ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Assessment Of Psychomotor Skill (Suturing Skill) In Interns And Freshly Joined Postgraduate Residents.

Ganesh S Chaudhari[1]*, Aditya Kondpalle[2], and Prashant Patil[3].

[1]Professor and Head, Department of General Surgery, GMC, MPGIMER, MUHS, Nashik, ACME Batch 2024, Maharashtra, India.
[2]Junior Resident, Department of General Surgery, GMC, MPGIMER, MUHS, Nashik, Maharashtra, India.
[3]Assistant Professor, Department of General Surgery, GMC, MPGIMER, MUHS, Nashik, Maharashtra, India.

ABSTRACT

Suturing is a fundamental skill for surgical trainees, yet many interns and freshly joined postgraduate residents demonstrate inadequate proficiency due to unstructured training. This study evaluated the efficacy of the Demonstration-Observation-Assistance-Performance (DOAP) method in improving suturing skills. To assess the effectiveness of the DOAP method in enhancing suturing technique, knot security, and wound approximation among interns and junior residents. This prospective observational study was conducted at Maharashtra Postgraduate Institute of Medical Education and Research, Nashik, from January 2024 to June 2024. A total of 15 participants were assessed using a 19-point checklist before and after undergoing training through the DOAP method. Statistical analysis was performed to determine the significance of improvements in suturing skills. Significant improvements were observed across all parameters. The median score for suturing technique increased from 12 (IQR = 5) to 17 (IQR = 1) ($p = 0.0007$). Knot security improved, with the median score decreasing from 2 (IQR = 3) to 1 (IQR = 1) ($p = 0.0014$). Wound approximation showed a median score increase from 4 (IQR = 2.5) to 5 (IQR = 2) ($p = 0.0021$). The DOAP method significantly enhances suturing skills in interns and junior residents, suggesting its integration into medical training programs.

Keywords: Suturing skills, DOAP method, psychomotor training.

https://doi.org/10.33887/rjpbcs/2024.15.6.27

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Suturing is a cornerstone of surgical practice, requiring precision, dexterity, and clinical judgment. [1]Despite its fundamental importance, many interns and newly joined postgraduate residents demonstrate inadequate proficiency in this critical psychomotor skill.[2,3] This gap, attributed to insufficient practical exposure and unstructured teaching during medical training, poses significant challenges in managing trauma and emergency cases. Consequently, it impacts patient outcomes, contributes to healthcare inefficiencies, and exacerbates incidents of patient dissatisfaction and violence against healthcare professionals.[4]

Interns and junior residents often enter clinical settings with limited hands-on experience, having prioritized theoretical knowledge and preparation for competitive exams over practical skills during their undergraduate education. Junior residents, who serve as immediate mentors, may themselves lack structured training, perpetuating the cycle of inadequate skill transfer. This highlights the urgent need for systematic, hands-on training approaches.[5]

The Demonstration-Observation-Assistance-Performance (DOAP) method offers a structured framework for teaching suturing skills, emphasizing step-by-step learning under supervision. By addressing individual deficiencies and standardizing training, this method has the potential to enhance proficiency and consistency in suturing techniques. This study evaluates the efficacy of the DOAP method in improving suturing skills among interns and junior residents, aiming to bridge the gap between theoretical knowledge and clinical competence.

MATERIALS AND METHODS

This prospective observational study was conducted at the Maharashtra Postgraduate Institute of Medical Education and Research, Nashik, over a six-month period from January 2024 to June 2024. The study aimed to evaluate the improvement in suturing skills among interns and freshly joined postgraduate residents using the Demonstration-Observation-Assistance-Performance (DOAP) method. A total of 15 participants, including interns and postgraduate residents, were enrolled in the study. Ethical approval was obtained, and informed consent was secured from all participants before the commencement of the training.

Participants were initially assessed for their baseline suturing skills. They performed basic suturing tasks on real patients using their pre-existing knowledge and skills. Their performance was evaluated using a standardized 19-point checklist, which encompassed key parameters such as technique, knot security, and wound approximation. This initial assessment served as a baseline to measure subsequent improvements following the intervention.

The intervention involved structured training using the DOAP method. Instructors demonstrated the correct suturing techniques, and participants observed these demonstrations closely. Under guided supervision, participants practiced the techniques, during which all doubts and questions were addressed. Finally, participants performed the suturing procedures independently on real patients, allowing them to apply the acquired skills in a practical setting.

Post-training, each participant was reassessed using the same 19-point checklist to evaluate improvements in their suturing skills. The data collected included scores for technique, knot security, and wound approximation before and after the training. Statistical analysis was performed to compare the pre- and post-training results. The significant improvements observed across all parameters highlighted the effectiveness of the DOAP method in enhancing the psychomotor skills of the participants.

OBSERVATIONS

Table 1: Before and after training study outcome.

Parameter	Before Training	After Training	P-Value	Significance
Suturing Technique	Median = 12 (IQR = 5)	Median = 17 (IQR = 1)	0.0007	Highly Significant
Loose Knots	Median = 2 (IQR = 3)	Median = 1 (IQR = 1)	0.0014	Significant
Wound Approximation	Median = 4 (IQR = 2.5)	Median = 5 (IQR = 2)	0.0021	Significant

This table succinctly captures the improvements in suturing skills, demonstrating statistically significant enhancements in all evaluated parameters following the training intervention.

DISCUSSION

Suturing is a critical skill for surgical trainees, yet it is often underdeveloped in freshly joined interns and postgraduate residents due to insufficient structured training during medical education. This study evaluated the efficacy of the Demonstration-Observation-Assistance-Performance (DOAP) method in improving suturing skills, focusing on three parameters: suturing technique, knot security, and wound approximation. The results demonstrate significant improvements across all parameters, highlighting the value of structured training in skill development.[6,7]

Key Findings

- Improvement in Suturing Technique

Before the training, the median score for suturing technique was 12, with an interquartile range (IQR) of 5, indicating moderate proficiency with considerable variability among participants. Post-training, the median score improved significantly to 17 (IQR = 1), and the variability in scores decreased markedly. The highly significant p-value of 0.0007 underscores the reliability of the improvement. These results suggest that the DOAP method effectively standardizes learning and enhances technical proficiency, reducing disparities in skill levels among trainees.

The marked improvement in suturing technique can be attributed to the step-by-step teaching approach of the DOAP method. Demonstrations by skilled instructors likely clarified technical nuances, while the supervised practice allowed participants to refine their techniques in real-time. This approach aligns with findings by Gaarder et al., who emphasized the importance of structured teaching in clinical skill development. By providing a consistent framework, the DOAP method ensures that all participants achieve a baseline level of competency.[8]

- Reduction in Loose Knots

Knot security is a vital component of suturing, as loose knots can compromise wound healing and increase the risk of infection. Before training, the median score for loose knots was 2 (IQR = 3), reflecting frequent errors and variability among participants. After the training, this score decreased significantly to 1 (IQR = 1), with a p-value of 0.0014, indicating a statistically significant reduction in loose knots.

The reduction in loose knots highlights the effectiveness of the DOAP method in emphasizing proper knot-tying techniques. Participants were taught to grasp the needle correctly, maintain tension, and secure the knots appropriately, reducing the likelihood of errors. The hands-on practice and feedback provided during the training likely contributed to these improvements. These findings align with those of Madavan et al., who demonstrated that practical, supervised training significantly enhances procedural skills, including knot security.[9]

- Enhanced Wound Approximation

Wound approximation is a critical indicator of a trainee's ability to align wound edges properly for optimal healing. Before the training, participants scored a median of 4 (IQR = 2.5) for wound approximation, indicating moderate proficiency with some variability. Post-training, the median score improved to 5 (IQR = 2), with a p-value of 0.0021, confirming a statistically significant improvement.

Although the improvement in wound approximation was less dramatic than in the other parameters, it remains clinically significant. Proper alignment of wound edges is a nuanced skill that requires a combination of technical precision and judgment. The stepwise training in the DOAP method likely enhanced participants' ability to judge the appropriate distance between

sutures and the tension required for optimal edge alignment. The observed improvement indicates that even subtle aspects of suturing can be effectively taught with structured interventions.[10]

The results of this study are consistent with existing literature emphasizing the need for structured training in clinical skills. Gaarder et al. highlighted that unstructured teaching methods during internship result in variable skill levels among trainees. This study corroborates their findings, demonstrating that baseline proficiency in suturing skills is often inadequate and inconsistent. The DOAP method addresses these gaps by providing a standardized framework for skill acquisition.

The findings of this study have significant implications for medical training programs. The observed improvements in suturing technique, knot security, and wound approximation highlight the potential of structured, hands-on training methods like DOAP in addressing skill gaps among trainees. By incorporating such methods into the curriculum, medical institutions can ensure that interns and junior residents are better prepared to handle clinical responsibilities.

Furthermore, the reduction in variability among participants post-training underscores the value of standardized teaching methods in achieving uniform competency levels. This is particularly important in high-stakes environments, where inconsistent performance can compromise patient safety.

CONCLUSION

This study demonstrates that the DOAP method is a highly effective approach for teaching suturing skills to interns and junior residents. The significant improvements in suturing technique, knot security, and wound approximation highlight the method's potential to enhance psychomotor skills, ensuring better clinical preparedness among trainees. By integrating structured training programs like DOAP into medical curricula, institutions can bridge the gap between theoretical knowledge and practical competence, ultimately improving patient care and reducing medico-legal risks.

Future research should focus on expanding the scope and scale of this intervention, exploring its applicability to other clinical skills, and identifying strategies to optimize its implementation in diverse healthcare settings.

Recommendations

- Incorporate DOAP-based training programs into the medical curriculum for interns and junior residents.
- Establish dedicated skill labs to facilitate hands-on practice under supervision.
- Regularly evaluate procedural skills using standardized checklists to identify areas for improvement.

REFERENCES

[1] Gaarder K, Eide NA. Clinical skills among interns. Tidsskr Nor Laegeforen 2000; 120(13):1512-7.
[2] Madavan KT. DOAP versus video-assisted learning in training ACLS among medical interns. J Educ Health Promot 2022;11(1):412.
[3] Attitude, Ethics, and Communication (AETCOM) Competencies for IMG. 2018.
[4] Cope DH, Fenton-Lee D. Assessment of laparoscopic psychomotor skills in interns using the MIST Virtual Reality Simulator: a prerequisite for those considering surgical training? ANZ J Surg 2008 ;78(4):291-6.
[5] Emmanuel T, Nicolaides M, Theodoulou I, Yoong W, Lymperopoulos N, Sideris M. Suturing Skills for Medical Students: A Systematic Review. In Vivo 2021;35(1):1-12.
[6] Chipman JG, Acton RD, Schmitz CC. Developing surgical skills curricula: Lessons learned from needs assessment to program evaluation. J Surg Educ 2009;66(3):133–139.
[7] General Medical Council Outcomes for graduates. GMC publications. 2018. Available at: https://www.gmc-uk.org/-/media/documents/dc11326-outcomes-for-graduates-2018_pdf-75040796.pdf.

[8] Taylor I, Reed MF, Kingsnorth AN, Carlson GL, Leaper DJ. Surgery in the undergraduate curriculum report by the education and professional development committee of sars. Bull Roy Coll Surg Engl 2005;87(4):138–139.
[9] Davis CR, Toll EC, Bates AS, Cole MD, Smith FCT. Surgical and procedural skills training at medical school – a national review. Intl J Surgery 2014;12(8):877–882.
[10] Tallentire VR, Smith SE, Wylde K, Cameron HS. Are medical graduates ready to face the challenges of foundation training. Postgrad Med J 2011;87(1031):590–595.