

What happens to F1 drivers' bodies, and what sort of training do they do?

March 23 2024, by Dan van den Hoek, Justin Holland and Paul Haines



Credit: Pixabay/CC0 Public Domain

Various forms of motorsport are passionately followed around the world, and the pinnacle of the sport is Formula 1—a fast-paced battle between drivers and teams with some of the most finely engineered vehicles in

the world.

Despite the impressive speeds and engineering of their machines, race [car drivers](#) have sometimes [battled the stereotype](#) that they are not truly elite athletes. However, the recent advent of television series such as Drive to Survive has given the public an insight into the demands of driving in Formula 1.

Formula 1 drivers: elite athletes?

Drivers use split-second judgements to perform precision steering while traveling at speeds of up to 300 kilometers per hour. All the while, drivers need to concentrate on the track, their opponents, and feedback provided through their radio or steering wheel.

As the vehicles have developed over time, so too have the drivers. Nowadays, drivers are considered athletes who must undergo immense preparation and training to ensure their physical and [mental abilities](#) can manage the [ever-increasing limits](#) of their machines and environmental demands.

What forces are Formula 1 drivers exposed to?

During a typical race, Formula 1 drivers are subjected to a [barrage of physical and psychological demands](#) that test their strength, endurance and mental fortitude at high speeds.

Not only is a driver required to have sufficient strength to perform, they must also stabilize themselves to withstand [gravitational forces](#) (G-force) in multiple different directions.

During cornering and braking, drivers experience forces upwards of

5Gs. In addition, each application of a brake pedal requires between 600–700 newtons of force which, during a 90-minute race, would equate to a total load of 57,940kg (based on the 14 turns and 58 laps of Melbourne's Albert Park track).

However, when things go wrong, the forces experienced by drivers are even more extreme. In a crash, drivers can experience deceleration forces of [up to 100G](#)

As you can imagine, such forces place incredible strain on [a driver's head and neck](#).

The forces experienced by Formula 1 drivers are like those of military pilots. Unsurprisingly, this can result in neck and back pain or a loss of peripheral vision (often called gray-out) when forces are endured for [an extended period](#).

Fortunately, F1 drivers aren't typically subject to extended G-force loading. Rather, they are challenged repeatedly through acceleration, deceleration and cornering.

To combat the effects of these forces, drivers train their trunk and [neck strength](#) against high loads to be able to counteract the forces pulling their head and neck around their cockpit. Drivers also train their [aerobic capacity](#) to assist with handling these demands, resulting in high heart rates and physiological stress.

Trying to beat the heat

Beyond the incredible forces experienced by driver-athletes, cabin temperatures can [exceed 50°C](#), and extensive heat generated from the vehicle (through the close proximity of the transmission and engine to the driver) via convective heat transfer can result in more than 3%

[bodyweight loss](#) during a race.

Drivers therefore need to stay hydrated to maintain their health, safety and performance. This process is made harder by the mandated safety equipment—under the [Federation Internationale de l'Automobile guidelines](#), drivers must wear fire-retardant boots, under- and over-garments, balaclavas, gloves and helmets that [limit their capacity to cool down](#) via evaporation and convection.

Every kilogram counts

In preparation for these ever-increasing demands, F1 drivers maintain very low body-fat percentages (around 8%) compared with IndyCar drivers (around 17%) and maintain greater levels of fitness than their counterparts from IndyCar and NASCAR, allowing them to meet the design demands of the vehicle.

Similarly, F1 drivers are [typically stronger and more powerful](#) than their counterparts from other racing series.

Because of the demands of the F1 racing calendar, drivers need to get the most bang for their buck through efficient training methods that improve strength, power and fitness.

Nutritionally, they should consume a [balanced diet](#) that maintains weight and optimal body composition so they don't become too heavy or large for their limited cockpit space.

What else do drivers do to prepare?

Of course, racing at speeds of more than 300km per hour with millimeters between rivals requires more than strength, fitness and

fearlessness. There is substantial skill required to control a machine that is being pushed to its limits.

Beyond their athleticism, F1 drivers develop skills from a very young age and typically progress from go-karting through to the elite level.

So, it's not just about a fast car and being fit and strong enough to control it—if you want to make it as an elite driver in the top tier, years of practice and devotion to the art of driving are required too.

This article is republished from [The Conversation](#) under a Creative Commons license. Read the [original article](#).

Provided by The Conversation

Citation: What happens to F1 drivers' bodies, and what sort of training do they do? (2024, March 23) retrieved 9 May 2024 from <https://techxplore.com/news/2024-03-f1-drivers-bodies.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.
