

Differences in postoperative pain, sleep status and functional recovery between TKA and UKA

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Disclosures: The authors have no conflict of interest.



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Background & Objectives

Generally, unicompartmental knee arthroplasty (UKA), is thought to be less invasive than total knee arthroplasty (TKA) , in terms of skin incisions, osteotomies, blood loss and operation time. Less invasive procedure is also considered to result in less postoperative pain, and then UKA is thought to cause less postoperative pain than TKA.

Postoperative pain may cause sleep disturbances, and sleep disturbances may enhance pain, but there are few reports on postoperative sleep disturbance. In addition, sleep deprivation can discourage rehabilitation and impede functional recovery.

The purpose of this study is to determine the differences in postoperative pain, sleep status, and functional recovery between TKA and UKA.



Study Design & Methods

Participants

- Seventy consecutive patients who underwent arthroplasty at our institution were included in the study.
 - TKA = 60 (M;12, F;48) , age 73.4 y.o. (50 - 89)
 - UKA = 10 (M; 1, F;9) , age. 70.9 y.o. (63 – 78)
- Indications for UKA;
 - one compartment OA, >60 y.o, low-demand for activities, ROM $\geq 90^\circ$, flexion contracture $\leq 5^\circ$, angular deformity <15 [1].
 - TKA: Stryker Triathlon® PS, medial parapatellar approach
 - UKA : Stryker Triathlon® PKR, sub-vastus approach



Perioperative analgesia

- **General anesthesia.**
- A single injection of femoral and sciatic **nerve block**, with ropivacaine, under ultrasound guidance with an electrical nerve stimulation device.
- **Patient-controlled analgesia (PCA)** with fentanyl citrate was used for postoperative analgesia until 48 hours after surgery.
- **Celecoxib** was administered orally starting 2hours after surgery.

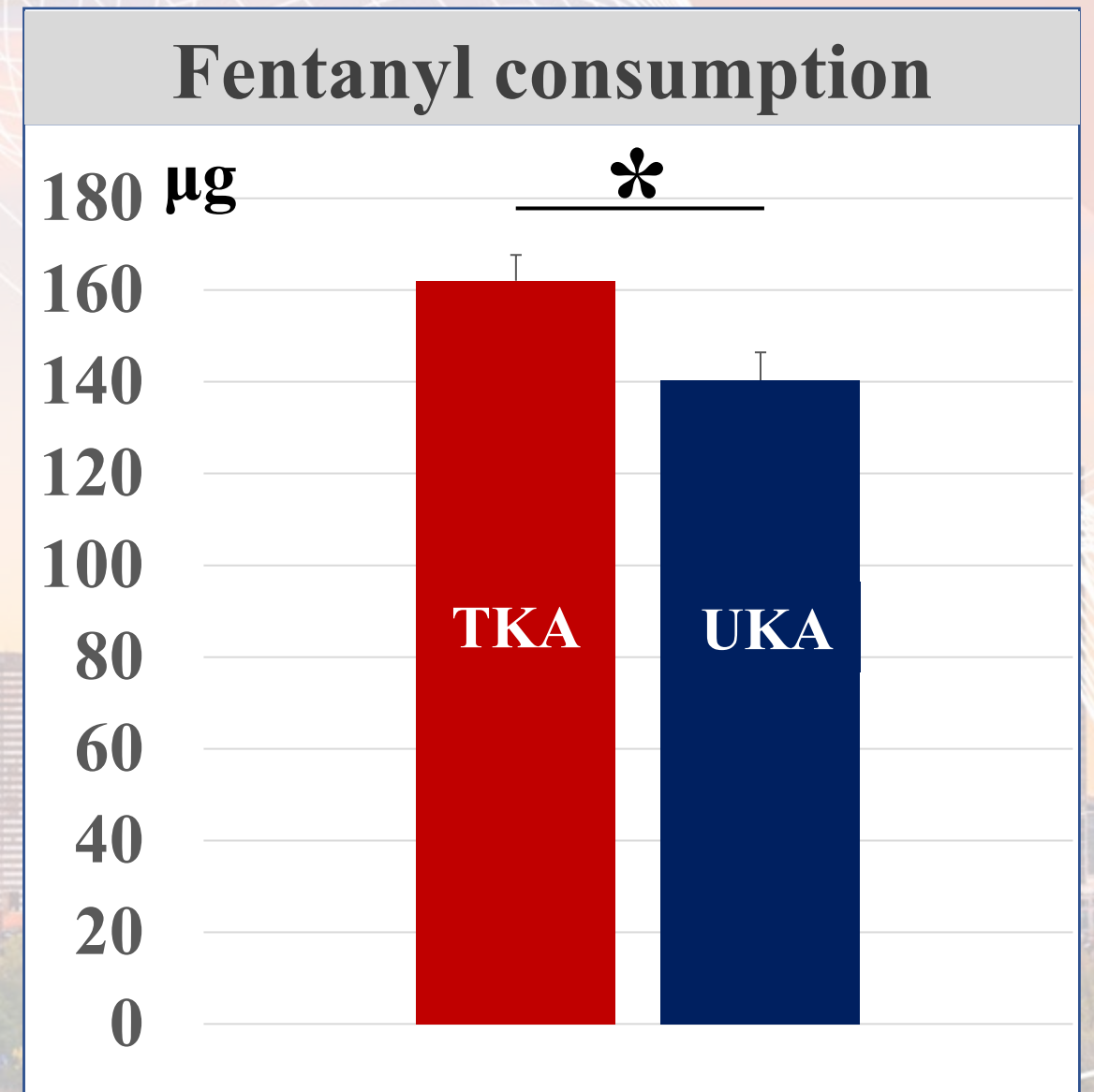
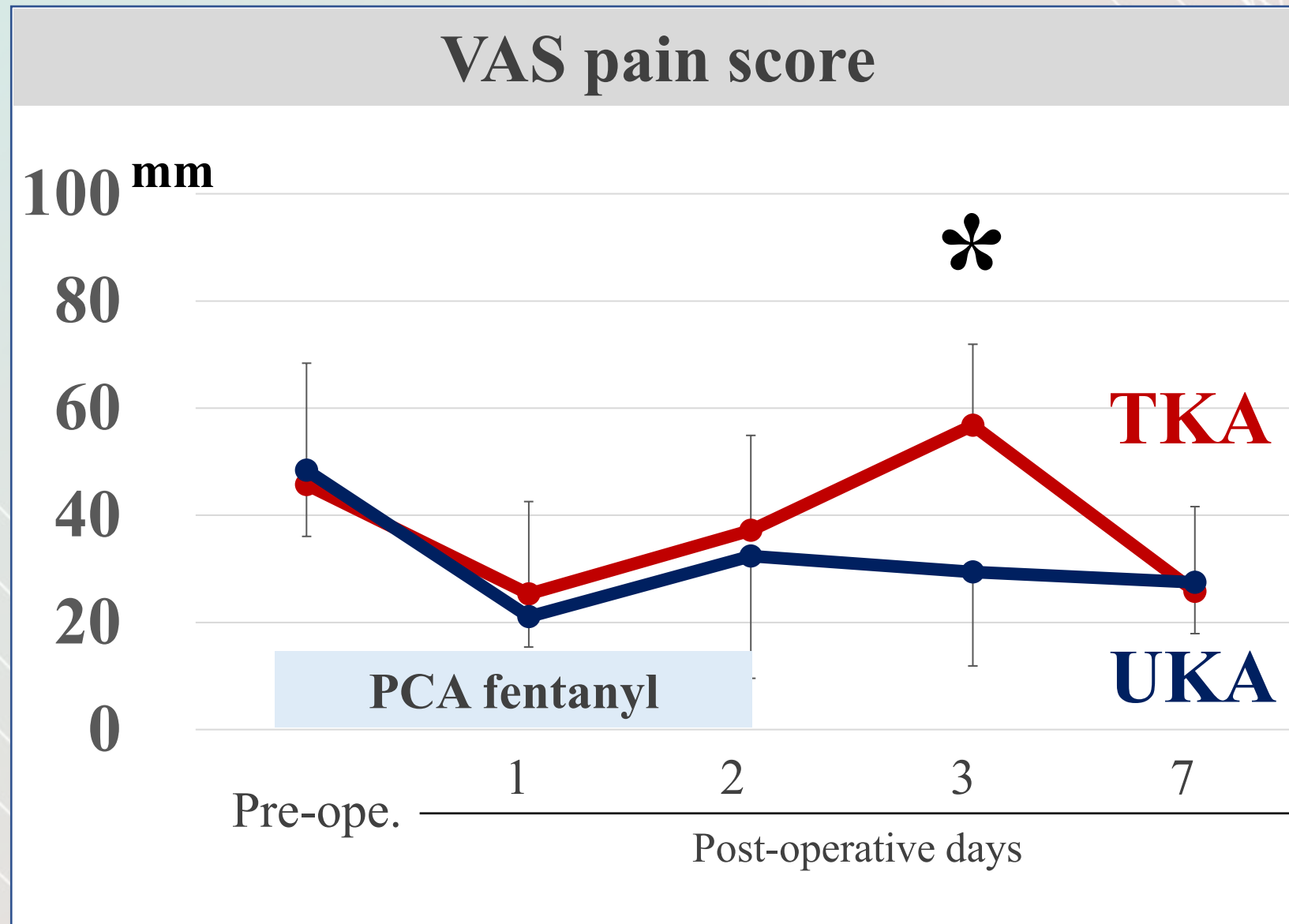
Outcome Measurement

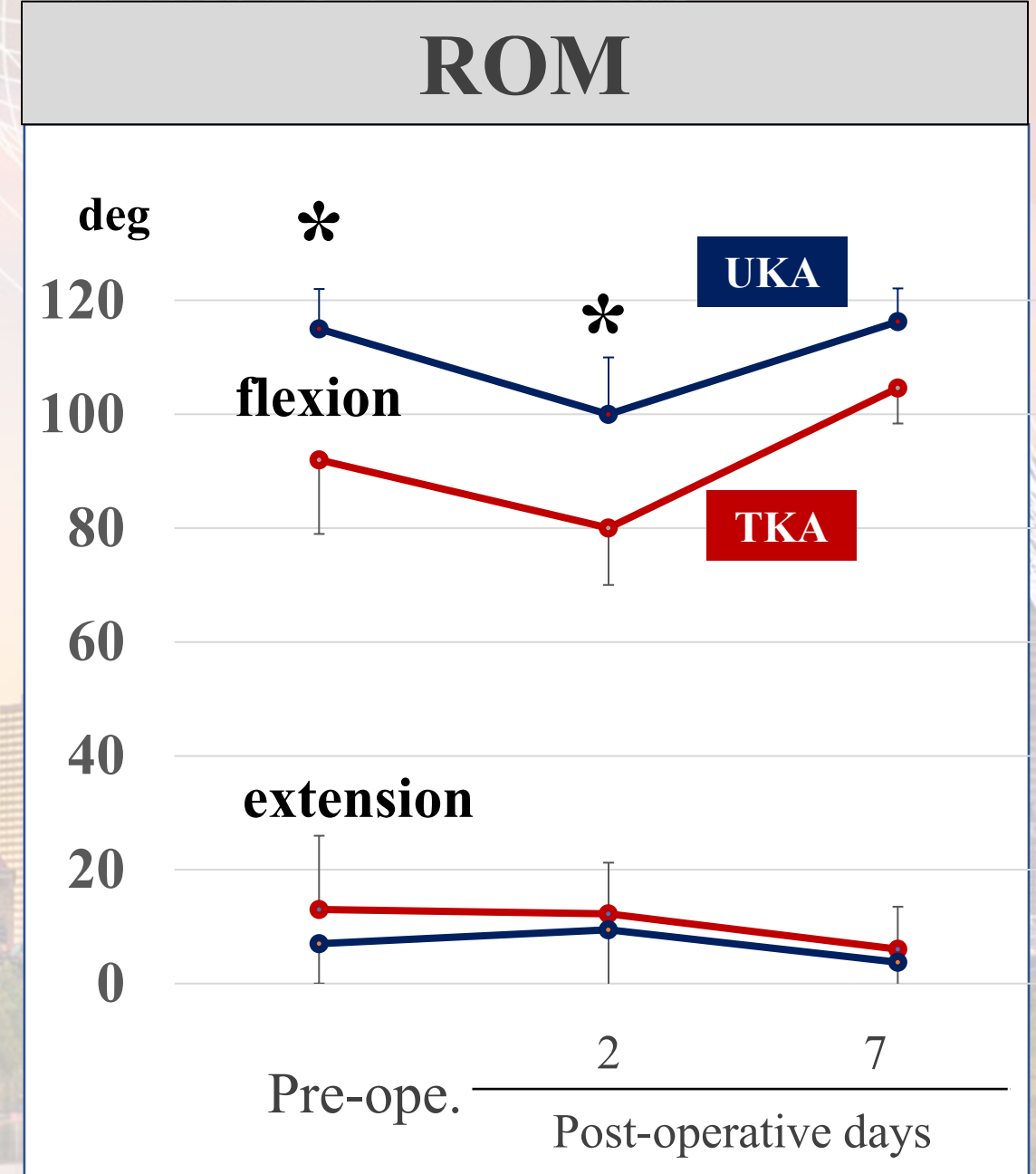
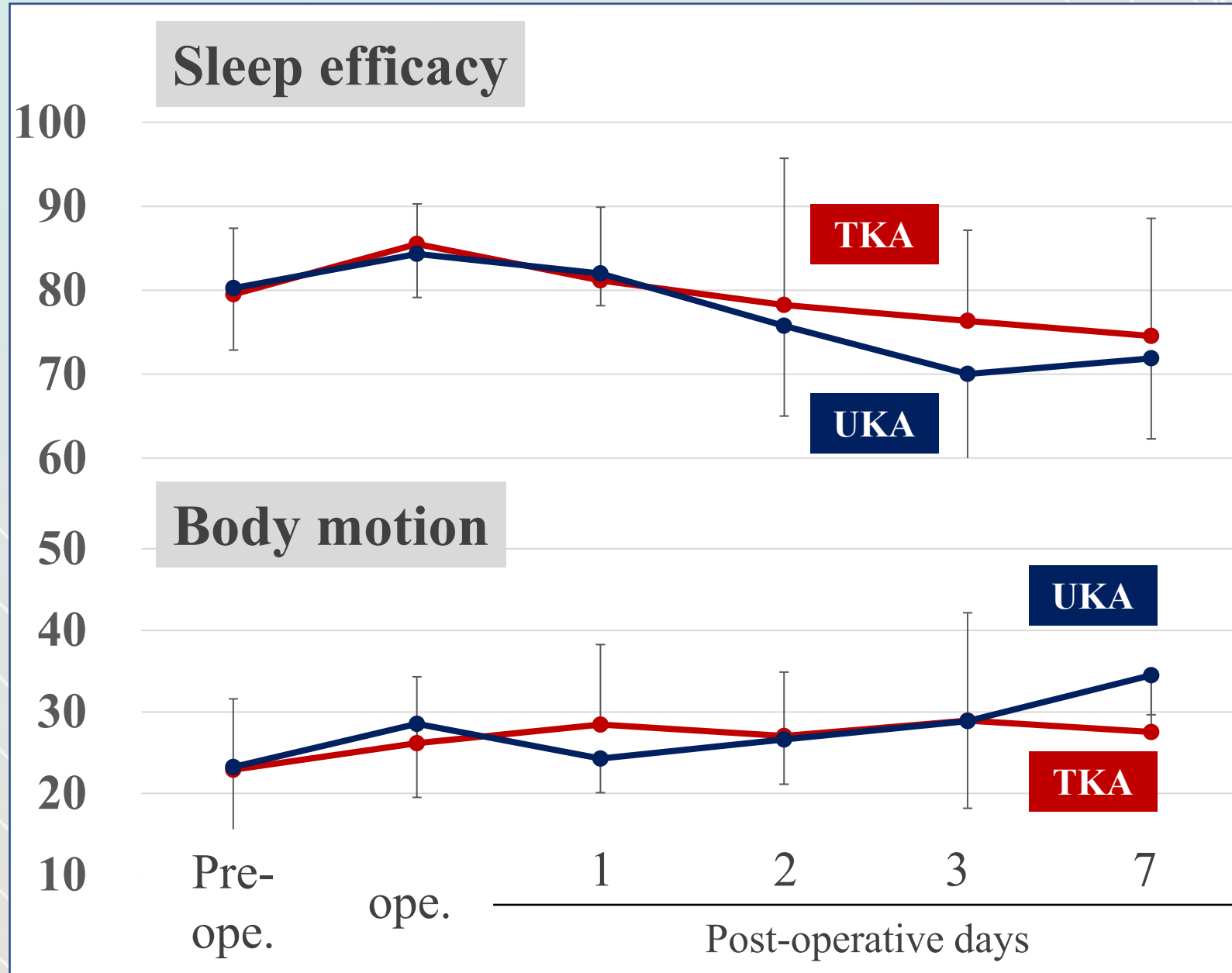
At the day of admission, the day of surgery, and postoperative 1, 2, 3 and 7 days.

- Patient-reported **VAS pain scores** at 9 am. @ day 1,2,3, and 7.
- **Consumption** of fentanyl PCA @ day2
- **Sleep status** monitored by SLEEPSCAN® (TANITA Corporation.) @ day 1,2,3, and 7.
Mattress type actigraphy, without direct sensor including bioelectrodes on human body.
 - **Body motion** (frequency)
 - **Sleep efficacy**: a rate of actual sleeping time in total bedtime hours.
- **Functional recovery** was assessed at knee range of motion (ROM) @ day2 &7.



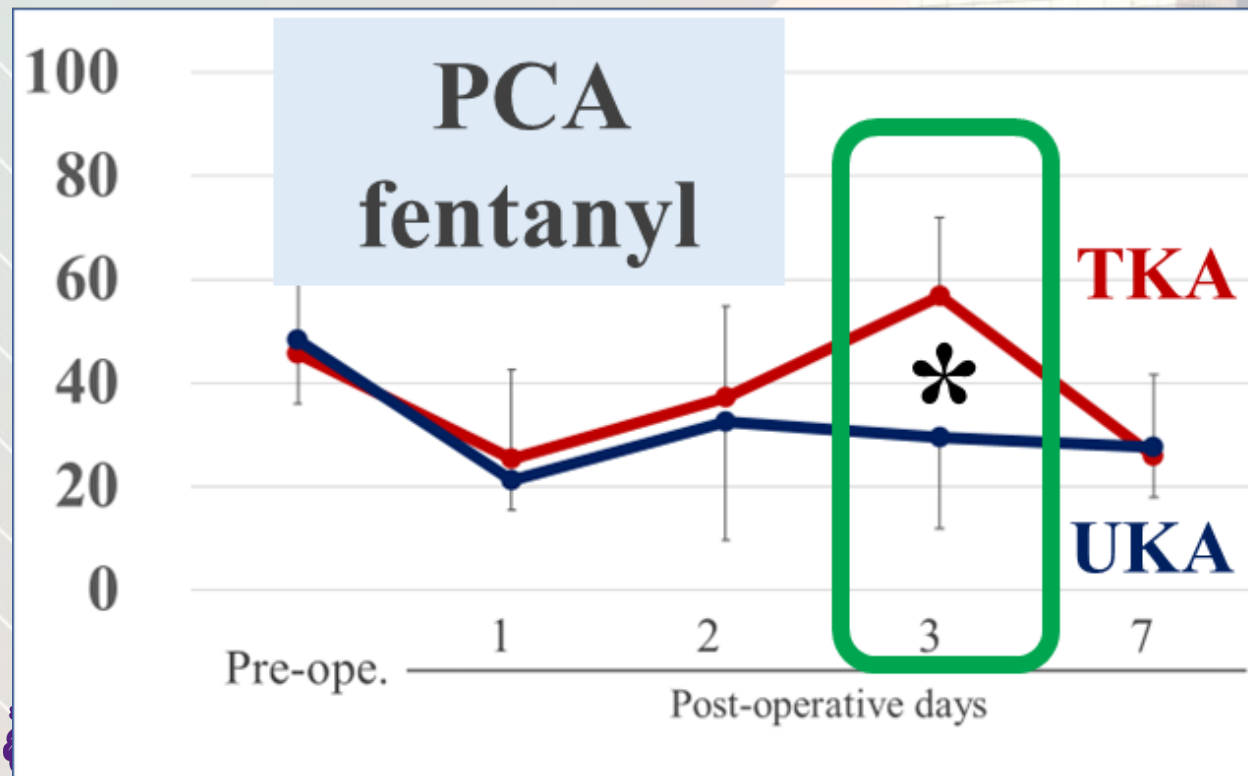
Results





Discussions

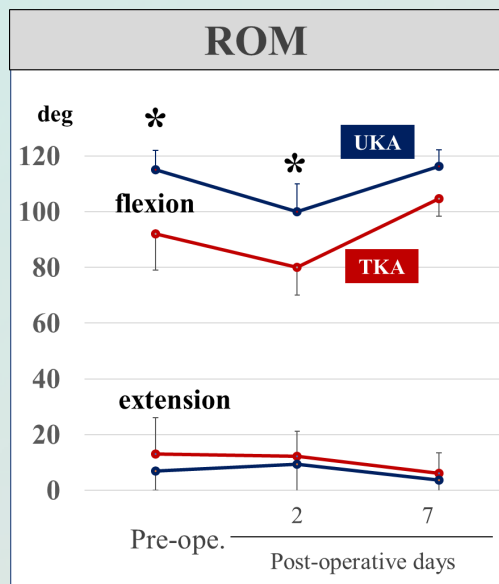
In this study, we investigated postoperative pain and sleep status in TKA and UKA; VAS pain scores and PCA fentanyl consumption were less in the UKA group than those of the TKA group. Flexion angle was greater in UKA on the second postoperative day. There were no differences in the frequency of body motion and sleep efficiency.



There was no difference in VAS pain score until the second postoperative day. PCA consumption was lower in UKA, possibly due to less pain. After PCA removal, VAS pain score was less in UKA.

These results suggests that, as far as pain in concerned, surgical invasion is less with UKA, at least up to the third postoperative day.





Flexion angle on the second postoperative day was greater in UKA.

This might be the result of less invasiveness and less pain.

However, of course, the influence of differences in surgical indications is inevitable.

Indications for UKA; one compartment OA, >60 y.o, low-demand for activities, ROM $\geq 90^\circ$, flexion contracture $\leq 5^\circ$, angular deformity < 15 [1].

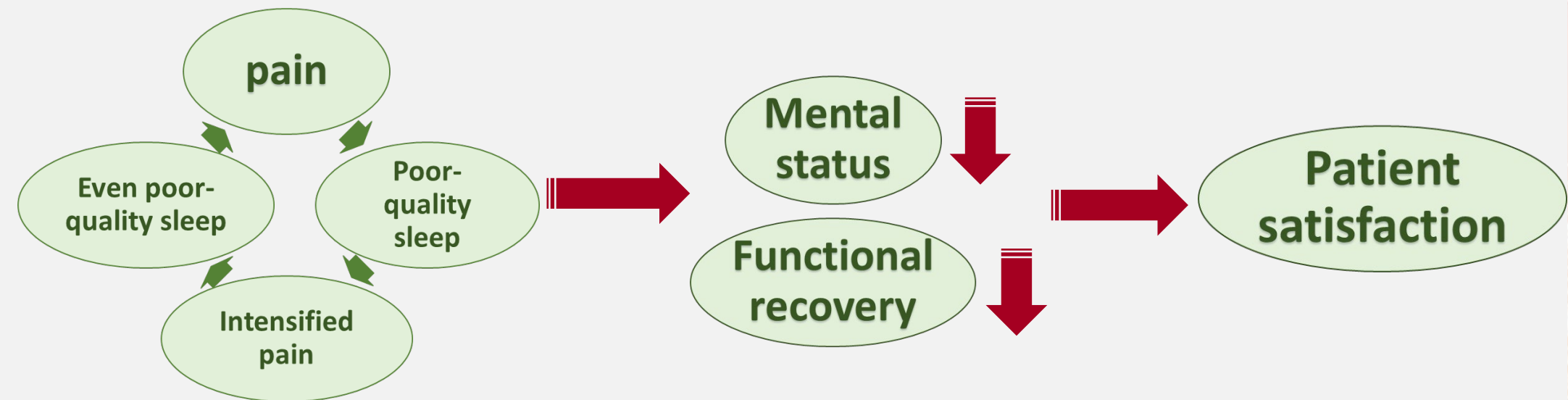
Postoperative pain can cause sleep disturbance, and sleep disturbances can further exacerbate pain. Sleep quality has been reported to decrease after TKA [2-4]. It has been reported that less pain leads to less body motion and better sleep efficacy [5].

The lower pain in UKA was expected to increase sleep efficacy and decrease body motion, however, there were no differences over time. Sleep status is considered to vary widely among individuals, and it is possible that no differences were observed in this study.



Pain affects sleep quality and may influence patient satisfaction as well as mental status and functional recovery.

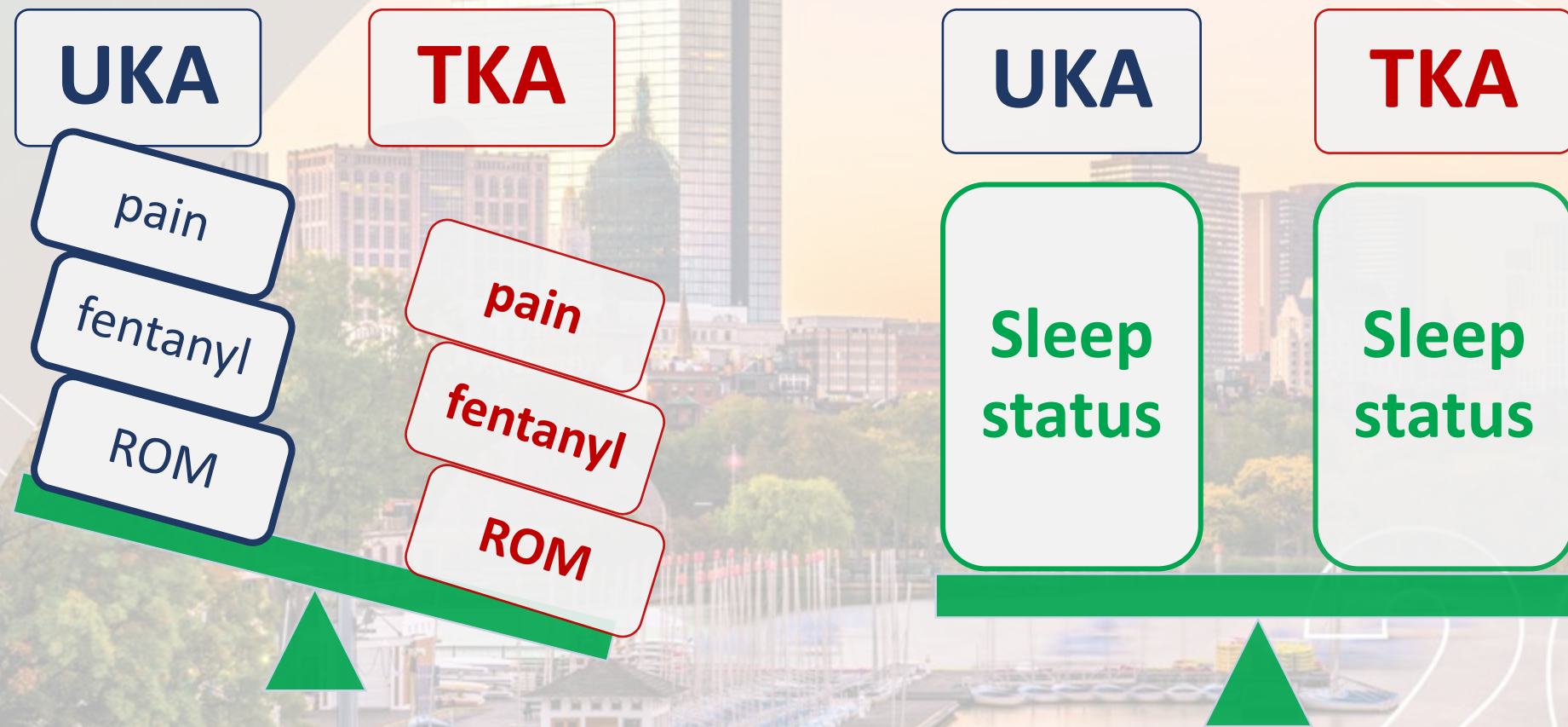
We believe that the interaction between postoperative pain and sleep may warrant further investigation, although this has not received much attention to date.



A limitation of this study was that the number of eligible cases was not the same. This was due to the limited indications for UKA compared to TKA. However, we believe that the inclusion of prospectively consecutive patients is an appropriate representation of the actual clinical situation. Another limitation was the differences in the approach. This could have affected postoperative pain and ROM.

Conclusions

UKA had less pain, less fentanyl consumption, and better ROM in the early postoperative period, but no difference in sleep status, compared with TKA.



ACKNOWLEDGEMENTS

Japan Society for the Promotion of Science (JSPS) KAKENHI (19K18486).

Ref.

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