How Internal Knee Compressive Forces are Most Effectively Reduced by Applied Hip, Knee and Ankle Joint Moments
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A combination of hip, knee and ankle moments in the sagittal plane (HipFE+KneeFE+AnklePD), reduces the first peak (~13% gait cycle) and second peak (~50% gait cycle) with 52% and 60%, respectively. HipFE+KneeFE mainly affects the first peak with a reduction of 56% and KneeFE+AnklePD performs slightly better on the second peak than HipFE+KneeFE with a reduction of 35%. It is worth noting that the KneeAA curve (simulating the effect from a varus or valgus brace) coincides with the Normal curve since this moment only shifts the condyle load.

Figure 1: The mean total knee compressive load as percentage of bodyweight (%BW) from 0-70% gait cycle for each combination of applied moments.

CONCLUSIONS
This study indicates that common valgus or varus braces leave the total compressive knee load unaffected during normal gait whereas muscle compensation in the sagittal plane has a much stronger influence on the total knee load. The results can be used as a guide for improving current knee braces on the market to ensure an efficient joint load reduction during gait.

REFERENCES