

EFFECT OF INTRA-ARTICULAR LIDOCAIN INJECTIONS ON KNEE JOINT KINETICS DURING WALKING IN KNEE JOINT OSTEOARTHRITIS PATIENTS

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INTRODUCTION

Excessive loading of the knee joint during walking in patients suffering from knee joint osteoarthritis (OA) has been hypothesized to participate in development and progression of the disease [1].

Joint pain is one of the cardinal symptoms of OA and is one of the primary aims in conservative treatment of the disease. As pain can be considered a protective mechanism, pain relief may have the potential to affect the knee joint loading pattern during walking and thus accelerate the degeneration through increased mechanical loads.

Accordingly, the aim of the study was to investigate the effect of local knee joint analgesia on knee joint loading patterns during walking in patients suffering from knee joint OA.

METHODS

Ten subjects with painful knee joint OA were included in the study (average age 67.8 (SD 5.0), height 164.2 (SD 4.5), weight 74.0 (SD 12.3)).

Intra-articular lidocain injections (10 cc) were performed using ultrasound guidance to ensure proper placement of the bolus within the joint cavity. The injection was performed in the most affected/painful knee.

Three dimensional gait analyses were performed pre- and post injection. Force plate and movement data was combined to calculate net muscle moments about the joints of the lower extremities. The subjects were instructed and trained to walk at 4.0 km/h (~1.1 m/s) both pre- and post injection.

Knee joint pain during walking was scored using a 100 mm Visual Analogue Scale (VAS) after the initial measurements (before injections) and again after the post injection measurements.

RESULTS

One subject was excluded due to misplacement of the lidocain bolus. All remaining subjects showed a significant decrease in pain during walking (p=0.005, see table).

A significant reduction of the peak extensor moments was found (K2: p=0.04, K4: 0.04) together with a significantly reduced knee flexion angle in early stance (p=0.003). Mid-stance peak flexor moments showed a tendency toward increase (p=0.06). No changes in abduction moments were found.

DISCUSSION

Pain relief caused the peak extensor moments to decrease, which may be interpreted as an unloading of the knee. A

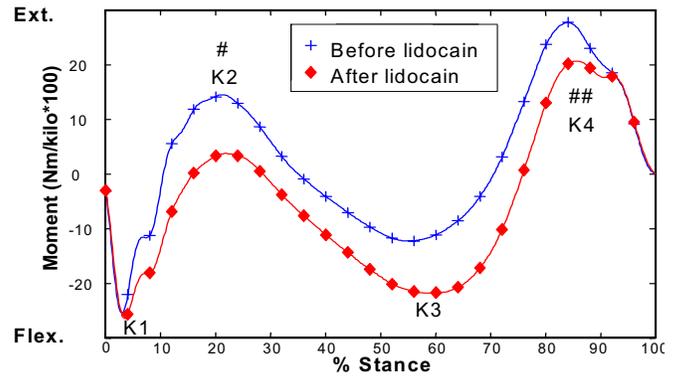


Figure: Knee joint moments during stance before and after intra-articular lidocain injections. Significantly reduced peak extensor moments (K2 and K4) were found (both p = 0.04.). A tendency toward increased flexor moments in mid-stance was observed (p = 0.06).

decreased knee flexion angle makes it possible to walk with lower extensor moments [2] and thus decrease joint loads in early and late stance. All together this suggests a quadriceps avoidance pattern following lidocain injections. Decreased extensor moments and knee flexion angles together with unchanged abduction moments have been suggested to result in a dynamically unstable knee joint [3]. We hypothesised that pain relief would remove the protective mechanism of pain and thus increase joint loads, but surprisingly we found the opposite. Increased co-contractions of the hamstring muscles could be a possible explanation, but no EMG data was available in the present study.

CONCLUSION

We surprisingly found that OA patients walked with a quadriceps avoidance-like pattern following pain relief, which represents a paradoxical unloading of the knee joint. The observed changes may suggest an unstable knee following lidocain injections.

REFERENCES

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Table: Average (SD) pain, peak moments (Nm/kilo*100) in sagittal and frontal planes and early stance knee joint angles (degrees).

n = 9	Before lidocain	After lidocain	Difference	Paired t-test
Pain VAS (mm)	37.3 (27.8)	1.8 (2.0)	35.6 (27.4)	0.005
Peak extensor moment (K2)	18.4 (13.7)	7.9 (12.6)	10.5 (12.9)	0.04
Peak extensor moment (K4)	32.2 (12.6)	27.2 (13.9)	5.0 (6.4)	0.04
Peak flexor moment (K3)	-11.4 (12.5)	-22.2 (23.4)	10.8 (15.0)	0.06
Peak abduction moment	58.2 (20.2)	57.7 (22.5)	0.6 (5.2)	0.75
Knee joint angle, early stance	21.3 (5.5)	17.8 (6.2)	3.6 (2.5)	0.003