

Skateboard parks: the time has come to develop policies to reduce injuries

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The built environment can exacerbate risk factors for illness and injury or be purposely constructed to contribute to healthy lifestyles.^{1,2} Healthy built environments promote physical activity, connect communities, and can lower the risk of injury.² For example, when the built environment does not allow for the separation of motor vehicles from modes of active transport such as walking, biking, or skateboarding, there is an increased risk of injury, particularly among children and adolescents.¹ Designing safer streets to reduce pedestrian and cyclist collisions with motor vehicles is an important strategy.² Nonetheless, the current number of injuries and fatalities indicates that further actions are needed.³

Traffic control measures such as speed bumps, reduced speed limits and roundabouts reduce vehicle speeds and injury risk,^{1,4} but they do not provide a safe space for vulnerable road users.¹ While separated sidewalks and bike lanes can enhance safety for pedestrians and cyclists, other recreational road users, such as skateboarders, remain vulnerable.^{2,5,6} Indeed, up to 65% of skateboard injuries result from riding on public roads, footpaths, and parking lots, and half of all deaths are attributed to collisions with moving vehicles.⁷

Passive injury prevention approaches can be an effective strategy to protect vulnerable users. Skateparks are an example of using the built environment to reduce rider-vehicle collisions and associated injuries.^{8,9} Building skateparks as an alternative user space has significant advantages, including separating the rider from traffic and pedestrians, ensuring adequate lighting, enabling the opportunity for safety inspections, and providing a challenging but more controlled environment in which to practice and perform tricks.⁷ They can also play a role in reducing injury risk. Skatepark users, for

example, had significantly lower odds of a severe traumatic brain injury compared with non-skatepark users (OR: 0.58; 95% CI 0.54, 0.63).⁹

Skateparks alone, however, are not enough to protect skateboarders. For example, in 2016, 22% of skateboarding injuries in British Columbia occurred at a skatepark.¹⁰ Indeed, skateparks are typically unsupervised, public, recreational facilities designed for skateboarding, inline skating, BMX, and scooter riding, and they pose risk of injuries.⁸ They are often constructed of concrete and metal and include features designed to mimic street architecture, such as half pipes, bowls, ramps, and rails. The opening of a nearby skatepark significantly increased the number of skatepark-related injuries presenting at a hospital in the UK. Prior to the skatepark opening, 1.5% of sports injuries were skatepark-related and this increased to 5.6% following the opening of the skatepark ($p < 0.001$).¹¹ Fractures and dislocations comprise approximately 59% of injuries occurring in skateparks and 9% of injuries required hospitalisation.⁵ Injuries commonly occurred on ramps and bars compared to half-pipe or gully features.⁵ Hence, despite creating a more controlled environment, skateparks have not eliminated the risk of injury to skateboarders. Designing skateparks with safety in mind may help to mitigate injury risk.

There are few publicly available protocols to guide skatepark design and it is unknown if users' safety is considered when developing protocols and designing skateparks. Design guidelines highlight skatepark flow, smooth surfaces, regular maintenance, water drainage, and obstacle size.^{6,12,13} Guidelines seldom consider if certain features are associated with greater injury risks or how features promote increased speed or tricks that have varying injury risk. It is unclear how widely the few existing recommendations are adopted, if they are based on empirical research, or if they have been evaluated to determine best practices. There is a need for further research to identify evidence-based approaches to improve skatepark design and prioritise user safety.

Addressing this need, recent research conducted by Morrongiello *et al* provides

insights into engineering of skateparks by examining the risk of falling as a function of different features and tricks.¹⁴ Their findings offer insights into features that elevated fall risk based on design and how skateboarders were engaging with that feature. For example, flip tricks were less successfully executed by youth and resulted in falls that were more severe; therefore, designing skateparks with features that limit flip tricks will likely reduce serious falls. This analytic approach of linking tricks with features and both tricks and features to injury outcomes could be applied across skateparks to help differentiate those designs that minimise injury risk and to determine if modifications to an existing skatepark have improved safety. Engineering recommendations have the potential to have the greatest impact by improving the design of skateparks to reduce the risk of injuries while still maintaining a fun and dynamic skateboarding experience. For example, features might be grouped together so that easier or smaller features are in one area and skateboarders are discouraged from being enticed to engage with larger features that they may not be ready to attempt.¹⁴

In addition, policies and guidelines from similar sport-related built environments may help inform future skatepark designs. The Association of Quebec Ski Resorts lists unenforced recommendations for the design, construction, and maintenance of terrain parks and compliance with the adapted checklist in Quebec terrain parks was high (~91%).¹⁵ The injury profile and features in terrain parks and skateparks are similar so it is possible that developing similar policies related to skateparks would reduce injuries among participants.^{5,16}

Active initiatives such as policies to mandate personal protective equipment also merit action. Helmets are recommended for some sport and recreation participation and some jurisdictions have legislated their use. Protective equipment initiatives have yet to see widespread adoption in public skateparks across Canada and the USA.⁵ Helmet compliance varies but increases in the presence of education, legislation, and enforcement.^{5,10} For example, Canada Skateboard has required helmets at all sanctioned domestic and international events since 2017,¹⁷ but this is rarely reflected in recreational skatepark users. In Canada, Nova Scotia has the most stringent provincial helmet laws and is the only province to require all ages to wear a helmet when skateboarding, bicycling, and scootering. They

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also have implemented ski and snowboard helmet laws. Prior to legislation, Nova Scotia used social media and educational campaigns and this increased helmet usage from 74% to 90%, with legislation improving uptake to 100%.¹⁸ Municipalities in other provinces, such as St. John and North Vancouver have since implemented bylaws regulating helmets for all skateboarders. This is important since the odds of severe traumatic brain injury were significantly lower among those who wore a helmet (OR: 0.54; 95% CI 0.45, 0.63).⁹ In a skatepark with both mandatory and enforced helmet use policy with supervision, helmet use increased to nearly 91%.⁵ Thus, there are positive trends toward mandating helmet usage for skatepark users; however, participant compliance is essential, and this will likely require enforcement.

Other initiatives to improve skateboarder safety, reduce injury risk, and promote physical activity should be explored alongside helmet policies. Recommendations can be broadly classified based on the '3 Es' of injury prevention—Education, Enforcement and Engineering.¹⁹ For example, education opportunities might include promoting the use of skateparks instead of street infrastructure and informing skateboarders about possible longer-term negative physical effects of returning to the sport before fully recovered from injury.²⁰ Enforcement opportunities might include mandating compliance with protective equipment usage policies and appropriate use of the environment, similar to patrollers who enforce safe skiing and snowboarding or lifeguards who ensure safe behaviours at swimming pools. Engineering initiatives might be reflected in safer designs as highlighted above or modifications such as adding signage or

colour coding to indicate feature difficulty in skateparks akin to ski resort trail difficulty markings.¹⁴

In conclusion, developing design guidelines and evaluating policies to improve skatepark safety is critical for reducing injuries, and both passive and active prevention strategies have an important role to play.

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