Post-operative quality of life after dental implant placement: dynamic navigation surgery versus freehand technique

Sejkati L.[1], Gibello U.[1], Forno F.[1], Dalmasso L.[1], Costantino A.[1], Asero S.[1], Tedesco G.[1], Pera F.[1]

[1] C.I.R. Dental School, Department of Surgical Sciences, University of Turin, Torino, Italy

Aim

To compare post-operative recovery following implant placement performed using dynamic navigation surgery (DNS) and the conventional freehand technique (FH), focusing on pain perception, analgesic consumption, and patient-reported postoperative outcomes.

Materials and Methods

Fifty patients requiring single or double-unit implant-supported prosthetic rehabilitations were consecutively enrolled between June 2023 and May 2026 and equally allocated to two groups: dynamic navigation surgery (DNS, n = 25) and conventional freehand surgery (FH, n = 25).
All procedures were performed by the same experienced operator.
The following outcomes were assessed:

- **Post-operative pain**, measured using a visual analogue scale (VAS).
- **Analgesic consumption** during the postoperative period.
- **Patient-reported postoperative recovery**, evaluated through a dedicated questionnaire.
- **Perioperative emotional state.**

Pain and analgesic consumption were monitored longitudinally during the postoperative follow-up.



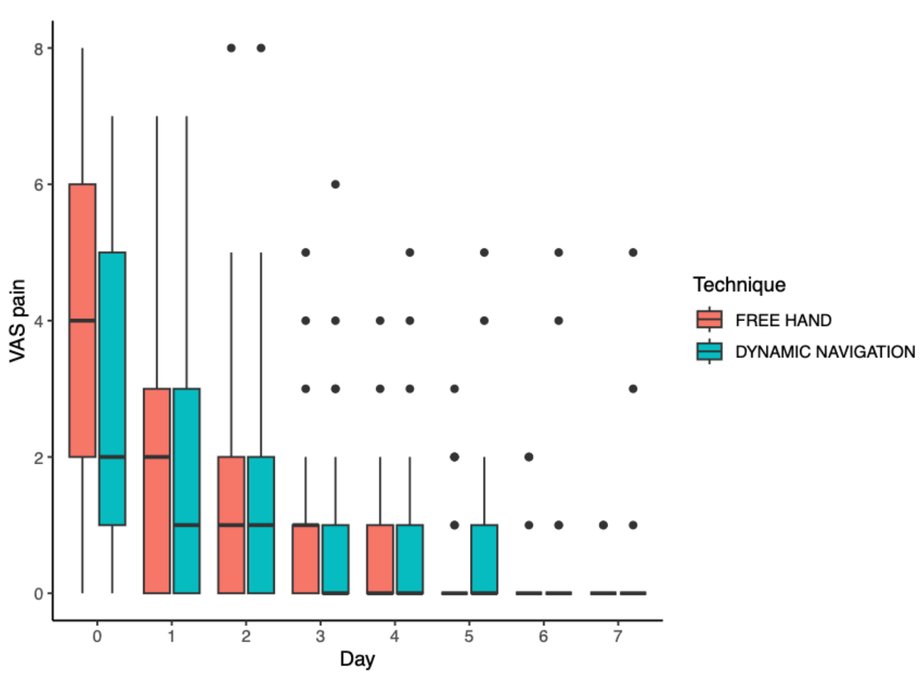
Implant surgery performed using dynamic navigation

Results

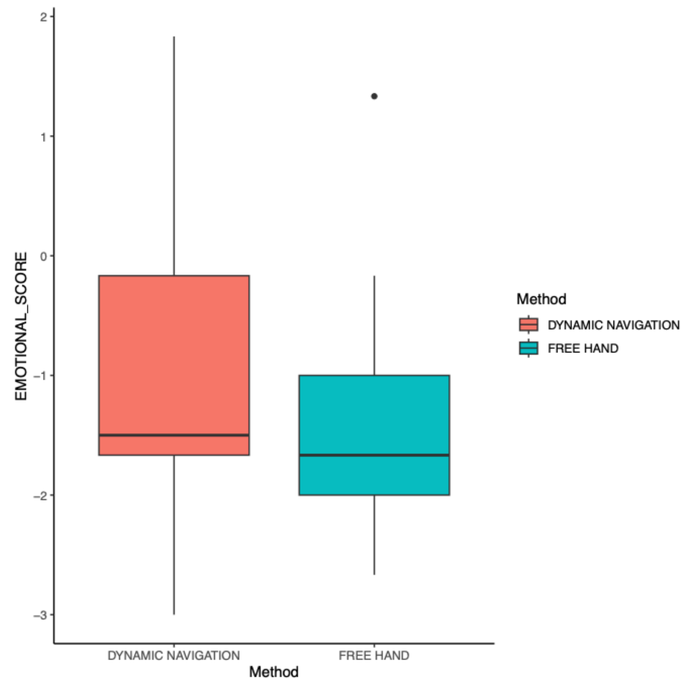
Postoperative pain significantly decreased over time in both groups (**p < 0.001**). However, no significant differences in pain intensity were observed between the two surgical techniques (**p > 0.05**).
Patients in the FH group reported significantly greater analgesic consumption on postoperative days 0, 1, and 2:

- **Day 0:** p = 0.0096
- **Day 1:** p = 0.0175
- **Day 2:** p = 0.0172

The longitudinal analysis confirmed significant effects of surgical technique, time, and their interaction on analgesic consumption.
No significant differences were observed between groups in terms of perioperative emotional state (**p = 0.37**) or patient-reported postoperative recovery (**p > 0.05**).



Comparison of post-operative pain course between the two groups



Emotional score

Conclusion

Within the limitations of this study, dynamic navigation surgery and the conventional freehand technique showed comparable postoperative pain intensity and patient-reported recovery.
However, dynamic navigation surgery was associated with lower analgesic consumption during the first 72 hours after implant placement.
Further studies with larger sample sizes are warranted to confirm these findings and investigate the potential clinical implications of dynamic navigation surgery for postoperative recovery.

- *Fortin T, Bosson JL, Isidori M, Blanchet E. Effect of flapless surgery on pain experienced in implant placement using an image-guided system. Int J Oral Maxillofac Implants. 2006;21(2):298-304.*
- *Kunavisarut C, Santivitoonvong A, Chaikantha S, Pornprasertsuk-Damrongsri S, Joda T. Patient-reported outcome measures comparing static computer-aided implant surgery and conventional implant surgery for single-tooth replacement: a randomized controlled trial. Clin Oral Implants Res. 2022;33(3):278-290.*
- *Pera F, Gibello U, Dalmasso L, Menini M, Pesce P, Molinero-Mourelle P, Roccuzzo A. Evaluation of dynamic computer-assisted implant placement accuracy by means of a novel digital method: a feasibility clinical study. J Dent. 2025;162:106021.*