Utilizing Mobile Apps to Monitor Recovery After Knee Osteotomy: Challenges and Time to Return to Preoperative Step Counts

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Disclosure of Conflict of Interest

We have nothing to declare for this study.

Introduction: importance of postoperative recovery and monitoring

Knee osteotomies and functional recovery

- Knee osteotomies correct malalignment and common in younger patients— recovery monitoring is key.
  Witjes S et al. J ISAKOS 2018
- Traditional assessments have limitations (ceiling effects, variability, and communication).
  Eckhard L et al. OTSR 2021
  Steinhoff AK et al. KSSTA 2016

Advancements in postoperative monitoring

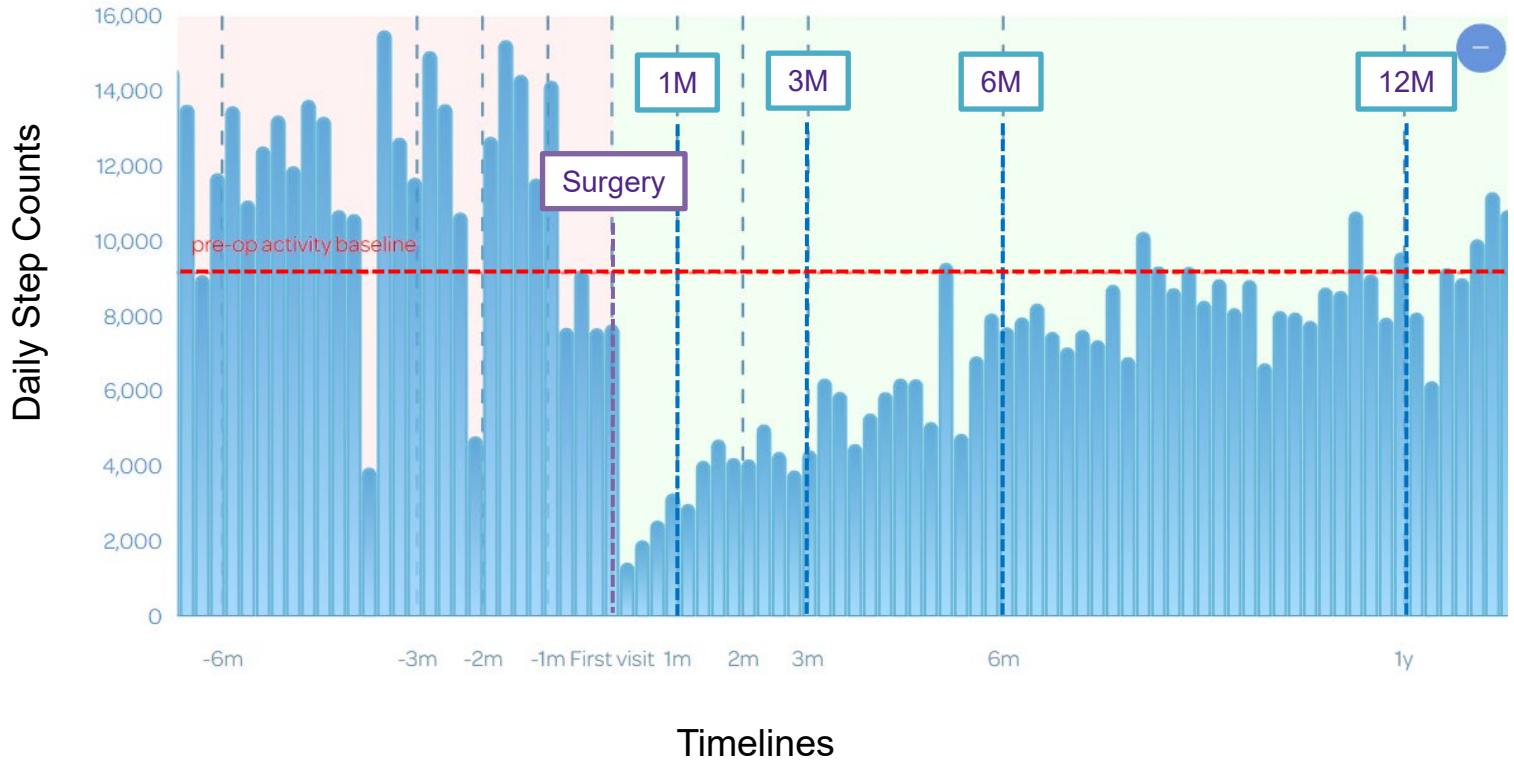
- Wearable sensors: real–time, affordable tracking
  Gianzina E et al. Knee 2023
- Mobile apps integrate with sensors to track step counts.
  Lebleu J et al. Sensors (Basel) 2024
- Used in knee replacement surgery but not studied in knee osteotomy.
  Sniderman J et al. JBJS Rev 2024

Purpose

- Assess **feasibility of mobile app** monitoring after knee osteotomy.
- Determine **time to return** to preoperative step counts.

Methods: step count monitoring with myrecovery app

- myrecovery app tracked step counts via phone accelerometer.
- Synced with Google Fit/Apple Health for data collection.
- Step count trends analyzed via myrecovery dashboard.

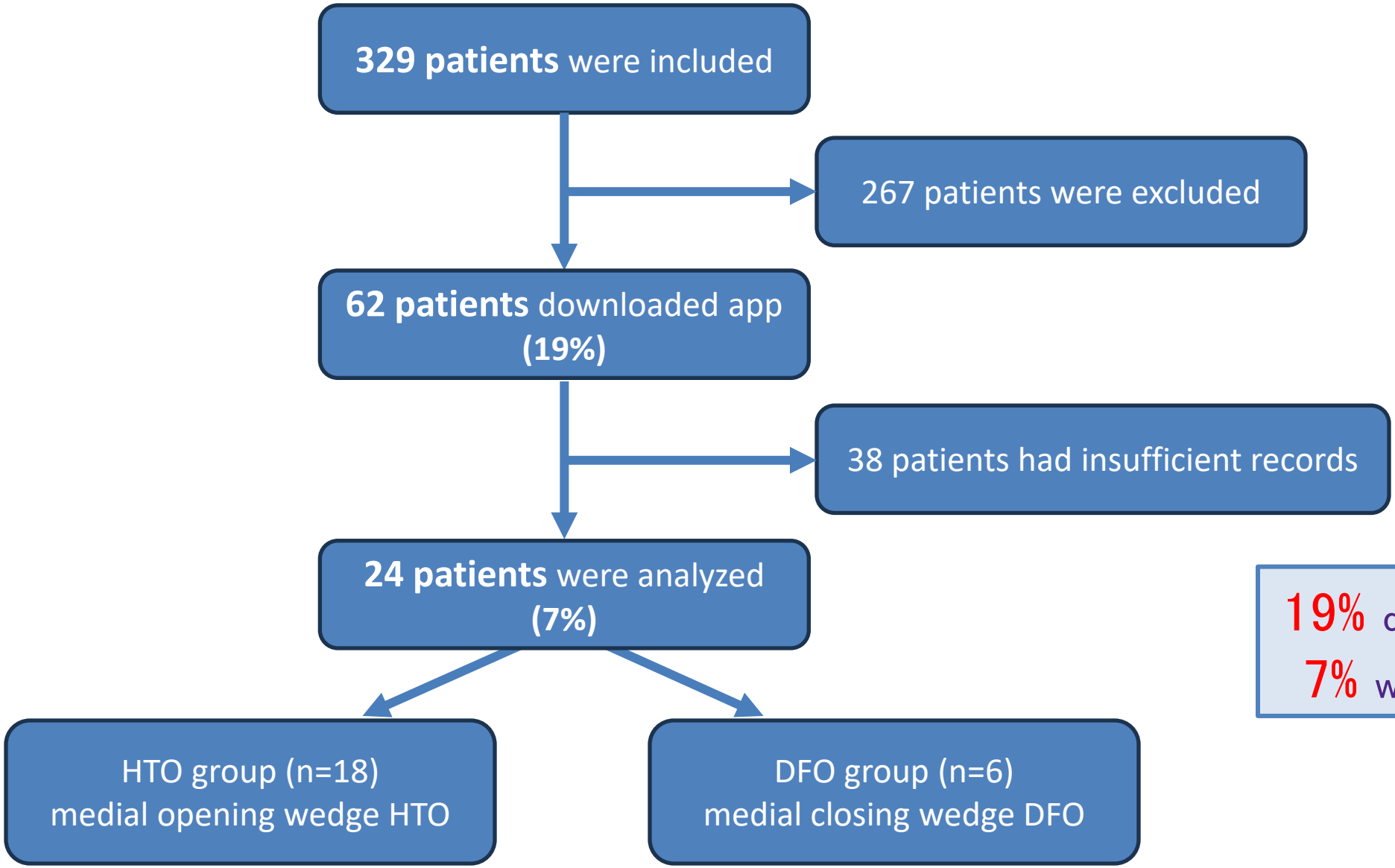


myrecovery app

Methods: statistical analyses

- **Recovery time:** mean days to regain pre-op step counts
- **Step count comparison:** repeated-measures ANOVA at **pre-op, 1M, 3M, 6M, and 12M**.
- **Correlation analysis:** linear regression between recovery time and step counts.

Result: patient inclusion and step count data availability



19% downloaded the app

7% with complete data

Result: patient demographics and clinical characteristics

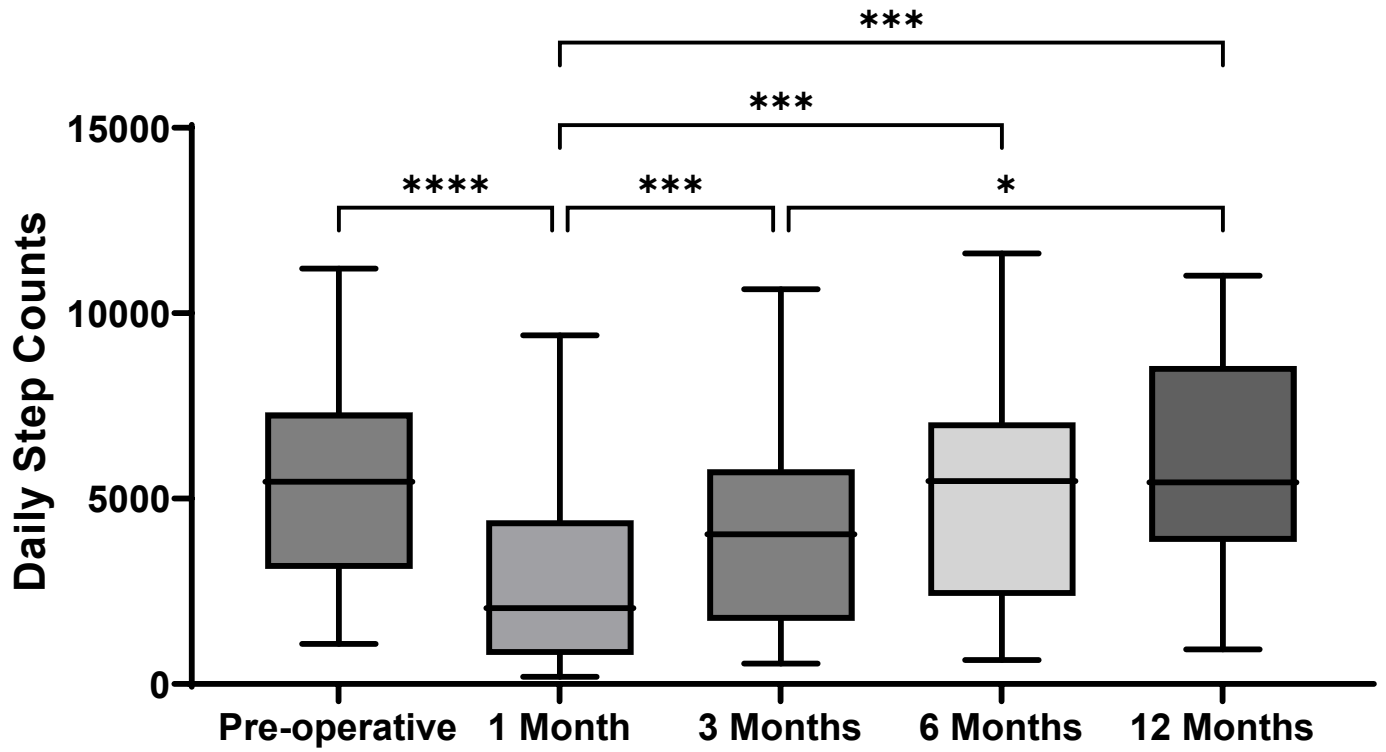
No. of knees	24
Sex (male/female)	13/11
Age (years)	46.2 ± 11.6
Height (m)	1.71 ± 0.09
Weight (kg)	90.3 ± 23.5
Body mass index (kg/m^2)	30.6 ± 5.9
Preoperative Kellgren-Lawrence grade (0/1/2/3/4)	0/0/17/6/1

Values are presented as number or mean ± standard deviation.

Result: daily step counts at each time period (all patients)

FOWLER KENNEDY stay active

All patients



Days to return to preoperative step counts

153 ± 112 days
(about 5 months)

Statistical significance is indicated as follows: *P < 0.05, ** P < 0.01, *** P < 0.001, **** P < 0.0001.

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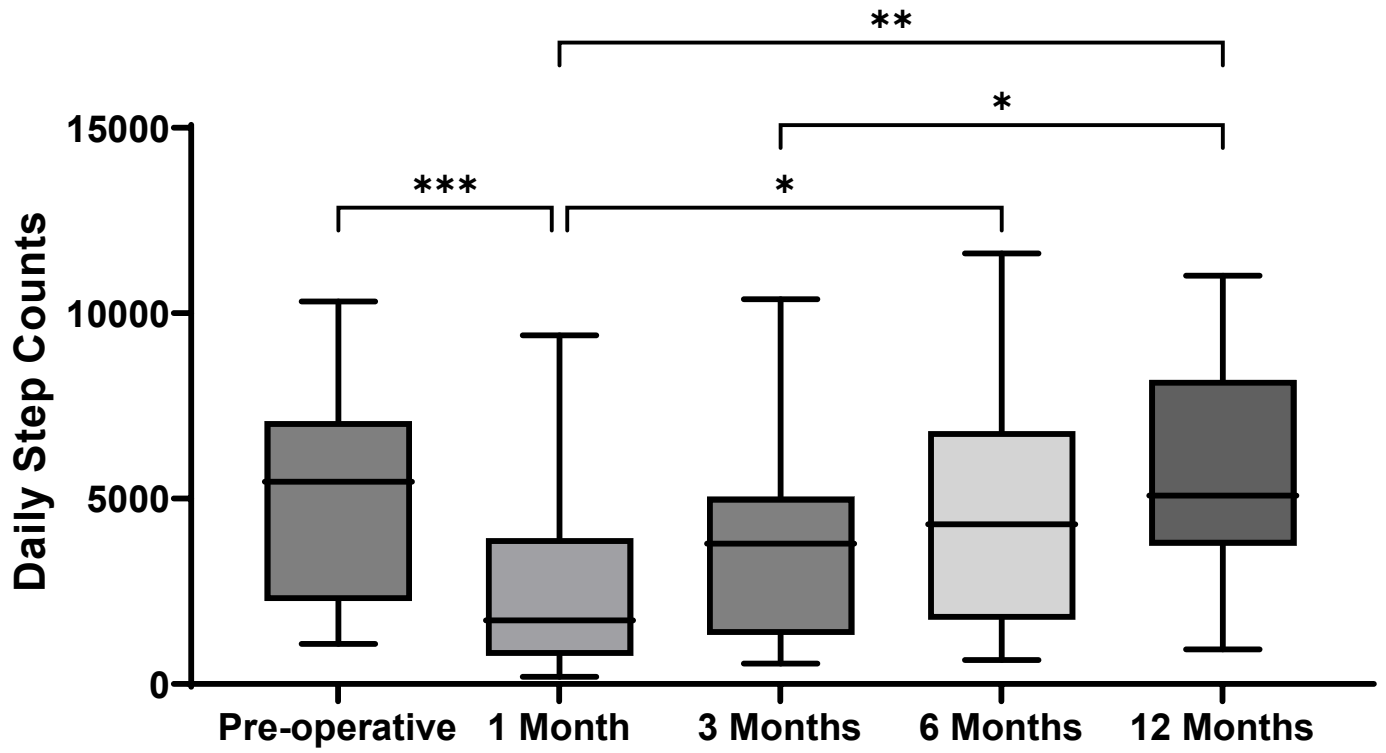
Result: daily step counts at each time period (HTO group)

HTO group



Days to return to preoperative step counts

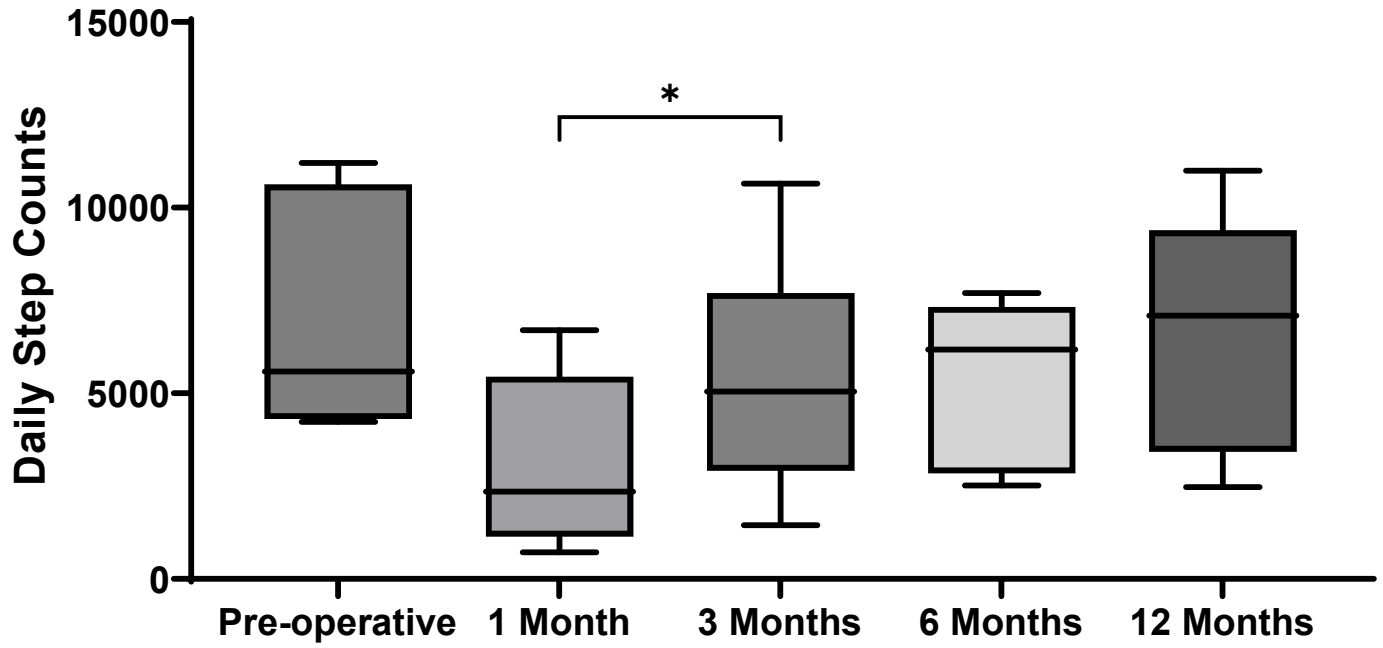
174 ± 121 days
(about 6 months)

Statistical significance is indicated as follows: *P < 0.05, ** P < 0.01, *** P < 0.001, **** P < 0.0001.

Result: daily step counts at each time period (DFO group)

FOWLER KENNEDY stay active

DFO group



Days to return to preoperative step counts

113 ± 77 days
(about 4 months)

Statistical significance is indicated as follows: *P < 0.05, ** P < 0.01, *** P < 0.001, **** P < 0.0001.

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Discussion: key findings and challenges

Recovery Time

Past study

- Most PROMs improve **within 6M** post-osteotomies (consistent with this study).

Nerhus TK et al. Bone Joint J 2017
Sischek EL et al. KSSTA 2014

This study

- Patients regained pre-op step counts in **5M** (HTO: **6M**, DFO: **4M**).
- Mobile app-based monitoring provides objective recovery insights.

Challenges in mobile app engagement

Past study

- Low engagement (**10～20%**)
- Accuracy depends on consistent sensor use (wearables/phones)
- Onboarding and patient education are key for better adoption

Rossi SMP et al. Healthcare (Basel) 2024
Szinay D et al. J Med Internet Res 2020

This study

- Low adoption: **19%** downloaded, **7%** had complete data
- This limits feasibility of recovery tracking.

Conclusion

- ✓ Patients took approximately **5 months** to return to their preoperative step counts after knee osteotomy
- ✓ **Low patient uptake** limits the feasibility of the app, despite its effectiveness in tracking recovery

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