

# Q&A

## MEET THE EXPERTS



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While shorter cyclists favour shorter cranks and a faster cadence, on a tandem with a taller rider both riders need to compromise

### [TECHNICAL]

#### Tandem crank lengths

**Q** I'm buying a new custom-fit tandem: my wife is just 5ft tall and I'm 5ft 10in. The frame seems to be no problem but I was planning to reduce the rear crank length too. The thinking behind this move was an attempt to arrive at some common ground for cadence. However, on a recent ride a colleague pointed out the stoker would lose that all important leverage with a shorter crank. I still think cadence is the most important but what would you suggest?

JOHN HARTLEY

**A** To answer this I'll start with a horse and a hare. They have about the same top speed, but the hare's shorter legs move with a proportionally quicker pace. If horses and hares rode bikes, the hares would spin short cranks rapidly whilst horses turned long cranks slowly. Likewise for people: those with short legs naturally pedal with a higher cadence than long-legged folk – if given proportionally shorter cranks. And there's the rub: they usually aren't!

Short-legged cyclists, being the minority, must generally pedal relatively long cranks on which they cannot achieve their natural cadence. Since their knees must bend more acutely, they'll pedal even more slowly than the average male rider these cranks are standardised for.

The same force on a shorter lever does indeed produce less torque. But power is the product of torque and rpm, so a higher cadence more than compensates – for when the knee does not bend too acutely, the leg can also push harder. So short riders do go better with short cranks, provided they also have the lower gears to spin uphill.

That's fine for solo cycling, but now imagine, if you will, a horse and a hare on a tandem. On most tandems they'll be obliged to pedal not only at the same cadence, but also with the same length of

crank. This in-between crank length slows down the hare's naturally rapid cadence whilst speeding up the horse's slower pace. So rather than making things worse, the compromise crank-length helps to achieve the necessary compromise in cadence!

So the same length cranks usually works pretty well on a tandem – provided the riders are fairly similar (a lot more similar than a horse and a hare!). If one rider is very much shorter however, this person may find 'standard' cranks too awkward and have difficulty keeping up with the pedals – especially when a leggy partner has control of the gears and insists on spinning, since the same cranks feel a bit short for him! In that case it'll be worth fitting something different: not as short or as long as each rider would ideally use on a solo bicycle, but something halfway there.

This isn't an exact science, but as a rule of thumb the difference in length between the cranks on a tandem should be half the difference between those on the riders' own bikes.

**CHRIS JUDEN**

### [HEALTH]

#### Cycling when drugged

**Q** After several years of living with an arrhythmia without medication, a recent ECG has resulted in my having to take 7.5mg

CONTACT  
THE  
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Send health and legal questions to the Editor (details on p78). We regret that Cycle magazine cannot answer unpublished health and legal queries. Technical and general enquiries, however, are a CTC membership service. Contact the CTC Information Office, tel: **0844 736 8450**, [cycling@ctc.org.uk](mailto:cycling@ctc.org.uk) (general enquiries) or Chris Juden, [technical@ctc.org.uk](mailto:technical@ctc.org.uk) (technical enquiries). You can also write to: CTC, Parklands, Railton Road, Guildford, GU2 9JX. And don't forget that CTC operates a free-to-members advice line for personal injury claims, tel: 0844 736 8452.



**[TECHNICAL]**

**Lower gears on a road bike**

**Q** I am recovering from a recent heart attack and need to lower the gears on my Specialized Roubaix. Current drivetrain is Shimano 105 with compact double chainset. I've looked at the option of using a 10-speed 12-36 cassette with a 9-speed mountain bike mech. Would smaller rings be another possibility? Or a triple chainset?

**JOHN PLANT**

**A** The first option (described in Aug/Sept 2011 Q&A) is the best one, as it'll take off the most gear inches per pound spent and give you gears that are more convenient to use. But do not delay in buying the necessary 'Shadow' design of rear mech. This year Shimano are deleting the 9-speed option from the better quality MTB groupsets, and 10-speed MTB mechs don't work with road shifters. There's are still few 9-speed Shadow-type mechs (which you need for more than 34 teeth in back) but I'd not be so sure that Deore is good enough quality to work with 10-speed precision. The importers say they're already out of M972 and M772 rear mechs – but some retailers still had stock at time of writing!

Smaller chainrings aren't really an option. You can't fit fewer than 34 teeth on those cranks. And apart from bolting an inner onto a Stronglight ST55 single chainwheel (contact Spa Cycles), nobody sells a more compact

double – I'm thinking 46-26 would be nice – unless it's an even smaller MTB double that'll be too small to work with a road front mech. And an MTB front mech will neither fit your bike nor work with your shifters.

A triple is an expensive option. Apart from the chainset and bottom bracket, you'll need new STI levers and two new mechs. That's virtually a whole groupset, but it won't knock off as many inches unless you also swap the inner ring for something smaller than 30. This is possible (down to 24 teeth) with most road triples, but not on Shimano's latest models, where the inner is fixed directly to the middle.

**CHRIS JUDEN**



Shadow 9-speed derailleurs like this Deore one are end of line, but some retailers may still have stock

of Cardicor daily. The side effects of this drug seem to have greatly affected my ability to cycle efficiently, since I have constantly to get off and walk even quite modest climbs, and my average speeds are lowered considerably. Is there any way to mitigate the drugs side effect? I am 77 years of age.

**MICHAEL SHERMAN**

**A** Cardicor (bisoprolol) is a beta-blocker drug that is widely used to treat cardiovascular conditions including various heart arrhythmias like atrial fibrillation, high blood pressure and heart failure. Beta-blockers work by reducing the force and rate of the heart beat so you will probably find that your resting and maximum heart rates are lower when you are

Beta-blockers can have side effects, such as fatigue. But don't reduce your dose without your GP's advice



taking them.

All beta-blockers can have side-effects, which include fatigue, low blood pressure (hypotension) and slow heart rate (bradycardia), and these could all contribute to a decline in your performance. Since these side-effects are largely dose-related (i.e. higher doses are more likely to cause side-effects), it may be possible to gradually lower the dose in order to strike a balance between minimising side-effects whilst still retaining many of the benefits of the medication. Bisoprolol is usually given at a dose ranging from 1.25mg to 10mg daily, starting at the lower end and gradually





increasing it until a maximum tolerated dose is reached. Older people are more likely to get side-effects at the higher doses and anyone with asthma should not normally take beta-blockers as they can worsen this condition.

The side-effects can seem worse when you first increase to a higher dose and they may lessen as your body becomes used to that dose. However, as I don't know how long you have been taking the bisoprolol or which arrhythmia you have, you should talk to your doctor about whether you should try a gradual dose reduction. (Please don't do this yourself without first seeking medical advice.) If this does not help or is not advised then there may be alternative drugs which you could try instead.

**DR MATT BROOKS**

#### [LEGAL]

##### Cycle path priority

**Q** I travel some of my daily commute on a cyclepath along the side of a busy city road. For about 500 metres this cyclepath is mounted on a pavement alongside a pedestrian footway. The cyclepath crosses three roads. On each occasion the road is marked with a 'give way' marking, suggesting that the cyclepath has right of way. Recently I was almost hit by a driver who failed to stop at the marking. The driver insisted it was his right of way. Where do we stand in this situation?

**BEN ADAMS**

**A** Without sight of the photographs, it is difficult to provide a definitive answer to the question posed by Ben Adams.

However, if the road is clearly marked 'Give Way' then a motorist is under a duty to give way to pedestrians or cyclists who are using the crossing. If a person runs or cycles onto the crossing at speed, taking a motorist by surprise, then a motorist may escape liability or alternatively there could be a significant finding of contributory negligence on the part of the pedestrian or cyclist. Nevertheless, a motorist at such a junction would be under a duty to give way to a cyclist.

Notwithstanding the legal position, it is of course sensible to make eye contact with a motorist approaching such a crossing to ensure that they have seen you and that they are going to stop at the crossing.

**PAUL KITSON**

#### [LEGAL]

##### Caught on camera

**Q** Recently I was unfortunate to suffer a road rage incident whilst cycling. I captured the incident on my head camera. The incident was quite violent and distressing, but the police seem to be less than optimistic about getting a conviction.

Would putting the footage up myself on YouTube cause a possible prosecution to be thrown out of court? And is it possible for me to make a civil case for damages against the individuals who assaulted me?

**NAME AND ADDRESS SUPPLIED**

**A** Helmet cameras are the latest piece of equipment to be used by cyclists to capture evidence of bad driving. It is unfortunate that cyclists feel it is necessary to go to

**In the Netherlands, cyclepaths routinely have priority when they cross side roads. In the UK, it's rare**

**Even when motorists are required to give way, it's well worth making eye contact to check that they will**



such lengths to secure evidence necessary to pursue a civil claim or a criminal prosecution. In my practice, I am already beginning to come across cases where bad driving or 'road rage' has been caught on film by helmet cameras, and often the evidence is very helpful. The film is your property and you are free to post it on YouTube. This should not prevent a prosecution taking place.

Without sight of the film, I cannot comment on the likelihood of securing a conviction. In the criminal courts, the Crown Prosecution Service (CPS) have the burden of proving the offence beyond all reasonable doubt. In the criminal courts, cyclists have produced helmet camera film to good effect. A recent example of this is the incident in which Martin Porter QC, a well-known London personal injury lawyer and keen cyclist, caught evidence of road rage on his helmet camera.

A passing motorist hurled insults at Mr Porter through his open window, including threats to kill. Mr Porter lodged a complaint with the Met Police (MPS). After the MPS informed Mr Porter that no further action would be taken, he complained to the CPS and to a senior police officer. Mr Porter's persistence finally paid off when the driver was brought before the West London Magistrates on 18 January 2012; he pleaded guilty to breaching the Public Order Act by using threatening words or behaviour. He was fined £250, ordered to pay Mr Porter costs of £300, and to pay a £15 victim surcharge into a Government victim fund. Further information about this incident is available on Mr Porter's blog, 'the cycling silk' (thecyclingsilk.blogspot.com).

In parallel with a criminal prosecution, you may also bring a civil claim against your assailant and claim damages for your personal injuries and financial losses. The burden of proof in the civil courts is on the balance of probabilities. This is much lower burden of proof compared to the criminal courts. The motorist's vehicle insurers are obliged to deal with your claim if the vehicle was used as a weapon. If the motorist





assaulted you after stepping out of his vehicle, this would not be covered by the motor insurers. In that scenario it would also be possible to lodge a claim with the Criminal Injuries Compensation Authority (CICA). The CICA provides compensation to victims of crimes of violence under a tariff scheme.

**PAUL KITSON**

#### [LEGAL]

#### Is your pedelec legal?

**A** We've seldom mentioned electric bikes in this magazine without reminding readers that the motor must not be rated higher than 250W and must cut out completely when the bike goes faster than 25kmph. Those are the EU standard limits. UK law specifies 200W and 15mph, but seems likely to be harmonised soon.

China allows much more powerful electric bikes and is only too happy to export. What's not to like about quicker acceleration and faster hill-climbing than regular cycling? Until now there hasn't been much risk of getting nicked for riding these de-facto electric mopeds on the road – without the registration, tax, insurance or moped helmet you need to do that legally. Trading Standards have also turned a blind eye.

Last year, however, a Richmond cyclist was commuting to work on an electrically-assisted bicycle that he had bought in good faith from a local supplier, when he was hit by a bus that allegedly jumped a red light. He went to

David Brennan videos his commutes and posts some of the results on YouTube. See also [magnatom.net](http://magnatom.net)

The motor on this Kalkhoff Pro-Connect is 250W, so complies with EU standards. More powerful ones do not



hospital and his bike, which was also damaged, was retained as evidence by the police. Whilst examining it they discovered that the motor was rated 300W. The rider is now being prosecuted for illegal use of an unregistered, untaxed motorcycle. And since this is a driving offence, it comes with points and possible loss of license. Adding insult to injury, the operators/insurers of the bus are trying to dodge responsibility for the cyclist's injuries on the grounds that the vehicle they hit was being driven illegally.

Trading Standards, meanwhile, have done almost nothing about the supplier, who nevertheless (so we hear) has ceased giving all and sundry illegal test rides. Actually it's not such a bad firm. Most of the cycles they sell are up to 250W and good to go. But they also sell 350W bikes without any provisos, or none that I can find on their website. At time of writing it boldly says: 'NO road tax, NO MOT and free UK delivery on all bikes!' Strictly, that's true, since road tax was abolished in 1936 (to be replaced by vehicle excise duty) and the MOT don't have a suitable test method yet. However, it gives the clear impression that all of the bikes they sell can be used just like a regular pedal cycle. They can't.

Buyers beware and owners check your bike's specification – or your electric dreams could become a nightmare driving ban!

**CHRIS JUDEN**

#### UPDATES

#### [TECHNICAL]

#### LED bulbs

In response to my speculation in the last issue (mudguard rear lamp, p50) that LED substitutes for the bulbs in old bike lamps may no longer be available, a few members assured me they can still be found.

At time of writing St John Street Cycles has both screw and push fit versions of the red Eco Bulb: product numbers 4357 and 4358, for £6.12. And on the Continent a few German mail-order firms are selling the Bikelight SLB (Standlicht LED Birnchen) for €8 to €10. This one also squeezes a capacitor into its screw-cap base and remains glowing for a few minutes after you've stopped! Try [fahrradladen-berlin.de](http://fahrradladen-berlin.de) and [hotopp-24.de](http://hotopp-24.de).

**CHRIS JUDEN**

#### [TECHNICAL]

#### Air really sucks

I must apologise for writing last issue that wind resistance increases exponentially with speed. I knew, and readers have pointed out, that it increases with the square of speed. But that takes more words and I didn't feel it would convey how dramatically this factor increases the power required to cycle quickly. So I resorted to a technically erroneous metaphor, for which I am truly sorry.

Power equals force times velocity. So: as air resistance increases with the square of speed, the power to overcome it increases with the cube. At 15mph, air already accounts for two-thirds of the drag on a typical touring cyclist. Increasing speed by a fifth, to 18mph, increases the power consumed by rolling and mechanical drag the same 20%. Aerodynamic power requirements however, go up by 73%. In round numbers: this 20% increase in speed demands 60% more effort, with air resistance accounting for 90% of the extra work.

**CHRIS JUDEN**