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**"Mountain Bike Performance and Recreation"**

*Editorial*

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# Mountain Bike Performance and Recreation

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The recreational activity of riding a bicyle off-road is very popular,[1] and consequently a major contributor to tourism across the globe.[2] As such the label accorded to the activity ("Mountain Biking (MTB)"), presents the image of an extreme sport. For many, this presents a picture of highly drilled and trained athletes performing gymnastic like tricks; hurtling downhill at speeds >70 km/h (Downhill racing) or negotiating a short lap numerous times (Country Racing), to prove ascendancy over an opponent(s). For the majority of consumers/participants the French term "Velo Tout Terrain (VTT)" is a better decriptor and indicates the fact that the bicycle is being purchased to ride on all terrain surfaces and profiles, by a diverse range of participants. Nevertheless, just like the world of motor car racing, technological development, physical understanding and skill development focuses on the very small percentage at the top of the pyramid in order to increase media exposure. The consequential amplification of participation along with technological enhancement affords a bigger polygonal base, ultimately adding depth at the various levels of participation.

The latter has important health implications as recreational VTT provides beneficial cardiovascular stimulus, social interaction, togetherness and autonomy.[3] VTT also comes with the added bonus of reduced risk for repetitive impact related injuries incurred during weight bearing activity[4] but contrary to road cycling, provides sufficient stimulus, *via* terrain induced vibrations, to promote an osteogenic effect.[5] As such VTT is potentially useful in alleviating the current burdens of a sedentary society. However, like many similar activities the product purchase comes with a danger warning entailing negative conotations of increased burdens on accident and emergency units *via* accute injuries,[6] the potential of chronic overuse injuries,[7] along with potential environmental impact disturbances to fauna and flora.[8,9]

While easy to suggest the postives outweigh the negatives, it is important to address the negative issues in order to augment that polygonal base, provide some basic guidelines to participants, understand best practise and build the layers towards the apex of the performance pyramid. As such, a PubMed (National Center for Biotechnology Information (NCBI)) database search specifically identifying "mountain biking" in peer-review periodical publications identified a total of 154 publications with an even split between performance and health/environmental (Figure 1). The majority (36%) of these were injury related and confirm that VTT is a hazardous activity. Research now needs to identify cause and effect in order to implement experimental trials to confirm or reject viable solutions. Interestingly, this process has begun to a small degree with 13.5% of publications focusing on the intervention of equipment design. While, it is imperative to understand performance gains or losses of such interventions[10-12] it is equally important that the health benefits are recognized. To this extent studies investigating suspension systems have addressed markers of stress, concentration levels and rider comfort[13] along with transferance of terrain induced accelerations to the rider.[14] This latter approach has also been taken with the effect of tyre volume on performance[11] with follow-up studies investigating the vibration damping qualities of tyres of differing volumes and pressures.[15] Interestingly, none of these studies have ventured into the environmental impact of using such equipment. It may well be the case that increase tyre volume reduces overuse injuries through reduced vibrations but could theoretically increase environmental damage through improved grip and weight distribution to the track surface.

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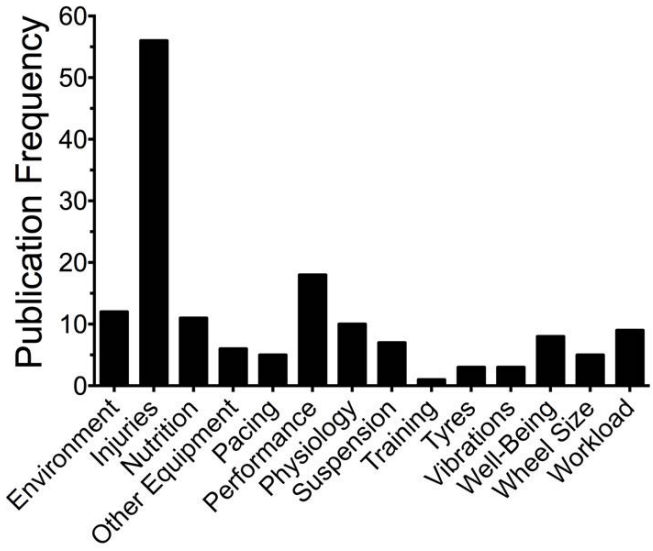


**Figure 1:** The frequency of mountain biking peer-review publications and the associated topics.

More recently, the bicycle industry introduced different wheel sizes to the off-road bicycle community. First came 29" which were marketed as a smoother faster ride. Subsequent, peer-reviewed work[11] agreed that the bigger wheels performed better in terms of speed over a set course for a given power output. However, the increased speed resulted in more surface-terrain accelerations, suggesting a bumpier ride on the bigger wheels. Subsequent work[16,17] similarly repeated performance studies with the addition of a new 27" wheel size. Both reported 29" wheels to be faster but only Steiner et al[17] reported significance. While such studies are valuable to the cycling community or cycling press there is a trend for development to be industry lead. There is nothing wrong with this if the industries main goal is to improve the sport. However, one supects that many aspects are fueled by the desire to sell more product to the consumer.

While the research culture within VTT is even younger than the sport there has been a trend for studies to be of a descriptive nature. This is normal as it is important to first understand the sport, but it is disappointing that only one follow-up study investigating training strategies was identified within the database search. Interventional studies on VTT specific skills training, nutritional strategies and physical or physiological training methods could all be associated with skill or performance level and/or injury susceptibility and are there for the taking. More importantly they are vital for the development of this very exhilarating activity that the whole family can escape to the outdoors to enjoy social interaction, togetherness and autonomy.

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