

Chapter 14 UNIQUE NEEDS

第 14 章 独特需要

*I'm a 42-year-old in a 20-year-old's body.
— KENT BOSTICK,
Olympian at age 42 and again at age 46*

*42 岁的年龄，20 岁的体格！
—— KENT BOSTICK
曾在 42 岁和 46 岁时两次参加奥运会*

Masters

老将

A few years ago I spoke at an American College of Sports Medicine workshop in New York City. The topic for the workshop was masters athletes – those over the age of 40. For two hours before my presentation I listened as one doctor after another talked about “normal” performance declining with aging.

When I finally got my turn to speak, I was beginning to think we were all supposed to give up sports as we got older. I told the audience not to believe half of what they had been hearing. The reason people slow down so much after age 40 is not as much physiology as it is psychology. We think we should be slower.

I reminded the audience of 41-year-old Eamonn Coghlan, the first person over 40 to run under four minutes for the mile. He didn't do this by reading statistics on what is supposed to happen with age. I pointed to 40-year-old Dave Scott, who was planning a comeback at that year's Ironman – not to just finish, but to win (he finished second). And Mark Spitz, who took a serious shot at making the 1992 U.S. Olympic swim team twenty years after his seven gold medals in Munich. Then there was Carlos Lopes who, at age 37, won the Olympic marathon. And Kent Bostick, 42, who surprised everyone by qualifying for the 1996 Olympic by defeating 28-year-old Mike McCarthy by nearly one second in the 4000-meter pursuit (Bostick qualified again for the 2000 Olympic at age 46).

These aging athletes are just the tip of the iceberg. There are hundreds of masters in the

几年前在纽约，我参加了一个全美大学运动医学研讨会。议题是关于“老将”们——那些年龄超过 40 岁的老运动员。在我演讲之前的 2 个小时里，医生们一个接一个地都在谈论着自然衰老引起的“正常的”运动能力下降。

最终轮到我发言时，当时我感觉大家几乎都认同如果年纪大了就应该放弃运动了。于是我告诉听众们不要相信刚才他们所听到的东西。年过 40 以后我们的速度会慢很多，这与其说是因为生理因素，到不如说是心理因素影响更大些——我们觉得慢一些是应该的。

我提醒大家想想 41 岁的 Eamonn Coghlan，第一个 4 分钟内跑完 1 英里的 40 岁以上的人。他能做到这些靠的不是读各个年龄段将会发生什么的统计数据。我提到 40 岁的 Dave Scott，他计划在当年的铁人赛中复出——不仅仅是完赛，而且要赢（他最终获得了亚军）。还有 Mark Spitz，这位慕尼黑奥运会上 7 枚金牌得主 20 年后复出，试图代表美国游泳队参加 1992 年奥运会（选拔赛中只差一点晋级）。另外还有 Carlos Lopes，37 岁时赢得奥运会马拉松比赛。Kent Bostick，42 岁时参加 1996 年奥运选拔赛，在 4000 米追逐赛中令人震惊地以将近 1 秒的优势击败了 28 岁的 Mike McCarthy 而晋级（2000 年，46 岁的 Bostick 再次在奥运选拔赛中晋级）。

这些老运动员只是冰山的尖顶而已。体育大家园中有数以百计的老将们，他们的

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Chapter 14 Unique Needs

world of sport who are within seconds or inches of their best performances of all time. In the last ten years, there has been tremendous growth in the number of USCF members who are over 40. Between 1984 and 1993 there was a 75-percent increase in the number of members in their forties. In 1996, 20 percent of USCF racers were over 40. What just fifteen years ago was a young man's sport has become a sport for both sexes and all ages.

Ability and Age

There's no denying that there's a loss of ability for racing with advancing age. The best indicators of this in road cycling are age group records for the individual time trial (ITT). The 40k records reveal an average slowing of twenty seconds per year, about 0.6 percent, after the age of 35. For the 20k, ITT times slow about 12 seconds per year from age 20 to 65 – a 0.7-percent decline per decade of life.

These small drops in performance result from continuing losses of the three basic abilities – endurance, force and speed skills. While longitudinal studies of highly-trained athletes are few and far between, it appears that the decline of each of these abilities is similar to what the ITT records show – about 6 percent per decade. That is well below the expected decline of 10 percent per decade that's found in the “normal” population after age 25.

Since the 1930s, scientists have studied the link between aging and physiological functions. One inescapable conclusion has come from this research: Getting older inevitably means some degree of reduced function. Aerobic capacity (VO₂max) decline is a good example of what the studies show.

You may recall from Chapter 4 that aerobic capacity is a measure of how much oxygen the body uses to produce energy at a maximal workload. The higher one's aerobic capacity, the greater his or her potential for performance will be in an event like bike racing. Studies show that starting at about age

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第 14 章 独特需要

现状比起一生中的最好成绩也就差了一点点。在过去 10 年间，40 岁以上的美国自行车联合会（USCF）会员有了极大的增长。1984 年到 1993 年间，40 多岁的会员增长了 75%。1996 年，40 多岁的 USCF 会员增长了 20%。这项 15 年前的年轻人的运动现在已经变成适合所有年龄和性别的运动了。

能力与年龄

不可否认随着年龄增长比赛能力会随之下落。公路车运动中最好的指示器就是各个年龄组的个人计时赛成绩（ITT）。40 公里记录中，35 岁以后平均每年慢 20 秒，大约 0.6%。20 公里记录中，20–65 岁之间，平均每年慢 12 秒 —— 平均每十年下降 7% 【1】。

这种运动能力的微小下降源自于三方面能力的持续损失 —— 耐力，力量和速度技巧。虽然对刻苦训练的运动员的纵向研究比较少，相互之间的差别也较大，但每种能力的下降趋势和 ITT 记录显示的相似 —— 每 10 年下降 6%，比预期的 10% —— 25 岁后的“普通”人群的下降趋势 —— 要小很多。

自从 20 世纪 30 年代起，科学家开始研究年龄老化和生理功能之间的联系。这项研究得出一个确定无疑的结论：年老不可避免地意味着某种程度的身体功能衰退。研究显示的最大摄氧量（VO₂max）的减退就是最好的例子。

第 4 章中说过，最大摄氧量反应了身体在最大运动负荷时为产生能量所消耗的氧气的度量。一个人的最大摄氧量越高，他在比赛中运动潜力就越大（比如自行车赛）。研究显示从 20 岁开始，普通人群的最大摄氧量就开始下降，部分原因是最大心率开始

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Chapter 14 Unique Needs

20, aerobic capacity begins to drop in the general population, in part because maximum heart rate decreases. A lowered maximum heart rate means less oxygen delivery to the muscles, and therefore a lowered aerobic capacity. The usual rate of decline measured in such research is in the range of six to ten beats per decade.

Similar results have come from aging studies on the pulmonary, nervous, muscular, thermal regulatory, immune, and anaerobic systems: Sometimes in the third and fourth decades of life (age 20 to 39), functional decreases begin, with losses of up to 10 percent per decade. Compounding the problem is what appears to be a normal increase in body fat after the early twenties, obviously made worse by a sedentary lifestyle. Again, this is for the general population – not those who race bikes or are highly active.

Flexibility is also lost with age. This is in part due to a drop in the amount of body fluids the body can store in later life. An aging immune system doesn't work as well as it once did, either – a good reason to take antioxidants. Then there's heat. Getting older means not sweating as much in hot, dry conditions, yet our urinary systems are more effective at flushing water, thus decreasing blood volume. To make matters worse, the thirst mechanism isn't as sensitive as it once was. All of this means a greater likelihood of overheating and dehydrating.

The Aging Myth

A little skepticism is a healthy thing when it comes to research. Most studies of aging are based on “cross-sectional” analysis. This means, for example, that a group of 30-year-olds and a similar group of 40-year-olds are tested for some parameter of fitness, and the difference is assumed as the normal loss.

The alternative is “longitudinal” research, which involves following a group of subjects for several years, testing regularly to see how they change. This method has many

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第 14 章 独特需要

下降。较低的最大心率意味着传输较少的氧气给肌肉，从而导致较低的最大摄氧量。这项研究显示一般每 10 年最大心率下降 6—10 下。

类似的结论也出现在关于肺部，神经，肌肉，热量调节，免疫，无氧系统的老化研究中：在 20—39 岁之间的某个时刻，身体功能的衰退开始了，每 10 年衰退 10% 左右。另外，20 多岁时身体开始积累脂肪，这本来很正常，但久坐的生活习惯会使它变成了一个问题，并使衰退情况雪上加霜。再次强调，这只针对普通人群——而不是那些经常骑车训练或经常运动的人。

身体的柔韧性也随年龄在退化。部分原因是年龄越大身体能够储存的水分就越少。免疫系统也不象年轻时那么灵光了——所以需要吃抗氧化剂。还有在干燥炎热环境下的抗热能力，年纪越大意味着出汗越少，排尿系统更多地排出水分，使得血液总量减少。更糟的是，口渴机制也不象原先那么敏感了。所有这些都意味着更大的过热和脱水的可能性。

衰老神话

对科学研究来说，抱一点怀疑论调总是有好处的。许多对年龄老化的研究是基于“横断面”分析建立的。也就是说，对一组 30 岁的人和一组 40 岁的人测试同样的身体健壮性指标，二者的区别就被认为是正常的衰退。

而另一种研究方法是“纵向”分析，包括对一组研究对象做多年的跟踪，定期测试以发现他们的变化。这种方法有很多好

The Cyclist's Training Bible (3rd edition)

Chapter 14 Unique Needs

benefits. Time is an obvious downside, however, so there are few longitudinal studies of athletes.

Research of aging also raises the question of who the subjects are. Many studies characterize the subjects as “trained endurance athletes.” This vague description is usually based on measures of training volume, such as years of activity, or hours of training in a week. Definitions vary. One study's trained endurance athlete may be another study's novice. Seldom is the intensity of training used to categorize the groups studied, as it is hard to quantify. But since it appears that intensity is the key to maintaining race fitness, this is a crucial issue.

The few longitudinal studies that have been done show that when the intensity of training is maintained, aerobic capacity and other selected measures of fitness decline as little as 2 percent per decade. This is roughly a third to a fifth of what is usually discovered in sedentary subjects, or even in those who maintain their health and continue exercising at low intensities.

The “normal” decline in performance of 6 to 10 percent per decade is probably more a result of self-imposed training and lifestyle limitations than it is of human physiology. Aging may actually only account for a fourth of the losses, while disuse takes the bigger bite.

Beating the Curve

While slowing down with age to some extent may be inevitable beyond some number of years, many riders have found that the rate of decline can be dramatically reduced by a willingness to train with the same high intensity and volume as they did when they were younger. In fact, some of the top masters riders are even doing more now than in previous decades. One scientific study has shown that it's possible to maintain aerobic capacity, a good indicator of fitness, for ten years past your youth. Another has

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第 14 章 独特需要

处。但时间显然是一个不利因素。所以目前很少有做运动员的纵向研究。

年龄老化研究要面对的另一个问题是研究对象。许多研究定义其研究对象为“经训练的耐力运动员”。这是个模糊的描述，其定义基于训练总量的度量方式，比如运动年头，或每周的训练小时数。因为定义的变化，一项研究中的“经过训练”的耐力运动员可能只是另一项研究中的“新手”。而训练强度很少被用于测试人群的分类，因为很难量化。但是我们知道训练强度是保持比赛能力的关键因素，所以这是目前研究中存在的一个关键的问题。

少数已完成的纵向研究报告显示，在保持训练强度的前提下，最大摄氧量和其他健壮性指标的下降为每 10 年只有 2%，这大致相当于久坐人群的下降率的 1/3 到 1/5，或大致等同于持续低强度运动以保持健康状况的人群的下降率。

所谓“正常”的每 10 年 6%—10% 的运动能力的下降，也许更大程度上只是某种自我强加的，在人体生理学方面有局限的训练和生活方式的结果。在所有导致衰退的因素中，年龄实际上只排在第四位，而不运动的影响要大得多。

战胜下降曲线

虽然随着年龄增长不可避免地会有一定程度的变慢，许多车手发现如果继续主动保持他们年轻时的训练量和训练强度，这种下降的趋势可以大大地减缓。实际上，有些顶级的老运动员们现在做的甚至比他们前一个 10 年做的还要多。有一项科学研究表明青春期的最大摄氧量和好的健壮性指标有可能在青春期之后继续保持 10 年。另一项研究表明运动员完全可以达到最大摄氧量只下降 2% 或更少的程度，一直到他 50 多岁的年纪。

demonstrated that aerobic capacity drops of 2 percent or less can be accomplished well into an athlete's fifties.

The bottom line is that intense training keeps the heart, nerves, muscles, lungs, and other systems all working to their genetic potential. If you never exercise at high intensity, you will lose fitness, and possibly health, more rapidly than is necessary. For those beyond the age of 40, the following training guidelines will help to keep fitness high and, for some, even improving.

Training Implications

How willing and able are you to train as much as you did when younger – or even more? Here are some suggestions for improving your racing even as you get older.

- Strength train year-round. While younger and more naturally muscular athletes may stop strength training in the late winter, masters should continue throughout the year. The stronger you are, the more force you can apply to the pedal. Greater strength means lower perceived exertions at all levels of power output.
- Train a minimum of seven to ten hours a week on average throughout the year. That means an annual volume of at least 350 to 500 hours.
- Take a full twelve weeks in the Base period. Don't cut it short. You must maximize your endurance, force, and speed skills before upping the intensity. Be sure to stay proficient at spinning at high cadences.
- Once you have established your base fitness, put less emphasis than younger riders do on endurance and more on power, anaerobic endurance, and muscular endurance. That means greater attention to jumps, sprints, intervals, and time trialing than to long workouts. Your longest ride

底线是高强度训练可以使心脏，神经，肌肉，肺和其他身体系统保持在其遗传潜能基础之上。如果你从没做过高强度训练，那么你也许会更快地失去强健的身体，甚至基本的健康。对那些 40 岁以上的人来说，以下的训练原则将会帮助他保持，甚至提高身体的健壮性。

训练提示

你有多大的意愿，或能够多大程度上象你年轻时那么训练 —— 或做的更多一些？下面这些建议能够改进你的比赛能力，即使你已经老了。

- 持续全年的力量训练。在冬季后期，年轻人和肌肉天生发达的运动员也许会停止力量训练，但老将们应该继续练习到年底。你越强壮，你的蹬踏就越有力。力量越强也意味着同样功率输出时更低的自我感觉负荷。
- 平均每周至少训练 7—10 小时，全年不间断。这意味着全年的训练量至少 350—500 小时。
- 基础阶段至少保持完整的 12 周，不要在缩短了。你必须在提高训练强度前最大限度地增强你的耐力，力量和速度技巧。一定要掌握保持高踏频的技巧。
- 当你已经建立了基础能力后，不要象年轻骑手那样把重点放在耐力训练上，而是要重点做力度训练，无氧耐力训练，和肌肉耐力训练。这意味着更加关注突击，冲刺，间歇训练和个人计时，而不是长距离的训练。你训练的最长距离应

should be only as long as your longest race time.

该就是你比赛的最长距离。

- After you have established your base, allow for more recovery time between workouts than you had in the past. Few masters can handle more than two or three high-quality workouts a week and get away with it for long. Many masters have found it is possible to race quite well on two breakthrough workouts a week. For example, in the Build period, at mid-week combine a muscular-endurance workout with anaerobic endurance or power, doing the faster portion first. Then recover for two or three days and complete a high-intensity group ride or tune-up race on the weekend. Take a day off the bike every week. If you find recovery to be especially difficult, change the pattern of weekly training hours in Table 8.5, so that there are only two weeks between recovery weeks instead of three. Omit the first week in each case. You may find that with only two weeks of hard training, you need only five days or so of recovery before starting the next cycle. So consider training with a pattern of sixteen days of hard training, followed by five days of R&R. Or maybe you'll find that a 15-6 pattern works best at certain times of the season. This will take some experimentation.
- Train in the heat once or twice a week during the summer, including higher-intensity workouts on hot days once you feel adapted. Be especially cautious with your levels of hydration. Drink a 16-ounce bottle of sports drink every hour during a ride whether you feel like it or not. Sip water throughout the day even if you don't feel thirsty.
- Stretch after every workout and again later in the day. Try to become more flexible now than you've been in years. You can do it if you are dedicated.
- In road races, stay in the front third from the start. Due to the wide range in abilities
- 当你已经建立了基础能力后，应该适当延长训练或比赛之间的恢复期。老将们几乎不可能长期保持每周进行 2—3 次高质量的训练而不导致训练过度。许多老将发现一周进行两次突破性训练的方式感觉很好。比如，在发展期，每周三或周四进行肌肉耐力训练并结合无氧耐力或力度训练，哪个项目骑得更快就先做哪个。然后花 2—3 天恢复，接着在周末完成一次高强度的大组训练或准备参加比赛。每周要有一天不骑车。如果你觉得恢复比较困难的话，就按照表 8.5 调整每周的训练小时数，使得恢复周之间只有两周，而不是三周。一般情况下只需把第一周省略即可。你会发现只有两周的艰苦训练，然后就是 5 天的恢复期和下一个艰苦训练的循环。所以训练模式就变成了 16 天的艰苦训练加上 5 天的休息恢复期（R&R），或者你会发现在赛季的某些时候变成 15—6 模式效果会更棒。当然你需要花时间做些试验和摸索。
- 夏天时每周在炎热中训练一到两次，身体适应以后每周要在炎热环境中进行一次高强度的训练。要特别注意补充水分。不管喜不喜欢，每一小时要喝完一瓶 16 盎司的运动饮料，即使不觉得口渴也要不断啜饮。
- 每次训练和比赛后要做拉伸活动，并在晚上再做一次。你要试着比以前更加柔韧一些，只要你专注去做就可以做到。
- 在公路赛中，从出发开始就要保持在前三的位置。因为老将们的能力和经验差

and experience levels at masters races, the groups tend to break up sooner than senior races do.

Diet, Aging, and Muscle

Popeye was right: Eating spinach can make you stronger and more muscular, especially if you're over age 50. Let me explain.

It's apparent that as we grow older muscle mass is lost. Although this loss is slowed somewhat by weight lifting and vigorous aerobic exercise, it still happens. Even athletes in their sixties typically demonstrate considerably less muscle than they had in their forties.

Now there is research that shows why. Nitrogen, an essential component of muscle protein, is given up by the body at a faster rate than it can be taken in as we get older. This is due to a gradual change in kidney function that comes with aging, ultimately producing an acidic state in the blood. Essentially, we are peeing off our muscles as we pass the half-century mark in life.

Also, with a net loss of nitrogen, new muscle cannot be formed. This same acidic state of the blood also explains why calcium is lost with aging resulting in osteoporosis for many, especially women, with advanced age.

The key to reducing, or even avoiding, this situation is to lower the blood's acid level and increasing its alkalinity. There are studies demonstrating that taking a supplement called potassium bicarbonate daily for as few as eighteen days increases the blood's alkaline level by balancing nitrogen in the body. While it can be purchased relatively inexpensively in laboratory supply shops, potassium bicarbonate is not currently available as an over-the-counter supplement, and there are no long-term studies of its effects on health. There is some evidence that it contributes to irregular ECG readings.

But there is also a natural way of

别比较大，所以相比于专业级比赛，大组集团会更快地分化。

饮食，衰老和肌肉

大力水手是对的：吃菠菜能使你更强壮，肌肉更发达，特别是在你年过五旬之后。下面我会解释。

我们知道随着年龄变老，肌肉块也跟着消失了。虽然举重和剧烈的有氧运动某种程度上能减缓消失的速度，但它毕竟还是要发生。即使是对 60 多岁的老运动员，他们所能展现的肌肉比起 40 多岁时也要少很多。

现代研究作出了解释。氮，肌肉蛋白质的主要成分，随着年龄老化其流失速度超过了吸收的速度。这主要是因为肾脏功能随着老化逐渐发生改变，最后造成了血液的酸性状态，从而打破了氮平衡。换句话说，在人生走过半个世纪之时，我们开始把身体的肌肉“尿”出去了。

另外，氮的净流失导致新肌肉不能形成。血液的酸性状态也解释了老化引起的钙流失。许多老年人，特别是妇女都有骨质疏松症，这就是钙流失引起的。

减少甚至避免这种情况的关键是降低血液的酸性和增加碱性。有研究表明每日服用碳酸氢钾，只需 18 天就可增加血液碱性使氮吸收平衡。虽然这种制剂在化工实验品商店都能买到，价格相对便宜，但碳酸氢钾是处方药，而且目前没有关于它对人体长期副作用的研究。有一些证据表明它是引起不规则的心电图的原因之一。

但是我们完全可以通过更自然的方式

achieving this same result through diet by eating foods that naturally increase the blood's alkalinity – fruits and vegetables. Fats and oils have a neutral effect on blood acid. In other words, they don't make it either more acidic or more alkaline. All other foods, including grains, meats, nuts, beans, dairy, fish, and eggs, increase the blood's acidity. If your diet is high in these latter foods but low in fruits and vegetables, you can expect to lose muscle mass and bone calcium as you age.

A study by T. Remer and F. Manz ranks foods in terms of their effect on blood acidity and alkalinity. For example, the food that has the most acidic effect, therefore contributing to a loss of nitrogen and ultimately muscle, is parmesan cheese. The food Remer found to have the greatest alkaline effect thus reducing nitrogen and muscle loss is raisins. Among vegetables, spinach was the most alkaline food. See what I mean? Popeye was right.

Table 14.1 ranks common foods (per 100-gram portions) and their effect on alkalinity and acidity taken from Remer's study. The higher a food's positive acidic ranking, the more likely it is to contribute to a loss of muscle mass and bone-mineral levels. The more negative the food's alkaline ranking, the more beneficial is the effect on these measures.

达到同样的目的——多吃那些能自然增加血液碱性的食物，也就是水果和蔬菜。脂肪和油是中性的，换句话说，它们不会使血液变酸性或变碱性。而所有的其他食物，包括谷物，肉类，坚果，豆类，奶制品，鱼类和蛋类，都是增加血液酸性的。如果你的饮食更多的是后一种食物而较少吃水果和蔬菜的话，到你老了的时候就会损伤更多的肌肉组织和骨质中的钙。

T.Remer 和 F.Manz 曾做过一项研究，把所有的食物按它们对血液酸碱性的影响分类。比如，引起血液酸性最大也就是引起最多的氮流失和肌肉流失的食物，是意大利奶酪。而 Remer 发现碱性最大也就是最大程度减少氮流失和肌肉流失的食物，是葡萄干，而菠菜是所有蔬菜中碱性最强的。明白我的意思了吧？大力水手确实是对的。

表 14.1 中的数据来自 Remer 的研究报告，其中列举了一般食物和它们的酸碱度影响值（每 100 克）。酸性度是正值，碱性度是负值。正值越大，表示该食物对肌肉和骨钙质的流失影响越大；负值越大，表示该食物的碱性越强，对身体的好处也越大。

【1】：原文为 0.7 percent，从上下文意思看似错误。译文改为 7 percent。