Highest possible force development in every rep

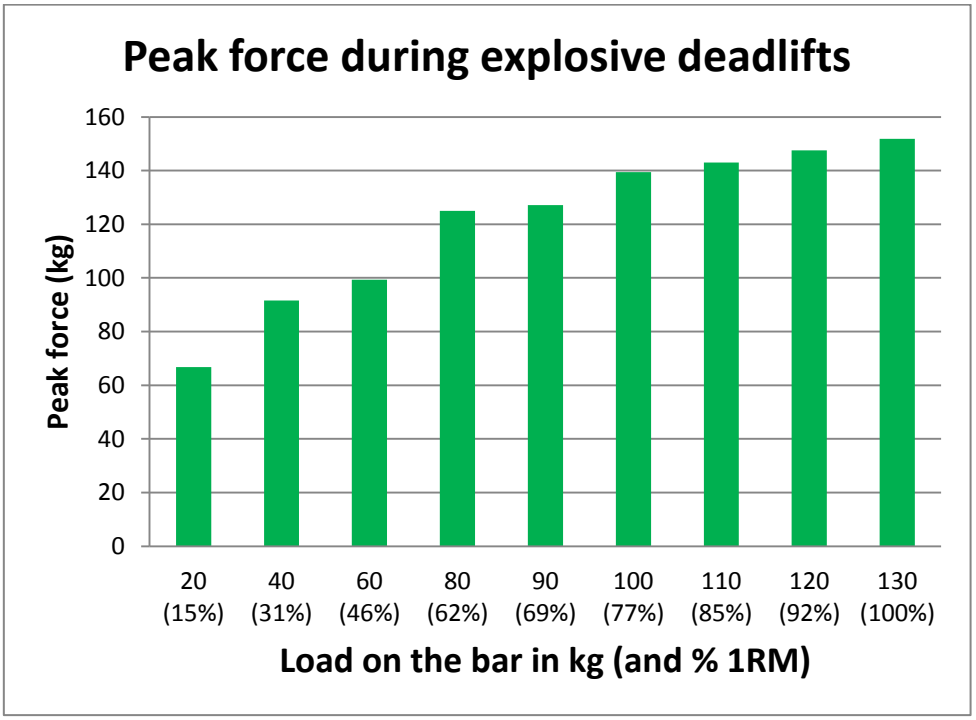
High force development in every repetition means more effective training if the goal is to get strong! This is the basis of strength training.

Force development during explosive lifting

For trained athletes explosive lifting with medium loads (~60-85% 1RM) is an important stimuli to increase maximal strength (**e.g. Max Strength Routine #1**). This might be explained from an experiment I made with explosive deadlifting on a force plate. The deadlifts were done with the bar approximately 10 cm above ground level caused by the height of the force plate. Force development (ground reaction force) during the lifts with increasing loads (15-100% 1RM) can be seen in the figure below. *And just for the record: Force is measured in Newton and not in kg as written – but this is just to make it more understandable (1 kg is equal to a force of 9,82 Newton).*

Peak force rises with increasing load on the bar - but not in a linear manner! With the lightest loads (20-60 kg ~ 15-46% 1RM) the peak force is low caused by lack of time to force exertion along with the muscles lack of ability to produce high forces during high contraction velocities (force-velocity relation). But already from 62% 1RM (80 kg on the bar) the peak force is 82% (125 kg peak force) of peak force development in the 1 RM lift with 130 kg on the bar (152 kg peak force)! This is caused by the high acceleration of the bar in the medium load lifts (Force = Mass x Acceleration). Off course the high peak force is of short duration in the medium load lifts, but on the contrary these lifts can be done plenty of times without causing fatigue (and with short recovery time). This fact might be the explanation off the effectiveness of including medium load explosive lifts in the training programme – the possibility of doing very high volume of good quality (high force) repetitions. Perfecting motor tasks (neuromuscular coordination) requires a lot of practice – no matter if it comes to playing guitar or deadlifting – and lifting heavy loads only, will make you fail in reaching a sufficient high volume of good quality repetitions (also without getting injured or overtrained).

Funny thing is that the zone from 60-85% 1 RM (80-110 kg) gives a relatively high peak force to load ratio, and this loading zone is actually recommended to make up the major part of total training volume by many weight- and powerlifters.



As mentioned it is important to have in mind that peak force during explosive lifting with medium loads (60-85% 1RM) is of very short duration and occurs only around the most powerful point during the full range of motion. Hence lifting heavyer loads is important to reach higher force development during the full range of motion!

Also – this experiment was carried out for one person only which makes the data less reliable.

Partials

To get the highest possible force development in every repetition – partials have to be mentioned. Partials is doing just a part of the full range of motion lift. The partial repetition should cover the weakest part of the full range of motion - thereby making the weak point stronger. The partial repetition is effective due to training with highest possible force development around the weak point also called "sticking point" – the point where you always fail in a given lift. This is for instance the top part of the movement for pull ups and the end range of motion when training with grippers. In the two examples partial repetitions should cover approximately the last ½-2/3 of the full range of motion. For pull ups this means starting the pull up with a little bend arms and for grippers; "choke" the gripper around half way and squeeze it from there. Try this and you will notice that you can lift more weight or close tougher grippers hence training more effectively! GOOD LUCK.