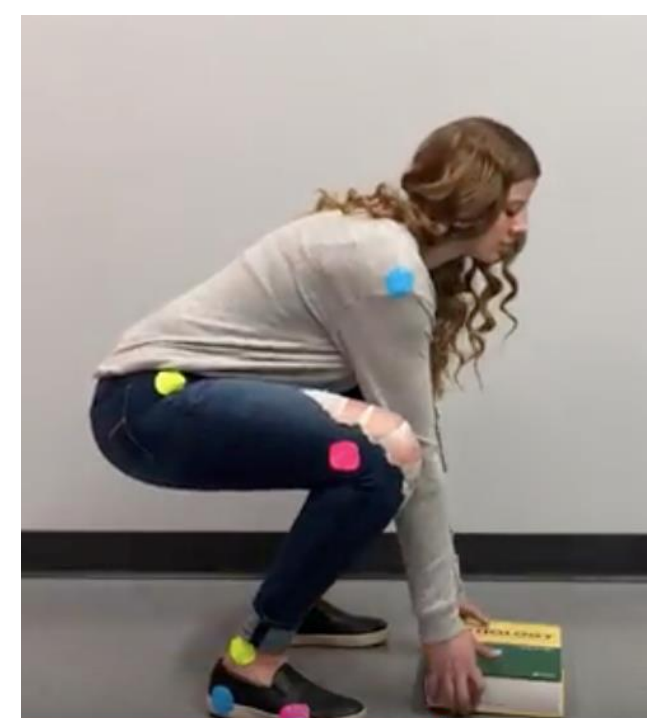


INTRODUCTION

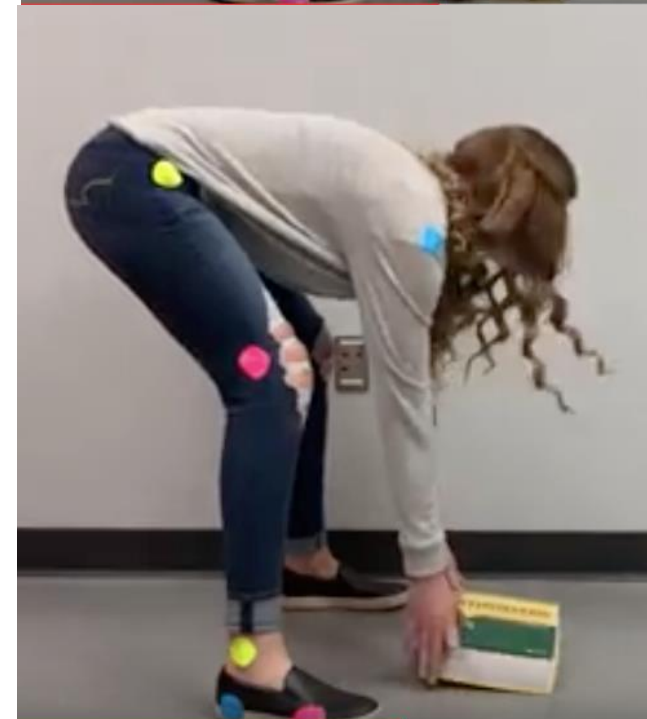
- Backpain is the second most common medical complaint in the medical field.
- A main reason why people begin to have back pain is because they are bending incorrectly, causing the body to form into a “c” shape to put pressure on the spinal discs, which can result in herniated discs.
- Hip hinging is said to be the correct way to bend.

- Create a firm stance with your feet between hip and shoulder width apart with toes slightly pointed to each side
- Bend only your hips and knees, pushing your pelvis back
- Keep your back relaxed
- When in a bent stance and ready to lift something, grab the object and lift with your legs, without twisting or using your back



Normal Condition (C1)

The picture on the left shows a representation of a normal bend, which is shown in blue on the graphs



Stiff Knee Condition (C2)

The picture on the left shows a representation of the stiff knee bend, which is shown in red on the graphs



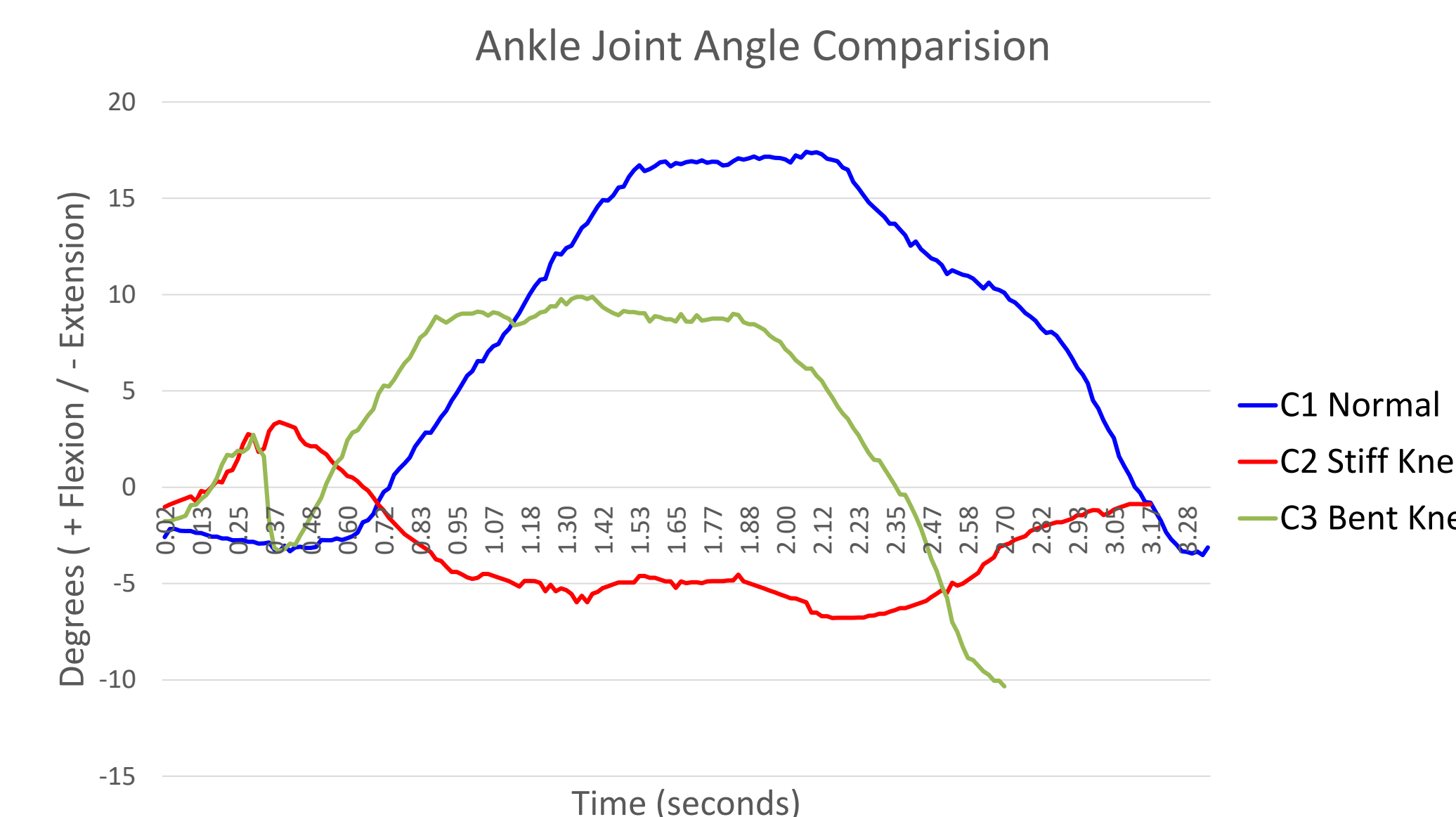
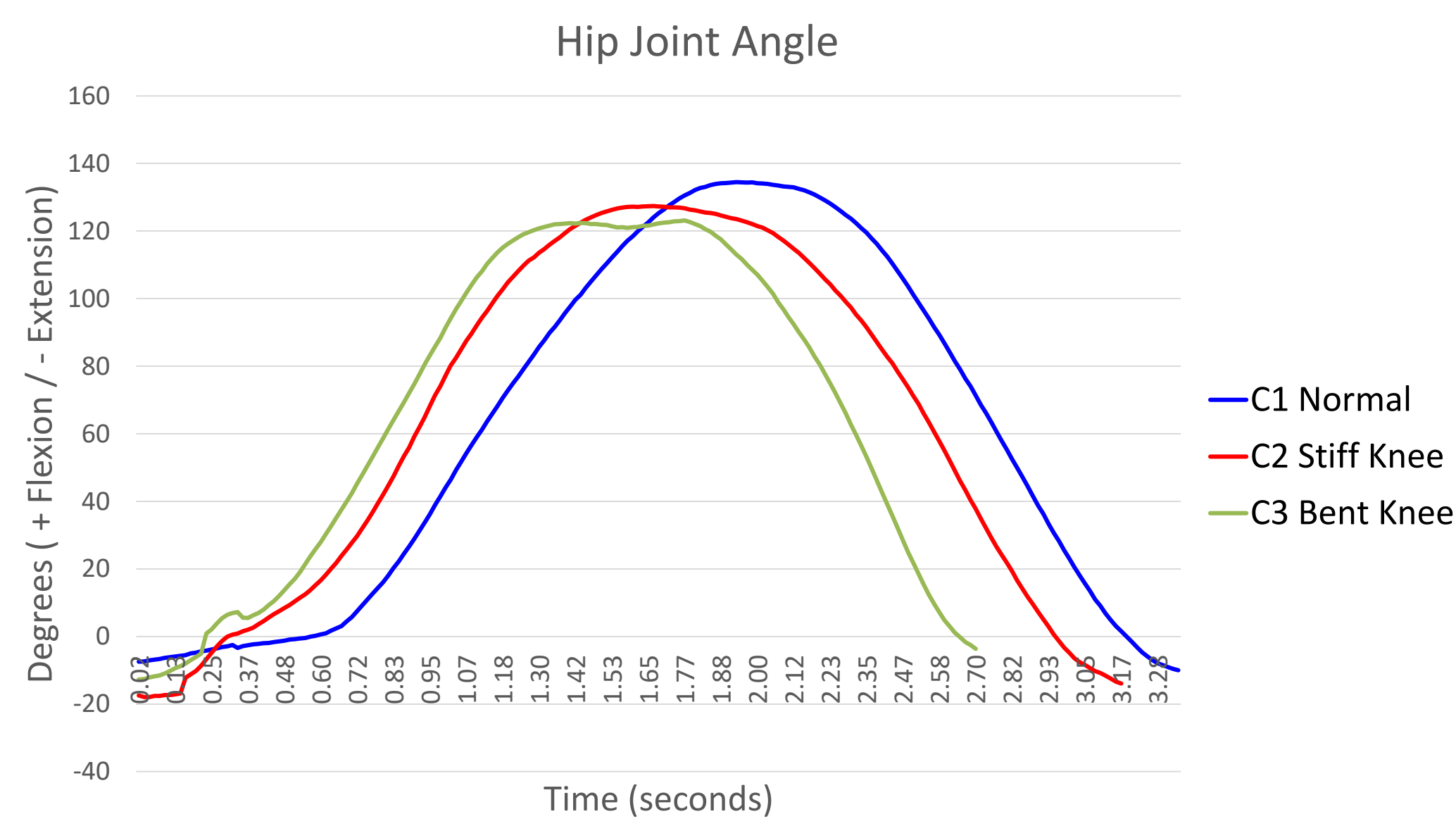
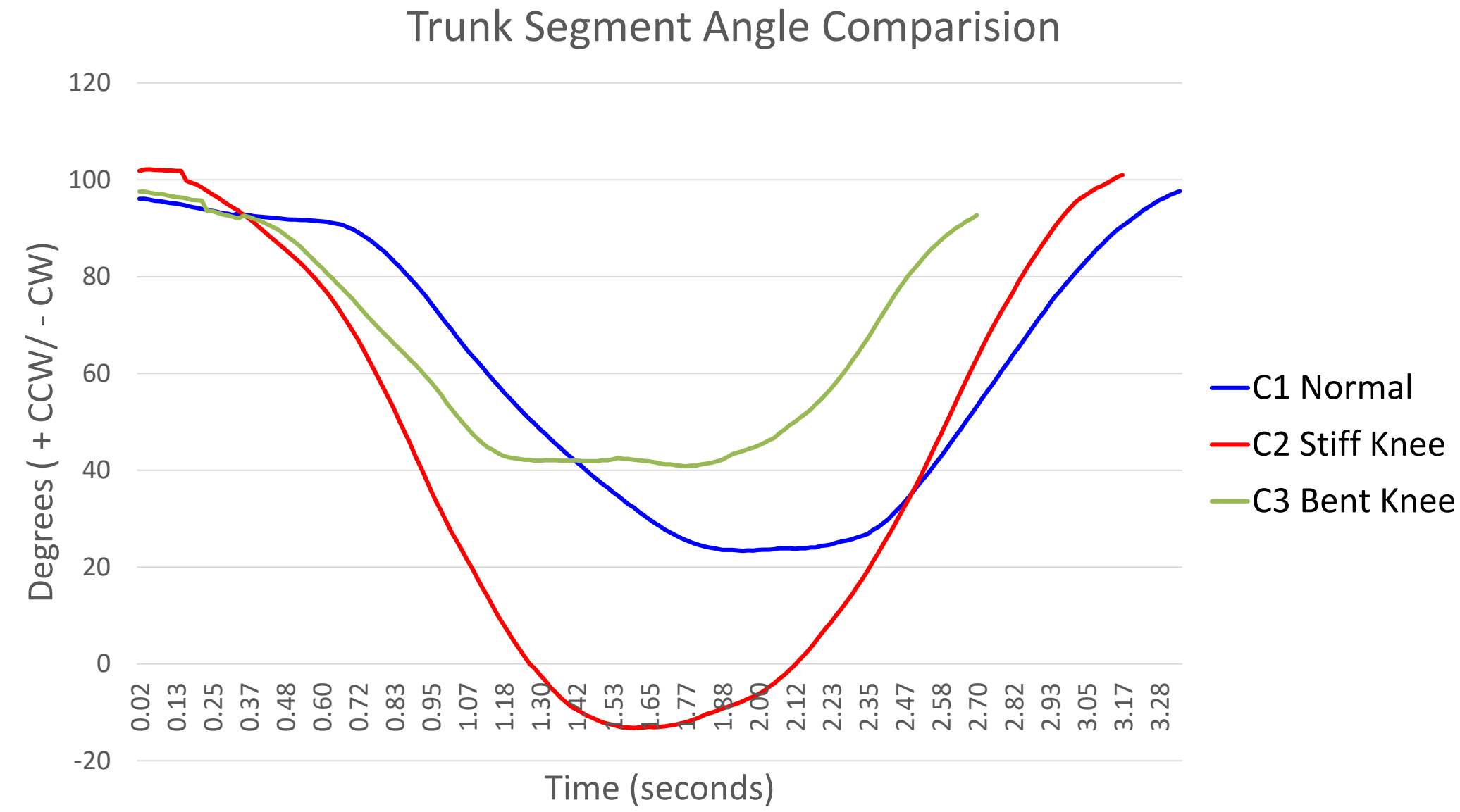
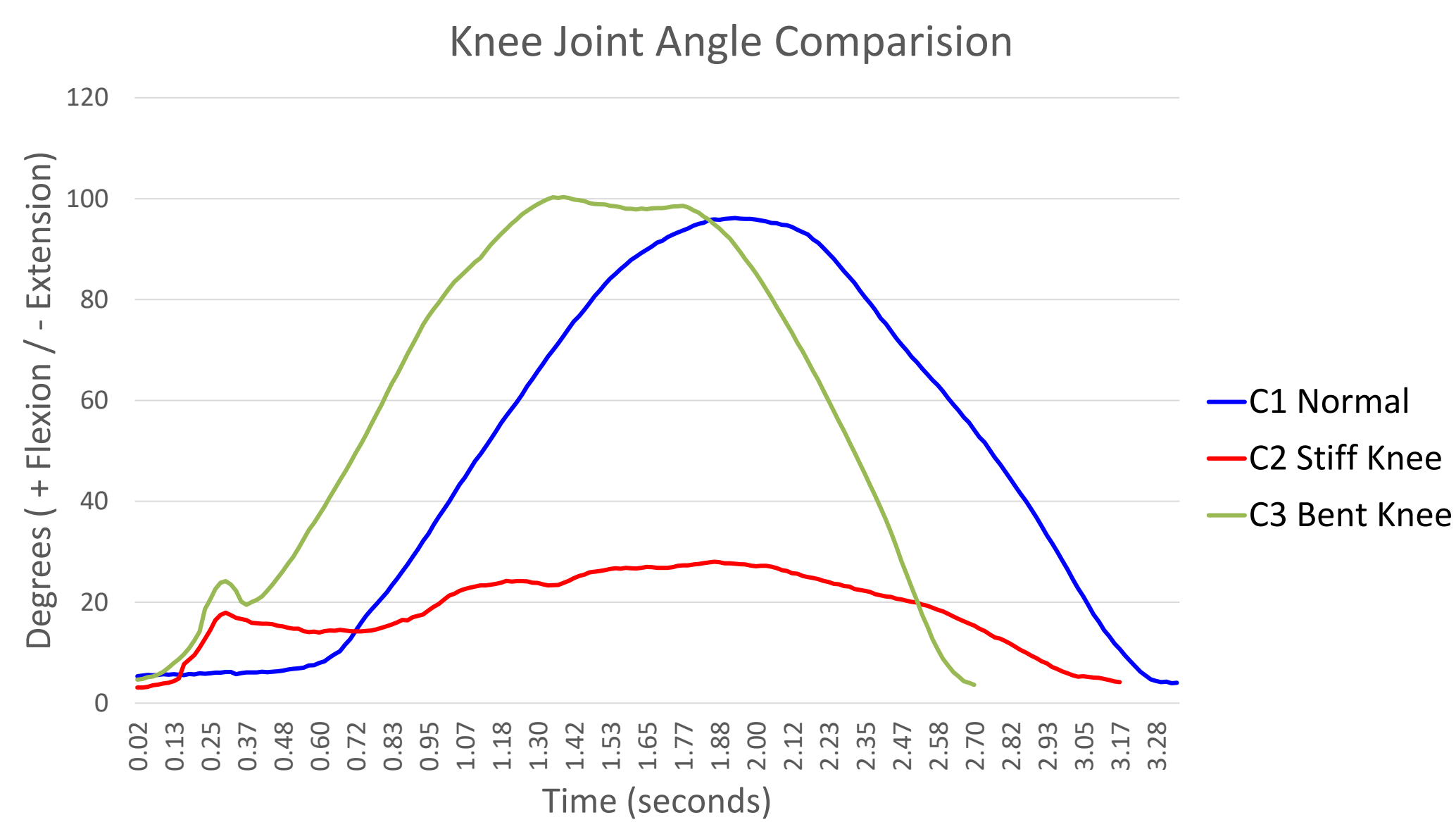
Bent Knee Condition (C3)

The picture on the left shows a representation of the bent knee bend, which is shown in green on the graphs

Joint Kinematics During Different Lifting Techniques

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METHODS AND RESULTS



- We placed markers on the participant’s fifth metatarsal (lower pink), lateral calcaneus (lower blue), lateral malleolus (lower yellow), femoral epicondyle (Upper pink), greater trochanter (upper yellow), and the shoulder (upper blue) to track the specific movements of the joints over the course of each type of bending action.
- We used the app *ProMovie* to record the various movements and techniques of bending over.
- To process the data, we used the software *Kinovea* to develop graphs for each of the marked joints.
- Above are the graphs of the joints that are most involved during the act of bending.

DISCUSSION

- The normal bend (C1) that was represented in this experiment is the recommended bend for an accurate movement that is less damaging for the body’s joints.
- The movement during the normal bend allowed for an equal flow of the joints to reduce the stress that was put on the spinal discs, as well as the hip and knee joints.
- During the restricted knee movement (C2), the ankle had to compensate by hyperextending to allow for a complete bend to the floor. The trunk was also forced to move much more to allow the arms to reach the floor to reach the book.
- The bent knee (C3) movement developed comparable results to the normal bend with slightly less movement in the trunk and ankle joints
- Hip hinging is the recommended technique for bending. Different variations of this technique were used in each bend, resulting in little change in flexion of the hip joint angle.
- We attempted to relate the experiment to occupational therapy because in our role of therapy, we can work on increasing the mobility of the joints, as well as encourage activities to allow for a proper bend of the body.

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