Newton's Second Law explanation: Whether you land on concrete or soft grass, your change in velocity will be identical. Your velocity may decrease from 3 m/s to 0 m/s. On concrete, this change occurs very fast, while on soft grass this change occurs in a longer period of time. Your acceleration on soft grass is smaller because the change in velocity occurred in a longer period of time.

$$a = \frac{\Delta v}{\Delta t}$$

When the change in the period of time gets larger, the denominator of the fraction gets larger and the value of the acceleration gets smaller.

When landing on grass, Newton's Second Law then tells you that the force must be smaller because the acceleration is smaller for an identical mass. $F = ma$. Smaller acceleration on grass requires a smaller force. Smaller forces are easier on your legs and you prefer to land on soft grass.

Momentum/impulse explanation: Whether you land on concrete or soft grass, your change in momentum will be identical. Your velocity will decrease from 3 m/s to 0 m/s on either concrete or grass.

$$F\Delta t = \Delta p$$

You can get this change in momentum with a large force over a short time or a small force over a longer time.

If your mass is 50 kg, the amount of your change in momentum may be 150 kg m/s, when you decrease your velocity from 3 m/s to 0 m/s. There are many forces and associated times that can give this change in the value of the momentum.

If you could land on a surface that requires 3 s to stop, it will only require 50 N. A more realistic time of 1 s to stop will require a larger force of 150 N. A hard surface that brings you to a stop in 0.01 s requires a much larger force of 15,000 N.

On concrete, this change in the value of the momentum occurs very fast (a short time) and requires a large force. It hurts. On soft grass this change in the value of the momentum occurs in a longer time and requires a small force: it is less painful and is preferred.

Change in value of momentum	Force	Change in Time Δt	$F\Delta t$
150 kg m/s	50 N	3 s	150 kg m/s
150 kg m/s	75 N	2 s	150 kg m/s
150 kg m/s	150 N	1 s	150 kg m/s
150 kg m/s	1500 N	0.1 s	150 kg m/s
150 kg m/s	15,000 N	0.01 s	150 kg m/s