

# Enhancing Surgical Training Through Coaching: A Systematic Review of Self-Determination Theory in Surgical Education

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**Introduction.** Surgical coaching is an emerging teaching method that promotes professional development. However, few interventions are grounded in educational theory. This systematic review evaluated how surgical coaching aligns with Self-Determination Theory (SDT), a framework emphasizing autonomy, competence, and relatedness, and whether SDT alignment is associated with improved educational outcomes.

**Methods.** A systematic review was conducted in November 2024 across multiple databases using PRISMA guidelines. Eligible studies evaluated surgical coaching interventions in the U.S. or Canada, included residents or attendings, and reported educational outcomes. Study quality, educational impact, and SDT alignment were assessed using the MERSQI, Kirkpatrick's framework, and Gillison et al.'s coding framework, respectively.

**Results.** Fifteen studies met inclusion criteria. Coaching models included faculty-led (n = 10), peer-led (n = 6), and hybrid (n = 1) formats. SDT strategies were coded 87 times: competence-supportive strategies were most common (n = 43), followed by autonomy (n = 31) and relatedness (n = 13). Interventions using video review or validated skill assessments (e.g., OSATS, GOALS) had significantly higher MERSQI scores (p < 0.05). Six randomized controlled trials demonstrated improved technical performance. Peer-led and hybrid models showed greater SDT alignment.

**Conclusions.** SDT-aligned coaching programs, particularly those using structured curricula, validated tools, and milestone-based feedback, may enhance surgical education by fostering motivation and skill development. Peer-led and video-based models showed promise for supporting autonomy and relatedness. SDT may serve not only as a theoretical foundation, but as a practical framework to improve coaching design, reinforce psychological safety, and promote individualized, competency-based growth.