I notice time and again that most people either don't spend enough time learning the basics around bouldering safety or are not taught this when they learn to climb.

On a recent trip I observed one person from another group fail on a rather patchy highball attempt and land hard on their crashpad. Bad spotting did not help, and the person managed to land on their back and took a knock. Suffice it to say he called it a day and probably suffered a splitting headache as a result.

A bit of physics helps explain why bouldering falls can be so dangerous. The key to understanding how much force is acting upon a fall is the braking distance.

A person landing on a crashpad will create a certain amount of energy (E). This Energy is a result of Force and Distance ($E = F \times s$). The potential energy from a fall is usually absorbed and transformed by our crashpads. As with sport climbing, the longer the braking distance the softer the fall (hence keeping slack on a line). Therefore the energy of a fall will equal the energy of the brake.

Obviously this distance is much smaller in bouldering than in climbing, namely the thickness of the crashpad! Let's take an example of someone who weighs 80kg, falls 4 meters and in scenario one has rope of 2 meters, and in scenario two has a crashpad thickness of 30cm.

The formula above gives a fall energy of 3,200 Joules (J) (E = F x s = m x g x s = 80kg x 10m/s2 x 4m). The force working on the climber with rope would be 1,600 Newton (F = E / s = 3,200J / 2m). The force in scenario 2 would be 10,000N (3,200J / 0.3m). The difference is massive. To put this into perspective, even if a boulderer falls 1m onto his crashpad the force working here is equivalent to ca. 250kg! Ouch!

Some of this force can be absorbed through our muscles when landing on our feet and through

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help from other spotters. Good spotters will help lengthen the braking distance by moving the person along the pad, cushioning the blow. Keep this in mind when bouldering or spotting and learn the basics <u>here</u> and <u>here</u>.