

Simple Seat Height Adjustment in Bike Fitting Can Reduce Injury Risk

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Assuming that the cyclist has an appropriately sized bike frame and correct saddle set back, we believe that the adjustment of vertical seat height is a critical aspect of the fitting. An improperly set saddle height can result in knee injury (1) and low back pain. Saddle heights that are too low or high alter the knee angle and, thereby, the mechanical work (2) and pedaling efficiency (6,7). A correctly set seat height helps prevent injury and improves rider economy and power by optimizing the knee angle. Multiple methods can be used to determine proper seat height, ranging from 3-D motion capture dynamic fitting to a simple measurement of knee angle using a goniometer.

When 3-D techniques are not available, the following method can determine whether cyclists have a correct saddle height.

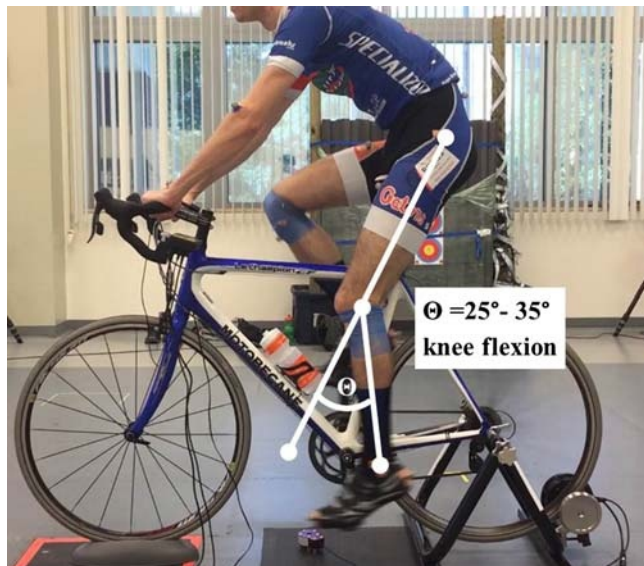


Figure 1: Knee angle measurement at the bottom of the pedal stroke between 25° and 35°.

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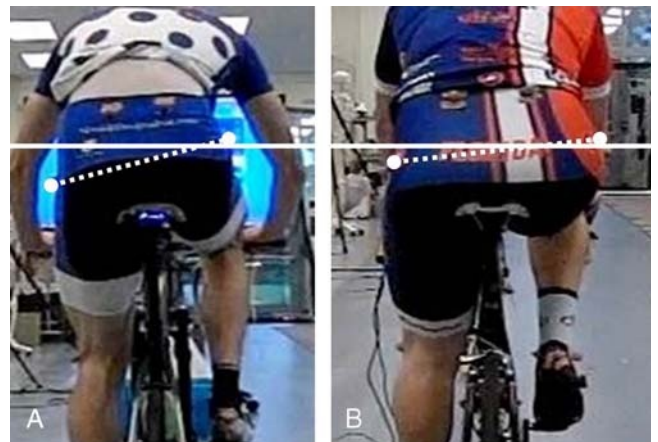


Figure 2: (A) Excessive pelvic drop. (B) Minimal pelvic drop.

dle height. First, with a goniometer, adjust the seat height so that the knee angle measurement at the bottom of the pedal stroke is between 25° and 35° (Fig. 1). Second, observe pelvic vertical oscillation motion from a frontal plane view, looking for any excessive excursion (4). Excessive pelvic motion is associated with a saddle positioned too high causing the cyclist to reach further to push the pedal (Fig. 2A) (5). However, eliminating all pelvic motion is not ideal either because it transfers power from the upper torso to lower limbs (Fig. 2B).

Even adjustments as little as 1 mm can make a significant difference in the amount of pelvic motion that occurs. Repeated observation after minute adjustments to the seat and feedback from the cyclist may be required to optimize position and comfort for the cyclist. Focusing on saddle height and pelvic movement is key to getting a bike properly fit for the cyclist and not fitting the cyclist to the bike.

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