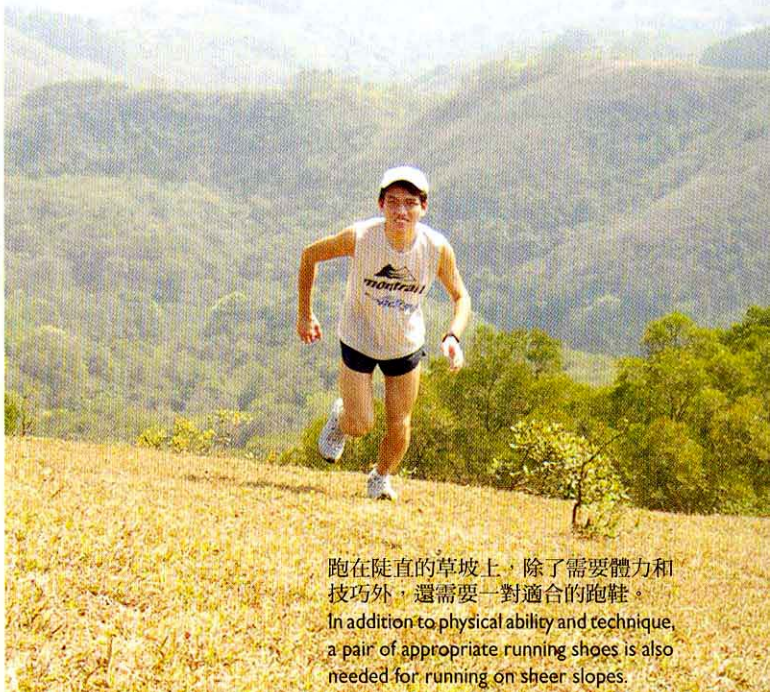
近年，香港不同形式、大大小小的行山比賽發展得非常快，連我這個不太積極的越野跑手，一到秋天，幾乎每個星期天，都在不同的山徑裡，跟其他對手比試比試。「沙士」過後，香港的郊區變得更為熱鬧，山徑擠得水洩不通。不過，遊人對很多新鋪設的混凝土山徑的埋怨，亦愈來愈多。

In recent years, more and more mountain races of different scales and forms have been held in Hong Kong. Though not a very enthusiastic trail runner, I have participated in races, on different kinds of trails, almost every Sunday. Since SARS, there has been growing number of people spending their time in the countryside; some popular trails can even seem crowded. Nonetheless, the number of complaints concerning the newly-established concrete trails has been escalating.



跑在陡直的草坡上，除了需要體力和技巧外，還需要一對適合的跑鞋。
In addition to physical ability and technique, a pair of appropriate running shoes is also needed for running on sheer slopes.

混凝土山徑與泥質山徑的好與壞

Pros and Cons of Concrete and Mud Trails

by Elton Ng

其實，政府把泥質的山徑鋪上混凝土，原意是令山徑變得更平坦易走，減少失足受傷的機會；而且混凝土山徑更易維修保養。可惜，大部分行山人士還未感受到其好處，已因而增加了很多不必要的傷患。

我認為，凡事都沒有完全的錯或對，但配合多變的環境及人為因素看來，混凝土山徑的弊處的確是比好處多，以下就讓我簡單地分析一下。

先說好處，無疑平坦的路面比起凹凸不平的路面是較少導致失足或扭傷足踝的。而且，相對於跑鞋來說，混凝土地面的靜止磨擦系數是0.7至0.8，滑動磨擦系數是0.6至0.75。而泥質地面的靜止磨擦系數是0.4至0.6，滑動磨擦系數只有0.3至0.55。最簡單的意思即是泥質地面較易「滑倒」(當然實際情況的變數，下文再詳述)。而且，跑鞋在混凝土地面的轉向扭力表現比起在泥質地面大約多一倍半，使到在混凝土地面走動時轉向亦較容易控制。

再者，混凝土山徑既耐用，又易維修保養。即使風暴過後，亦很少出現路陷，提高了道路的安全性。還有，一條人跡罕至的混凝土小徑也不易湮沒在草堆中。迷路時，混凝土小徑永遠都是好選擇。下走混凝土小徑通常都能碰上大路，因為混凝土小路通常由低處向高處鋪設的。相反，下走泥徑有時會被引領到草莽叢生、不能通越的山谷之中。

不過，另一方面，混凝土路面對人體的傷害往往比想象的還多。情況有點像網球的發展史一樣。50年多以前，很多新式的硬地球場出現，很多球員由泥地轉為硬地的球場。可是，後來卻出現一個現象，就是球員的傷患次數增加了很多。文獻指出，場地的硬度是構成這些傷患的主要原因之一。另外，症狀多以勞損等痛症為主，以腰膝痛症最為常見，反而急性創傷則較少；專家指出這與地面給予運動員的反作用力增大，及反應時間改變等等有直接關係。

雖然，沒有實際的研究針對跑山運動，但根據常理推斷及運動員的經驗所得，情況實為相似。有人會問，馬拉松的運動員也是跑瀝青的硬地馬路，為何行山/跑山運動員嚷著因跑混凝土山徑而受傷？第一，跑公路馬拉松很少會跑樓梯或大斜坡。而跑山的話就會不斷地上上落落，甚至一口氣撐足千多級混凝土梯級。可知道，在平地上緩跑，雙腳只承受著大約自己身體重量的2.9倍的反作用力負荷。但在石梯級上上落落躍動時所增加的壓力，可達身體重量的5倍，甚至更多。

鞋廠一貫是根據跑步/走動時所承受負荷的特性而製造鞋的物料。公路跑鞋和跑山鞋是有一定的分別。但現在，行山/跑山的人也不再是純粹走泥路了，隨時有一半的時間走在混凝土上。跑山鞋自然未完全發揮其功用。所以，有跑山的運動員問我，「不如穿一對公路跑鞋到山上去，不是更有用嗎?」。我認為，這是一個兩難的問題，雖然公路跑鞋可能減少到部分反作用力帶來的傷害，因山徑又不會是全段也舖了混凝土，當跑過凹凸不平的泥質或碎石路段時，又會因為保護性不足而增加失足受傷的機會。所以鞋的選擇視乎於當日的路線、天氣和本身的腳型和步姿（這些留待下一期跟大家詳細解釋）。

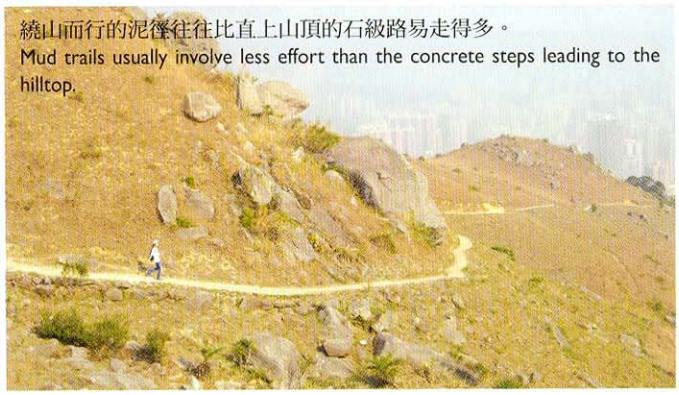
另外，混凝土山徑還有一些很實際的問題。縱使混凝土地面的靜止磨擦系數較泥質地面大，當大雨過後，滲水能力低的混凝土山徑往往較滲水能力高的泥質地面更易滑倒。還有一個很有趣的現象是，對於一些下山速度較快的朋友來說，下走混凝土地面時更易失足受傷。很大程度上是因為太信任地質的磨擦力而掉以輕心的緣故。反而，走在凹凸不平的路段時會更集中精神去控制速度和平衡。

除此之外，很多行山人士不喜歡走石級路的原因是連綿不絕的石級路局限了雙腿屈曲的角度。如果這角度與個人的腿長不協調，會格外費力，甚至更易形成一些勞損的傷患，例如髂脛束磨擦綜合症。

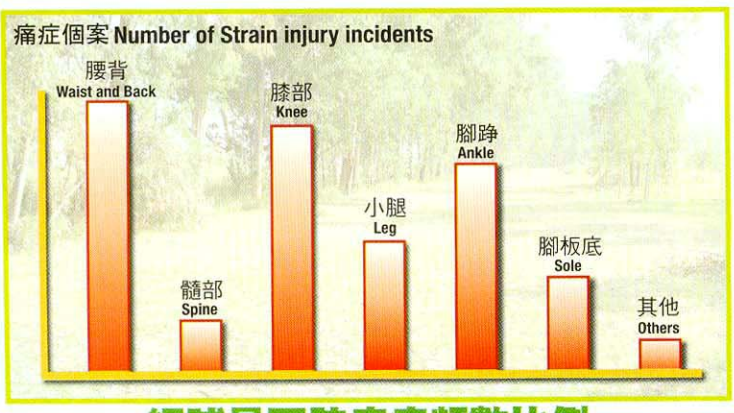
還有，在弱光環境或晚間時行山，直線地上落混凝土梯級時很易有錯覺，容易失足受傷。相反地，在轉彎位上落石級較泥級看得清楚。

總括來說，我個人比較喜歡從前常用的木板建出來的泥級，平坦得來又可吸收振盪力。不過，這些泥級愈來愈少了，我想因為這些泥級需要經常維修保養而遭放棄吧！我真的希望多保留些泥級，代替石級始終人走到山裡去都是想多接觸大自然，而不是人工建築物。況且，每每遠眺綠油油的山崗時，都被長長的灰線～混凝土山徑分開一截截，大煞風景。

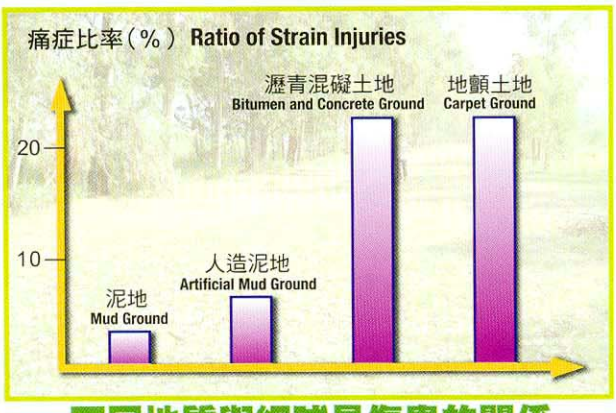
最後，我都想鼓勵大家多到山野間走走，畢竟是件有益身心的事情。當然，除了石級路，還有很多事情都要注意，才能達致行山保健的目的，這些留待日後陸續同大家分享。



繞山而行的泥徑往往比直上山頂的石級路易走得多。
Mud trails usually involve less effort than the concrete steps leading to the hilltop.



網球員下肢痛症頻數比例
Ratio of frequency of strain injuries at legs of tennis players



不同地質與網球員傷患的關係
Relationship between different kinds of grounds and injuries of tennis players

近年愈來愈多人由跑步轉為跑山，而沿途迷人的風景，的確比沉悶的街景吸引得多。
Recently there have been an increasing number of people taking part in mountain racing instead of running on roads. I believe one of the reasons is the more gorgeous vista in the countryside.

At first the government covered mud trails with concrete to make the path more even and hence reduce the chance of tumbling; besides, a concrete trail is easier to maintain. Unfortunately most hikers might get hurt because of the concrete, before they can really feel how good a concrete trail is.

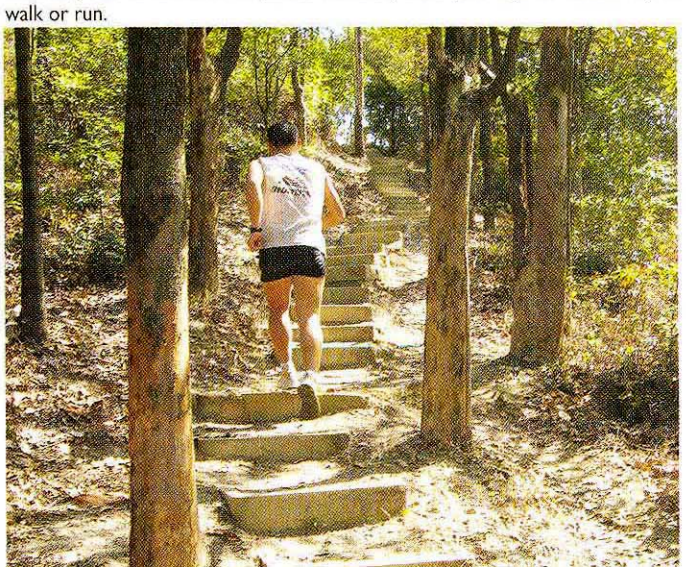
To me, there are no absolute rights and wrongs. But when considering the changing environmental conditions and human factor, you might find that concrete trails really bear more drawbacks than benefits. Let me elaborate more on this.

Undeniably, an even road is safer than a rugged road in that it leads to fewer tumbles and wrenched ankles. Also, for running shoes, the static friction coefficient for a concrete road is 0.7-0.8, and the sliding friction coefficient for that is 0.6-0.75; while the static friction coefficient for a mud road is 0.4-0.6 while the sliding friction coefficient is only 0.3-0.55. Simply put, this means people generally slip more easily on mud roads than concrete roads (though there will be some variation of course, we will discuss that later). Besides, the maximal torque performance of sports shoes on concrete roads is one and a half times more than on mud roads. That means turning direction when walking on a concrete road is more controllable.

What's more, a concrete path is more durable and is easier to maintain. Concrete roads seldom cave in even after a storm, ensuring safety when walking on the path. And a relatively unused concrete path does not disappear in vegetation quickly. It's more secure to take a concrete path when you get lost in the wild, as little concrete footpaths leading downward are usually connected with more obvious trails. Taking a mud road leading downward might only guide you to nowhere.

Unfortunately, a concrete path does more harm to the human body than you probably realise. This can be well illustrated by the development of tennis sports. Some 50 years ago, new hard tennis courts became more popular and thus many tennis players switched to this kind of tennis court from the original mud ones. But soon more incidents of injuries arose among the players. Literature points out that the hardness of the ground surface of the tennis court was the main cause of the injuries. Also, most injuries were associated with chronic and/or overuse injuries of the lower back and knees, while acute injuries were rarer. Academics stated that this directly correlated to the increase in ground reaction force loading and change of reaction time of the hard ground.

漫長的石級路，不論您走或跑，都容易對雙腳造成傷害。
This long line of concrete steps will inevitably hurt your legs no matter if you walk or run.



Although no similar research has been done specially for sport racing on mountains, through our inductive thinking and experiences shared by trail runners, hard ground does pose negative impacts to hikers / trail runners. Some people might ask, if marathon runners seldom get hurt even though the events usually take place on concrete highways, then why do hikers / trail runners get injured so easily when taking / racing on concrete hill path? First of all, marathon runners rarely run stairs and very steep roads; but paths on hills are usually sloppy and hikers / trail runners might have to walk / run up concrete stairs of over 1,000 steps. When jogging on plain ground, the ground reaction force loading on your legs is already 2.9 times of your body weight, but the burden will be as much as five times of your body weight when you take concrete steps and sloppy roads, or even more (depends on speed and vertical displacement).

Shoe manufacturers tailor-make the materials of sports shoes according to the characteristics of burden bore during running or walking. There are sports shoes particularly for marathon racing on highways, while others are for hiking and mountain racing. However, about half the hiking trails in Hong Kong have become concrete roads that shoes especially for hiking might not be suitable for. Some trail runners have asked me, "Can I wear running shoes produced for highway racing when hiking / racing on mountains?" This is really a dilemma as not all hiking trails are covered by concrete. Shoes for highway racing cannot offer enough protection when on rugged mud trails, resulting in more injuries. That's why you should choose your shoes depending on the trail you take, the weather condition and your own foot shape and walking gait. (I will talk more about this in the next issue).

One more thing, I've mentioned before that the static friction coefficient of concrete paths is higher than that of mud roads. However, after a downpour, the concrete path, which is less permeable to water, might become more slippery. Besides, those walking on concrete roads might fall more easily when they walk down a slope too quickly; this is mostly because they rely too much on the friction of the concrete road and hence became inadvertent. On the contrary, you might control your walking speed and balance more carefully if you pay more attention when walking on rugged roads.

Many hikers don't enjoy a long line of concrete steps as the bending angle of their legs will be limited. If this angle is not compatible with the length of the leg, you will have to put in more effort and may even get an overuse injury like Iliotibial Band Friction Syndrome.

It can also be a bit risky to hike on a concrete road in dim light or at night as when you walk straight on concrete steps it is easy to tumble. However, at turning points concrete steps are more visible than mud steps.

Personally I prefer mud steps made of wooden boards, which was a common type in the past. This kind of step is usually even and can absorb shock effectively. However, they are now vanishing. I believe this is because mud steps are usually difficult to maintain! I do hope more mud steps can be retained, as hikers including me usually relish the natural to the artificial. It is really an eyesore when you see the greenery of the hills is sectioned into several parts by long gray lines - the concrete footpaths.

Finally, I would like to encourage you all to visit the countryside more. Of course you have to beware of the concrete steps. And there are still many other things to note during hiking. I will talk about this later.