

The Hard Truth Regarding Cycling and Erectile Dysfunction?

Letter to Editor

Regular cycling has been proposed as an independent risk factor for the development of numerous urological complaints. These include pudendal nerve compression, genital numbness, hematuria, prostatitis, and even urological malignancies.¹ However, the proposed causal link with de novo erectile dysfunction (ED) is a particular favorite of the populist media and provides a potential barrier to cycling uptake in some men.

It has been previously hypothesized, but not proven, that erectile dysfunction may result from repeated compression of the pudendal nerve at Alcock's canal, against the pubic arc.² Such compression is exacerbated by the tilt forward of cyclists on the seat and repeated oscillation, leading to pudendal neuropathy and transient or even permanent ED.³ Furthermore, perineal compression has also been linked to penile arterial insufficiency, promotion of increased connective tissue deposition, and ED driven by veno-occlusive dysfunction.²

After the impact of coronavirus disease 2019 on public transport systems worldwide, many of us are encouraged to join the "cycling revolution" and commute to work by bicycle. Commuter cycling has strong evidence for improving both baseline cardiovascular fitness and risk factors.⁴ An increased uptake in cycling among men would be a positive lasting public health impact from this pandemic.

Gan et al¹ timely first meta-analysis on this topic sought to answer this hypothesis using clinically validated ED in a recent edition of *Sexual Medicine Reviews*. After systematic evaluation, six cross-sectional studies, with or without matched controls, using either the Sexual Health Inventory for Men ($n = 5$) or International Index of Erectile Function ($n = 1$), met inclusion. This generated a total combined cohort of 3,330 cyclists and 1,524 non-cycling controls for pooled analysis. The authors reported no significant difference in ED prevalence between cyclists and non-cyclists (56.8% vs 56.2%; odds ratio [OR]: 0.99; [95% confidence interval {CI}: 0.88–1.14]; $P > .05$). Furthermore, cyclists did not have a significant difference in odds of ED when compared with non-cyclists (OR: 0.99; [95% CI: 0.87–1.14]; $P > .05$) or significant differences in reported mean Sexual Health Inventory for Men scores (20.3 vs 19.7; $P = .08$).

Commendably, the authors performed a subgroup analysis controlling for age, hypertension, and diabetes. Interestingly, this reported cyclists did have a higher odds of ED (OR: 2.00; [95% CI: 1.57–2.55]), albeit with no significant difference in the mean Sexual Health Inventory for Men score.¹ These results seem to suggest that there may be an association between regular cycling and ED in the subgroup of men who have diabetes, hypertension, and/or of increased age. However, before adoption

of these results, it is important to consider several major limitations of this meta-analysis.¹

First, the six studies showed clear heterogeneity ($I^2 = 93.3\%$). One study evidenced much higher odds of ED in cyclists when controlling for age and other comorbidities compared with the other studies.⁵ When subgroup analysis was performed with this outlying study excluded, the prior reported association was not durable, and in fact, cyclists were reported to have lower odds of ED than non-cyclists (OR: 0.69, [95% CI: 0.53, 0.90]).¹

Second, the paucity of well-designed studies actually answer this research question. Such cross-sectional design lacks the rigor to prove causality when measured objectively using the Bradford Hill criteria for causality.⁶ Studies included in this meta-analysis were of all assessed as moderate to poor quality. One included study evaluated 57 "extreme off-road cyclists" who cycled more than 2 hours a day. This is hardly representative of the recreational male cycling population and was ultimately a poor choice of inclusion.⁷ When these limitations are taken collectively, it could be suggested that performing a quantitative meta-analysis for effects estimates was not appropriate.

Overall, the results of this first meta-analysis does little to confirm nor refute any causal association between cycling and de novo ED. Randomized evidence is also unlikely to be forthcoming, largely owing to a practical standpoint. Prudently, alternative research effort is now focused on how any risk of ED can be mitigated in cycling, rather than pursuing to demonstrate a causal relationship via an observational design. Attention is being placed on the role of saddle shape, size, or material components that can be altered to improve chronic perineal pressure.²

Although as urologists, we will always believe in the benefit of maintaining a state of unrestricted neurovascular flow to the penis, it seems self-evident that regular cycling activity offers our patients much broader health benefits, and as such, we should adopt a position of firm support for cycling as part of promotion of a wider men's health strategy.⁸

Alistair McManus, MBBS¹, Martin J. Connor, MBBS, MRCS^{1,2}

Ankit Desai, MBBS, MRCS¹, and

Saiful Miah, PhD, FRCS(Urol)³

Imperial Prostate, Division of Surgery, Department of Surgery and Cancer, Faculty of Medicine, Imperial College London, United Kingdom

Imperial Urology, Charing Cross Hospital, Imperial College Healthcare NHS Trust, London, United Kingdom

Department of Urology, Wycombe Hospital Buckinghamshire Healthcare NHS Trust, High Wycombe HP11 2T, United Kingdom

Corresponding Author: Martin J. Connor, MBBS, MRCS, Division of Surgery, Department of Surgery and Cancer, Imperial College London, Charing Cross Campus, Fulham Palace Road, London, W6 8RF, UK. Tel: +44 (0) 203 311 5473; Fax: +44 (0) 20 7594 8932; E-mail: m.connor@imperial.ac.uk

Conflict of Interest: The authors report no conflicts of interest.

Funding: Alistair McManus, Ankit Desai & Saiful Miah have no financial disclosures. Martin J. Connor receives research grant funding from the Wellcome Trust charity and University College London Hospitals (UCLH) Charity.

<https://doi.org/10.1016/j.sxmr.2020.08.001>

STATEMENT OF AUTHORSHIP

Alistair McManus, Martin J. Connor: Writing - Original Draft, Formal Analysis; Alistair McManus, Martin J. Connor, Ankit Desai, Saiful Miah: Conceptualization, Resources, Writing - Review & Editing.

REFERENCES

1. Gan ZS, Ehlers ME, Lin F, et al. Systematic review and meta-analysis of cycling and erectile dysfunction. *Sex Med Rev* 2020.
2. Michiels M, Van der Aa F. Bicycle riding and the bedroom: can riding a bicycle cause erectile dysfunction? *Urology* 2015; **85**:725-730.
3. Ricchiuti VS, Haas CA, Seftel AD, et al. Pudendal nerve injury associated with avid bicycling. *J Urol* 1999; **162**:2099-2100.
4. Oja P, Titze S, Bauman A, et al. Health benefits of cycling: a systematic review. *Scand J Med Sci Sports* 2011; **21**:496-509.
5. Mugalo E, Ojiambo R, Tam C, et al. Occupational cycling is a risk factor for erectile dysfunction in east africa. *East Afr Med J* 2017; **94**:68-71.
6. Fedak KM, Bernal A, Capshaw ZA, et al. Applying the Bradford Hill criteria in the 21st century: how data integration has changed causal inference in molecular epidemiology. *Emerging themes Epidemiol* 2015; **12**:14.
7. Leonhartsberger N, Buttazzoni A, Steiner H. 843 scrotal changes and fertility problems in extreme bikers. *J Urol* 2010; **183**:e329.
8. Tharakan T, Salonia A, Minhas S. Male life expectancy is still inferior to that of women: Urologists must refine and develop the concept of men's health. *Eur Urol Focus* 2019; **76**:712-713.