

Cycling safety as part of a successful road safety strategy in India

India's growing economy and population foster motorization, bringing with it congestion, pollution and road traffic crashes. Bicycles are environmentally friendly, function as feeder for public transport, and still have a share of between 15-35% of total trips in India.^[1] However, many cyclists may not be cyclists by choice. Rather they are 'captives', unable to buy a motor vehicle but as their income increases they may aim to shift to a car or motorcycle to reduce their exposure to road safety risks or increase their travel range.^[2] Cyclist-friendly strategies to improve cycling safety (and hence encourage cycling) could be part of a policy to counter the vicious circle of motorization.

The results of the study by Munivenkatappa *et al.*,^[3] suggest that many Indian cyclists may indeed be captives. Ninety-two percent of cyclist victims were of low socio-economic status. Moreover, there appeared to be a higher risk of moderate to severe injuries among menial workers, which may be explained by their use of busy arterial roads where they are exposed to high-speed vehicular traffic, especially in urban areas. Rural roads are often narrow, with poor road surface quality, and are jointly used by domestic animals, which increases the crash risk. The perceived risk of road crashes and contributory factors, such as lack of separation from vehicular traffic and poor road surface quality, may cause cyclists to shift to motorized vehicles as their income increases. Policies aimed at improving cycling safety, possibly combined with investments in public transport, may prevent such a shift. Munivenkatappa *et al.*, describe a series of strategies as the basis for a cycling policy: Separation of cyclists from motor vehicles by dedicated bicycle tracks, separate signals and low speeds at intersections, use of bicycle helmets, and medical management and

rehabilitation for patients with ongoing concussion symptoms.^[3]

In 1963, in response to the adverse effects of mass motorization, the British traffic engineer Colin Buchanan published his landmark work *Traffic in towns*.^[4] He proposed a hierarchical road structure, in which 'access roads' (in what Buchanan called 'environmental areas') serve access traffic, while higher-order roads serve an efficient flow of through traffic (motorways). In between are 'distributor roads' to distribute traffic from through roads to access roads. The road hierarchy became an important input to the development of road safety strategies, such as the Dutch Sustainable Safety vision for road safety.^[5] It is one of the explanations for the low risk to cyclists in the Netherlands. Low speeds in traffic-calmed areas reduce cyclists' crash and injury risk. Grade separation and a prohibition on using motorways reduce cyclists' exposure to high-speed vehicles. Road safety at distributor roads remains a challenge. Dedicated bicycle tracks and speed reduction at intersections are effective measures for achieving that goal.^[5-7] In many European countries, cycling safety has formed part of a broader road safety policy. Aiming to keep cyclists totally free from harm in what is an inherently unsafe system is unlikely to be successful.^[8]

To maintain its current levels of cycling, India needs to develop its own vision for road safety and transport. There are similarities between India and Western countries in the length of time during which mass motorization has taken place. However, there are also differences. Relatively advanced motor vehicles are becoming available in India at a rate which is difficult to match in terms of road capacity and quality.^[1] Developing effective policies requires careful scientific research and availability of crash and injury data. Good research on cycling safety cannot rely only on police-reported crash statistics, due to under-reporting (especially of single-bicycle crashes) and the lack of injury data.^[9] For instance, as is shown in the study by Munivenkatappa *et al.*,^[3] data on patients with Traumatic Brain Injury is needed to study bicycle accident-related head injuries.

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