

Knee Joint Loading Indices Before and 3 Months After Arthroscopic Partial Meniscectomy

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AIM

Patients undergoing arthroscopic partial medial meniscectomy (APMM) are at increased risk of developing medial compartment knee OA. APMM may contribute to altered knee joint loading patterns.

The aim of this pilot study was to determine the short-term changes in knee joint loading indices after APMM.

CONCLUSION

Our preliminary data indicate that knee joint loading increases in the operated leg compared with the contralateral control leg within the first 3 months after medial meniscectomy.

It is not clear if this increase is influenced by changes in pain status or as a result of medial meniscectomy *per se*.

RESULTS

Patient characteristics are displayed in Table 1. KAM impulse increased in the operated leg compared with the control leg from before to 3 months after APMM (Table 2). Loading indices were generally higher in the control knee compared to the leg undergoing APMM prior to surgery (Table 2). However, this only approached statistical significance for peak flexion moment (peak KAM, $p=0.29$; KAM impulse, $p=0.14$; PFlex moment, $p=0.06$).

Table 1: Patients characteristics (n=16)

Men/women (no.)	13/3
Age (yrs)	46.0 (6.9)
Height (m)	1.79 (0.7)
Body mass (kg)	81.1 (10.7)
BMI (kg/m ²)	25.4 (3.5)
Kellgren & Lawrence grade:	
- Operated leg:	
Grade 0	15
Grade 1	1
- Control leg:	
Grade 0	16
Grade 1	0

Numbers in brackets represent SD

Table 2: Knee joint loading indices before and 3 months after APMM (n=16)

	Operated leg			Control leg			Difference in change, <i>P</i>
	Before	After	Change	Before	After	Change	
Peak KAM, Nm/BW*HT%	3.05 (2.70-3.40)	3.37 (3.00-3.74)	0.32 (0.09-0.55)	3.28 (2.81-3.75)	3.29 (2.81-3.77)	0.01 (-0.26-0.28)	0.10
KAM impulse, Nms/BW*HT%	1.15 (1.01-1.29)	1.32 (1.16-1.48)	0.17 (0.04-0.30)	1.24 (1.08-1.40)	1.26 (1.05-1.47)	0.02 (-0.08-0.12)	0.03
PFlex. moment, Nm/BW*HT%	2.56 (1.90-3.23)	2.69 (2.06-3.30)	0.12 (-0.40-0.64)	3.33 (2.77-3.89)	3.28 (2.56-4.00)	-0.05 (-0.60-0.51)	0.60

Values are mean (95% CI), APMM = Arthroscopic Partial Medial Meniscectomy, KAM = external Knee Adduction Moment, PFlex moment = external Peak Flexion Moment

METHODS

Patients (n=16) aged 35-55 years scheduled for APMM were recruited from two different hospitals. Exclusion criteria:

- Radiographic knee OA (K/L grade >1)
- Previous knee surgery
- Co-morbidities limiting lower extremity function
- Low activity level (i.e. only indoor walking)

Gait analysis was conducted using a Vicon MX system (100 Hz, Plug-in-Gait marker set) and 2 AMTI force plates (1000 Hz). All motion data were collected barefoot at self-selected walking speed. Variables were calculated for each trial, then averaged over 5 trials. At the follow-up patients were instructed to walk with the same speed, allowing a margin of $\pm 5\%$.

Paired t-tests were used to assess differences in change from before to 3 months after APMM.



Figure 1: Example of 3D gait analysis