't say that really (okay maybe once I did), but I do hope that we might consider Mia Hamm, a more attractive role model than Barbie. Mostly, I am optimistic that we can define beauty from function. Many kids are already doing it now. The popularity of court and running shoes stems at least in part from the perception that these shoes make us jump higher and run faster. This impression transcends to wearing these shoes all the time, not just when playing sports.

When we isolate aesthetics of walking from other functional aspects, we can make an informed decision whether or not to direct our rehabilitation efforts at altering the aesthetics. Perhaps someone with quadriceps weakness hyperextends his/her knee when that leg is on the ground during the stance period of walking (knee recurvatum). If we were certain that this pattern in this particular person would not cause injury or pain to the posterior capsule of the knee (we might observe a normal extensor knee joint, implying normal forces to the posterior structures of the knee) (8), could we accept this atypical gait pattern as a good compensation for quadriceps weakness? Perhaps a boy with cerebral palsy and spastic diplegia walks on his toes. We go through all the functional aspects. In this particular boy's case, his walking pattern is efficient, comfortable for him, *et cetera*. The main issue is that it just looks abnormal.

He doesn't "fit in" with the rest of his classmates, but he is able to run and jump with them. The decision of what to do lies mainly with the boy and his family, with advice from clinicians. We ought to consider that some kids who do not have cerebral palsy naturally walk on their toes. We even might ponder that just about all animals except primates and bears walk on their toes. We might consider that while we prefer that the boy walk on his heels and toes like other children in his class, those children may in fact want to look like Olympic gold medalist Michael Johnson, who runs on his toes.

The clinical and research challenge is to try to isolate walking aesthetics from other functional aspects of walking. I have been discussing only walking but clearly this challenge extends to other tasks and types of mobility besides walking. The nonaesthetic functional aspects can be improved with rehabilitation treatments and new research and technology developments. These new modalities might change aesthetics but that should not limit our thinking. We should be optimistic in that by improving the nonaesthetic functional aspects, ultimately we should be able to change our notion of what is aesthetically acceptable.

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