Your Chair: Comfortable but Deadly

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I
n the 1 h before work, a person can use more than 50 labor devices. At work, between logging-on to log-
ing-off, a person can remain nearly continuously in
their chair. At the end of the work-day, if the home
is the castle, the chair is its throne. From their throne, a
person can order food, purchase a car, find a new life-
partner, and play war; all this—and more—without ever
getting up. With creativity, a person can eat, work, repro-
duce, play, shop, and sleep without taking a step.

The articles in this issue of Diabetes by Højbjerre et al.
(1), Katzmarzyk (2), and Franks (3), plus a growing body
of evidence suggest that chair-living is lethal. Of concern is
that for most people in the developed world, chair-living is
the norm.

The consequences of modern chair-dependency are
substantial. The data summarized by Katzmarzyk suggest
that chair-dependency is linked to cardiovascular disease,
metabolic sequelae, excess weight, and shorter life span.
Other authorities stress deleterious psychological and
psychosocial effects as well (4,5).

The consequences of chair-dependency, however, ex-
tend beyond human health. Chair-living has been associ-
ated with the increased sales of automobiles, machines of
convenience (e.g., dishwashers), and the ubiquitous prev-
alence of computers and televisions at work and at home
(6). These factors, in turn, have had deleterious impact on
fuel use, global warming, and the depletion of human
resources. Corn crops are used to fuel cars rather than feed
people (7). Neighborhoods are designed without
walkways (8). Motorized walking belts are commonplace
and escalators are everywhere (9). Modernity has imposed
a Chair Sentence; work, home, and play are the shackles.

In an evolutionary context, Katzmarzyk and Franks
suggest that the human evolved over several million years
to be bipedal and ambulatory. This time frame is consist-
tent with the genetic and epigenetic design of the human
physique and organ systems. Neuro-behaviorists would
argue that the human brain and behavior evolved in
concert (10). The human evolved to competitively flourish
while upright with respect to providing food (agriculture
and hunting), shelter (home building), and tool design
(e.g., flint knives) (11). The human evolved to feed, shelter,
and invent while ambulatory. The human, simply put, was
not designed to sit all day.

That said, if logic suggests a biological evolutionary role
for ambulation, it is difficult to dismiss a biological func-
tion for sitting (12). Here, it is reasonable to argue that
energy conservancy is at play. Hunting and threshing may
be highly exothermic but resting, while seated, is almost as
energy efficient as lying down. While sitting, though, a
person can be vigilant of their surroundings. Detailed
analysis of agricultural work demonstrates periodicity of
exothermic and restful tasks (13). Sitting is not bad for you
in moderation, but in excess it is addictive and harmful.

The Chair Sentence is likely to have been imposed over
three temporal phases (14). The first phase was the
Neolithic transition, 10,000 years ago, from hunter-gather
to agriculturalist. The second phase was the last two
centuries, which saw the effects of the Industrial Revolu-
tion. The third phase covered the last 30 years, which have
been impacted by technological advances, particularly
with respect to electronic engineering and computer sci-
cences. In the developed world, with urbanization and the
geographic centralization of work, economic productivity
per person has increased along with enhanced food,
shelter, and infant security. This societal change occurred
faster than physical and maybe psychological adaptation
could. But once enticed to the chair, we were stuck. Work
and home alike: we do it sitting.

Chair-living is not without potential solutions. Katzmar-
zyk suggests that the exercisers of the last 60 years have
identified one solution: moderate and high-intensity exer-
cise. The more of it, the better; it promotes health for those
that do it. The problem is, however, that people, especially
those prone to be inactive with obesity, do not exercise
regularly. Moreover, human and animal data suggest that
repeated frequent bouts of low-intensity meandering-style
activity may be more health-beneficial than occasional
bouts at the gym and that a primary risk of ill health is
sitting time per se (15). A pharmacological solution is a
possibility as well; for example, there could be population-
wide deployment of medications to mitigate the ill effects
of day-long sitting. Current embodiments of the metabolic
dopoly pill are close to this (16). From early school onwards,
the biological adaptation needed to accommodate to chair-
living could be met using life-long medication. Most effi-
ciently, such medications could be infused into the water
such as occurs with fluoride supplementation. A third
arena for consideration in combating the Chair Sentence
might be, based on Franks’ review, epigenetic modification
of the obesity-prone fetus.

In conclusion, the physical, mental, societal, and envi-
ronmental sequelae of the modern Chair Sentence have
broad-based implications. There are solutions to chair-
associated ill health that range from population-wide gym

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See accompanying articles, pp. 2717, 2732, and 2790.
attendance, pharmacological administration, or genetic manipulation. Alternatively, people could get up.

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